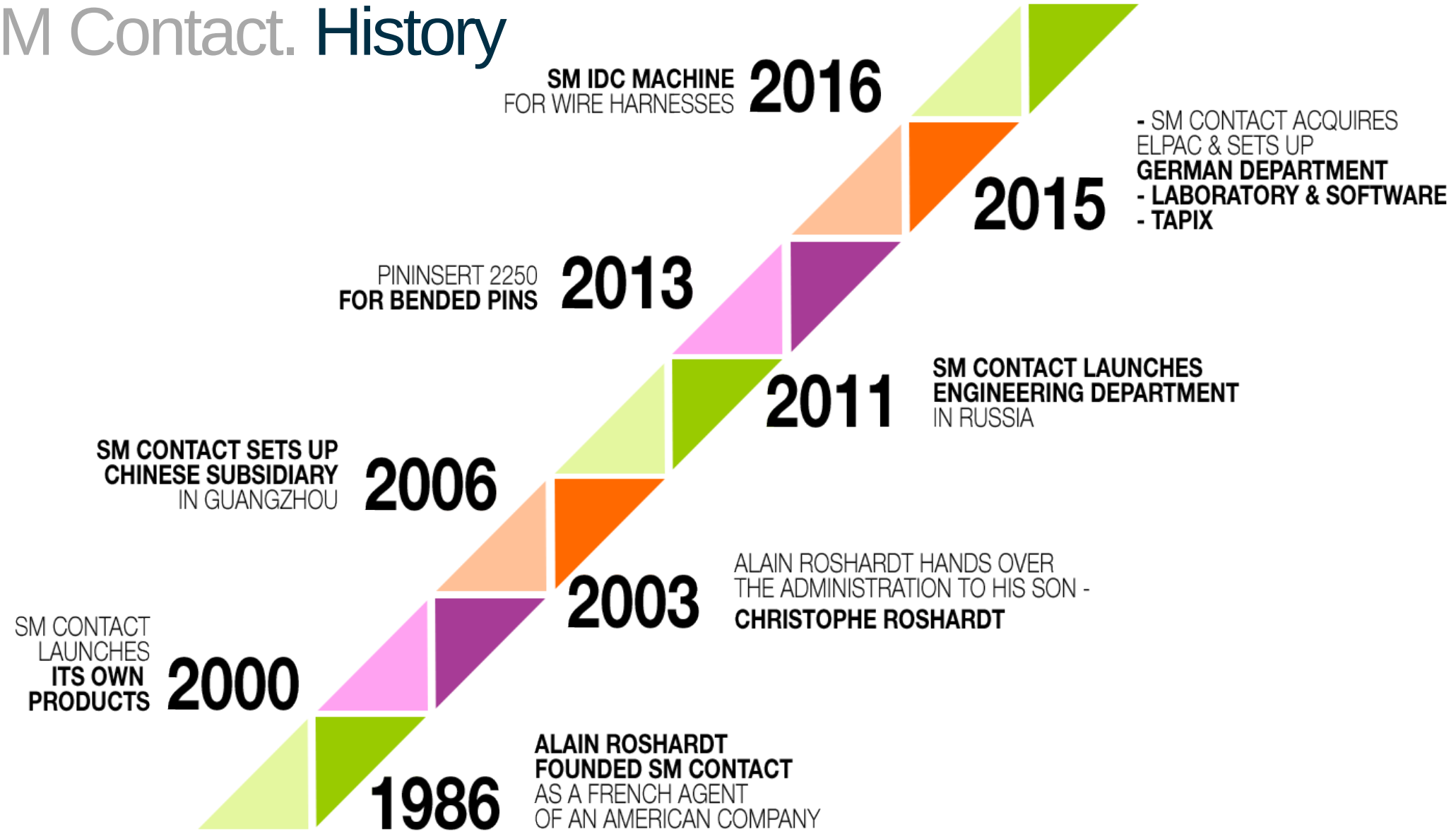
SM contact CORPORATION

SPLICE ◦ NANOSPLICE
PINS ◦ PRESSFIT TECHNOLOGY

SM Contact. History

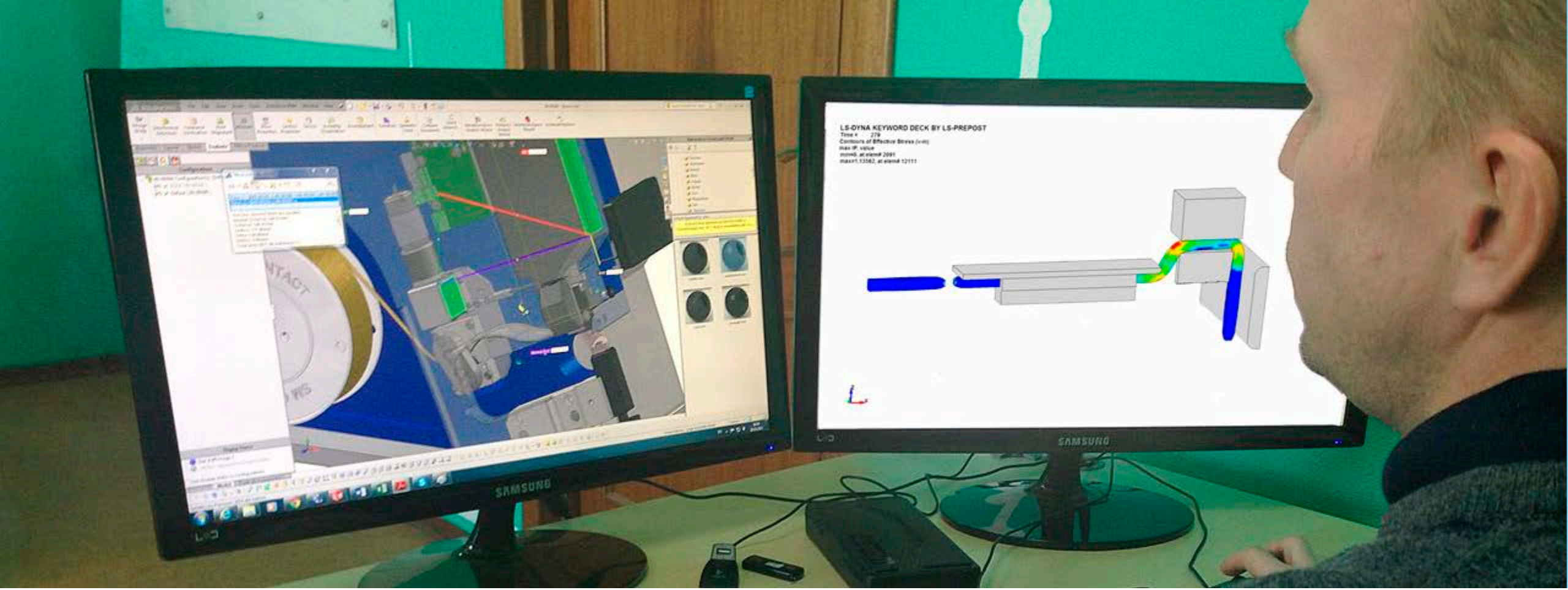


SALES DEPARTMENT

France, China, Russia,
Germany & Spain

PRODUCTION & ASSEMBLY DEPARTMENT

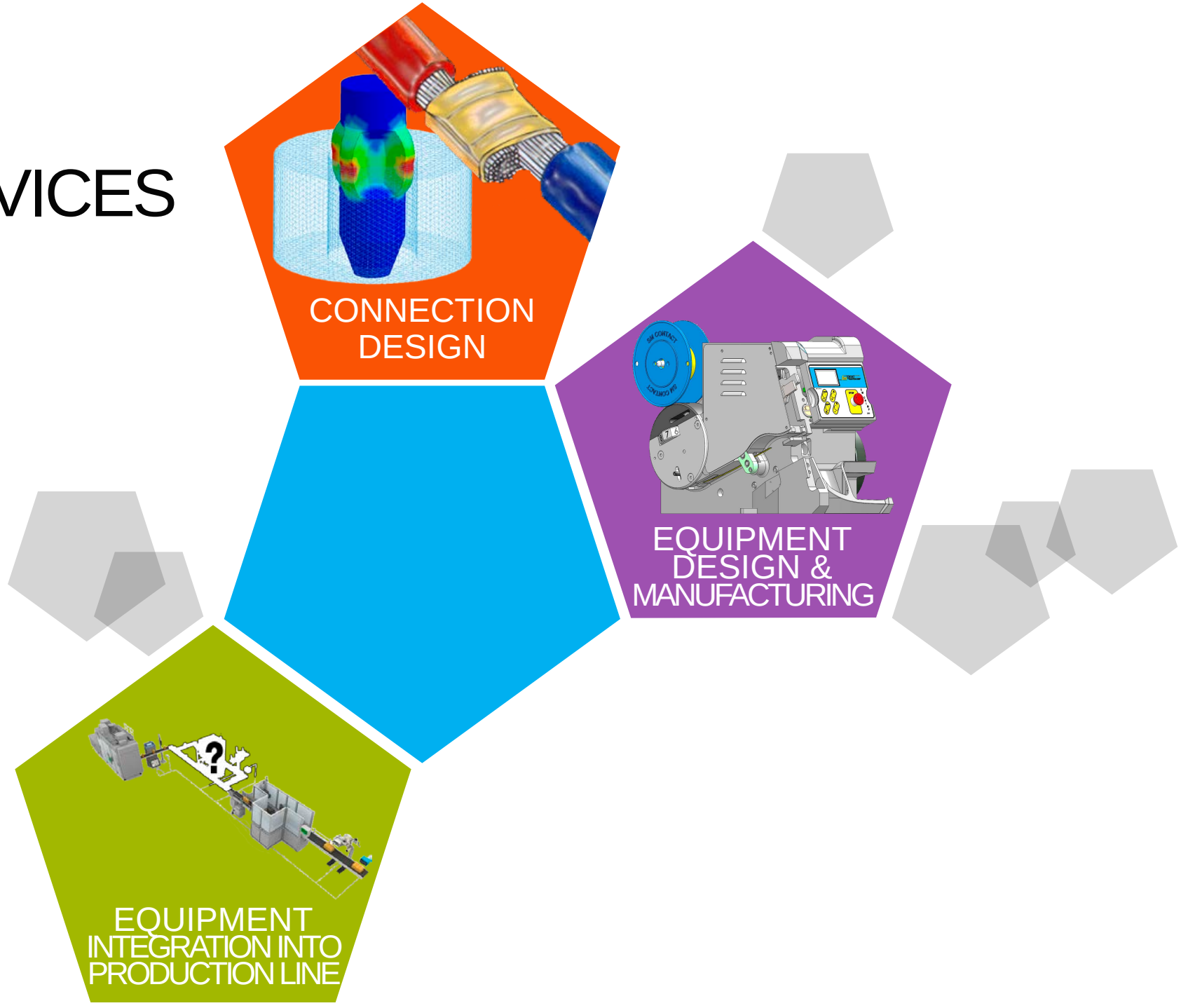
France, China, Russia, Germany & Spain

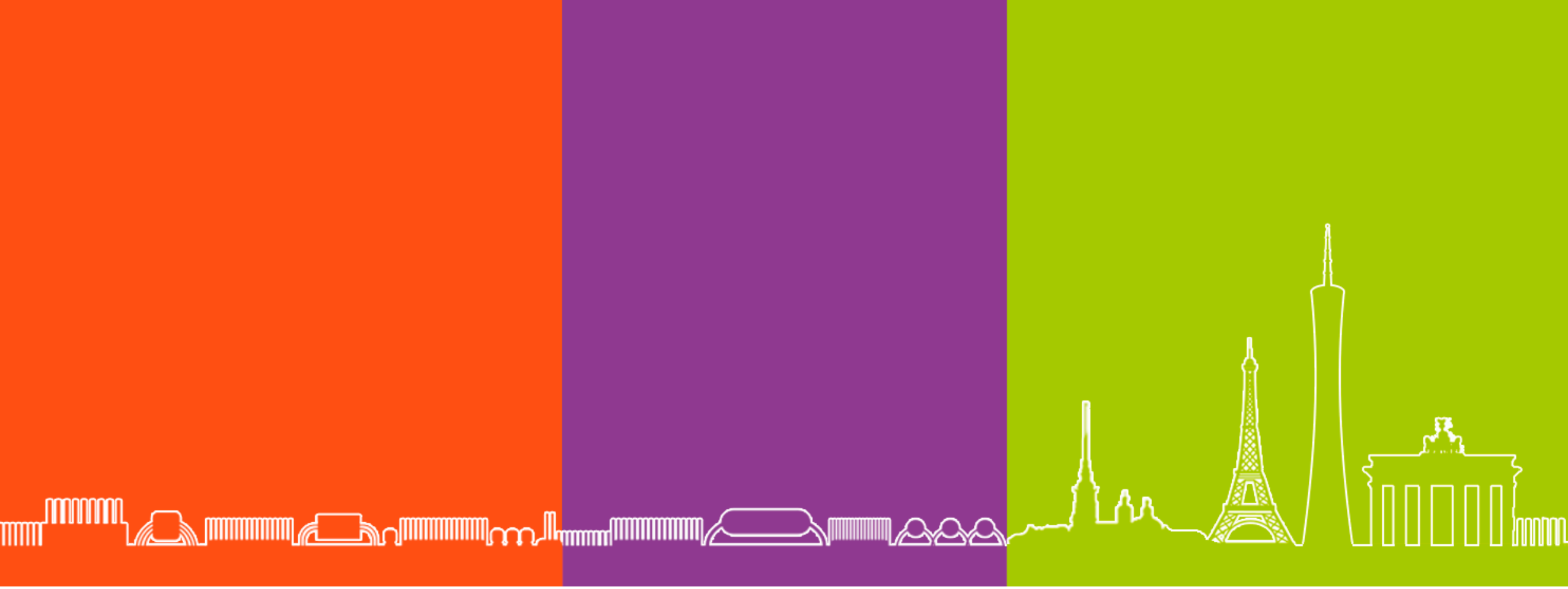


ENGINEERING DEPARTMENT

Russia

OUR SERVICES



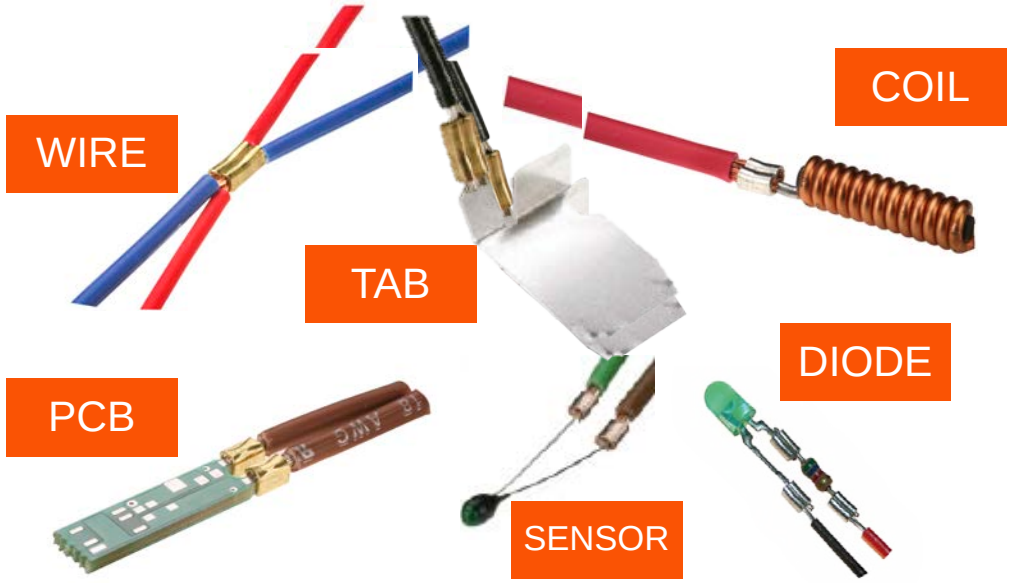


SPLICE CONNECTIONS

WHAT IS SPLICE CONNECTION?

Splice

Connection between two or more components of any type.



Crimp

Connection between wire and terminal ONLY.

WHAT IS SPLICE CONNECTION?

COMPONENTS

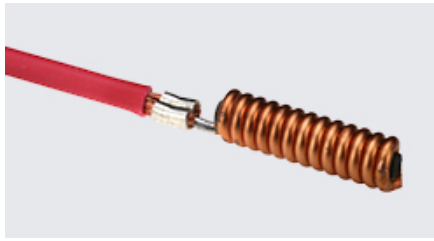
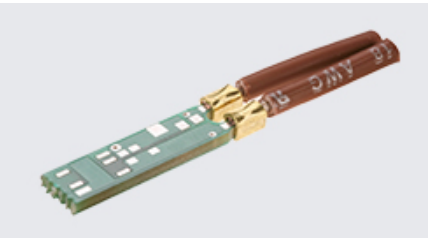
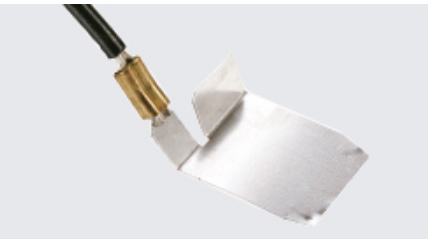
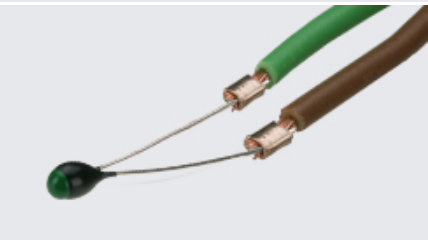
- WIRE
- PCB
- COIL
- PLASTIC CONNECTOR
- SENSOR
- DIODE
- RESISTOR
- CAPACITOR
- ETC.

MATERIALS

- BRASS
- TINNED BRASS
- COPPER NICKEL
- BRONZE
- STAINLESS STEEL
- ETC.

APPLICATIONS

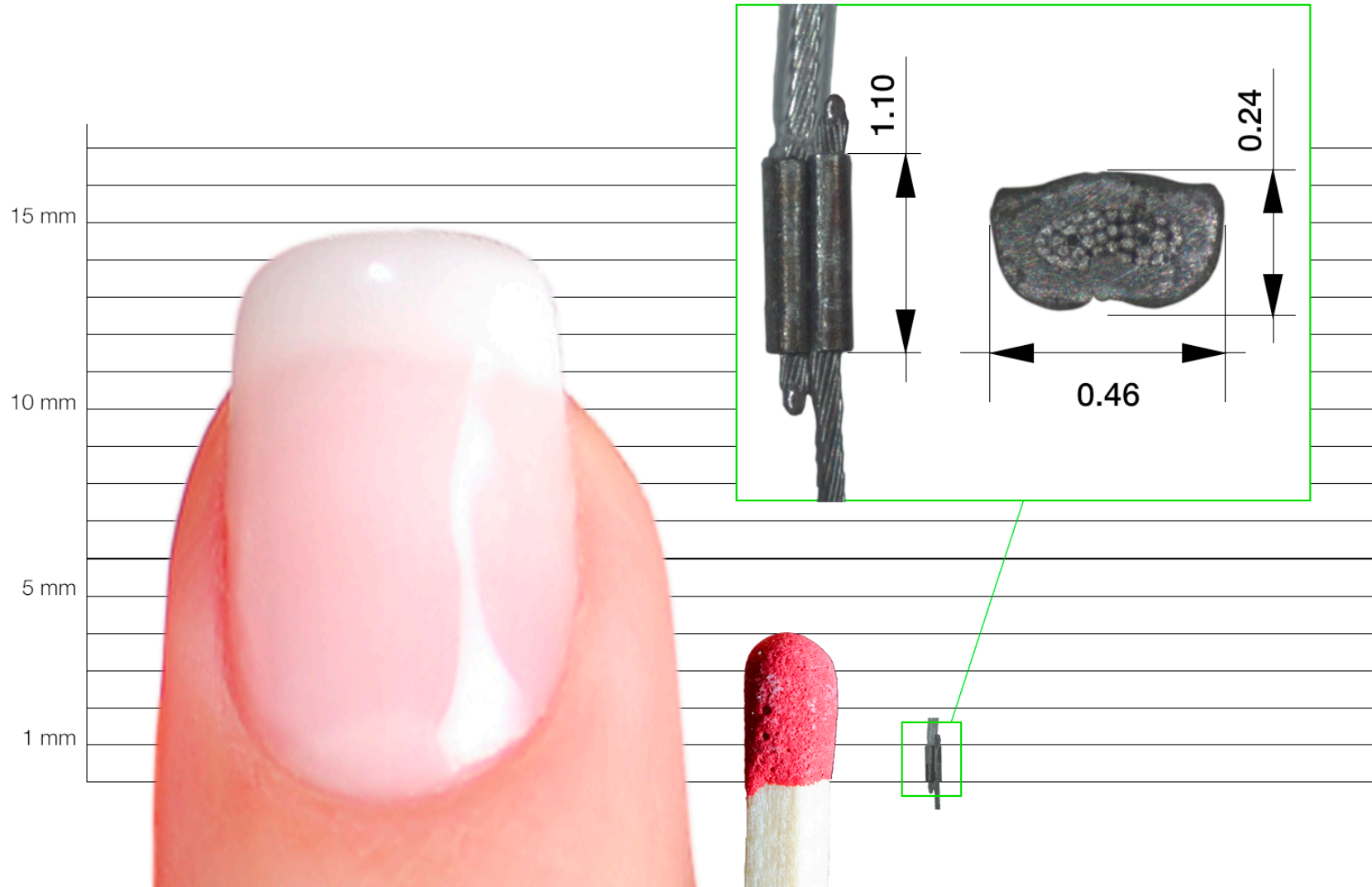
- AUTOMOTIVE
- MEDICAL INDUSTRY
- MASS MARKET
- RAILWAY
- CONSTRUCTION
- HOUSEHOLD APPLIANCES
- ALTERNATIVE ENERGY
- ETC.

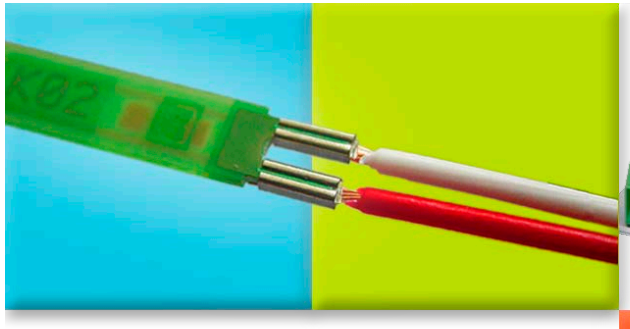

DEVELOPMENT EXAMPLE ◦ NANOSPLICE

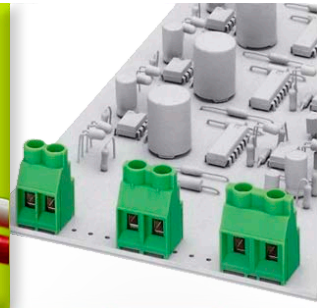
ENTER THE WORLD OF INVISIBLE

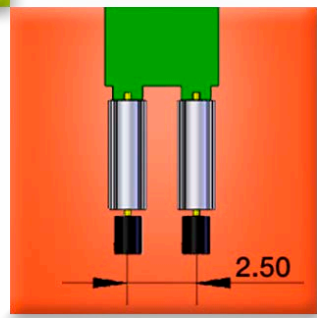
CONNECT WITH NANOSPLICE



SPLICE CONNECTIONS. ADVANTAGES



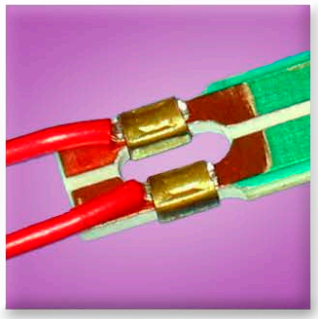


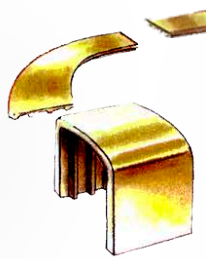


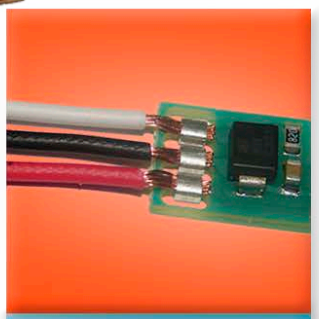
1 Space saving

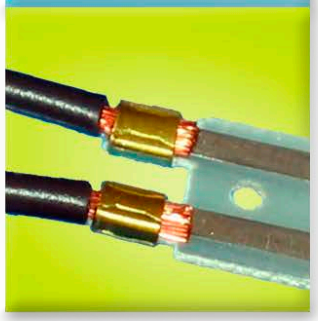
Standard connectors are unacceptable as concerns to saving space.

Splice allows to make flat connection with minimum dimensions – ideal for sensors, bulbs, heating elements, etc.









2 Universal

It is possible to perform various connections using the same splice band and varying tooling.

The tool cassette can be prepared to cover a wide range of cross-sections, e.g. 0.5-1.5 mm2.

SPLICE CONNECTIONS. ADVANTAGES

3 Quality control

- Splice connection professional qualification;
- In-line quality control: Crimp Force Monitor, components position and color camera control, Poka Yoke;
- Laboratory equipment: EPT 1000, SK 4000 & SK 6000.

4 Easy to go

Thanks to automation it’s possible to make up to 1000 splices per hour without any experience in splicing.

5 No soldering

Crimp connection doesn’t involve heating and thus is more resistant to bending and vibrations.

6 Cost-efficient

Spare parts replacement each 300 000 – 3 000 000 assemblies depending on spares type

SPLICE CONNECTIONS VS. TERMINALS

SM Contact splice crimping	Standard Terminals (KOSTAL®, SUMITOMO®)
1 Customized connections defined by engineering office	1 Standard terminals from catalogue. For specific design – tooling manufacturing is required.
2 Up to 20% cheaper	2 High price
3 Easy tooling accessibility for manual and automatic processing	3 Difficult tooling accessibility for manual and automatic processing

SPLICE CONNECTIONS VS. WELDING

SM Contact splice crimping

1. Process expenses
   - a Equipment: standard or automatic
   - b Spare parts: tooling
   - c Splice band material
   - d No special qualification for operation
2. Stable production parameters
   - a Mechanical system
   - b Combined with Crimp Force Monitoring
   - c FPC (Full Process Control): possible analyze after production

Welding (laser, spot)

1. Process expenses
   - a Equipment
   - b Spare parts: electrodes
   - c Gas
   - d Qualified employees
2. High production parameters survey required
   - a Temperature
   - b Intensity and timing
   - c Pressure
   - d No possible analyze after production

SPLICE CONNECTIONS VS. WELDING

SM Contact splice crimping

3 Contact quality and flexibility

- a Good and repeated contact resistance
- b Good behavior under vibrations
- c Components mechanical properties respect
- d Components material and surface treatment can be different
- e Components dimensions can be different

4 Environment and accessibility

- a Mechanical process
- b Energy consumption: 400W (only while crimping)

Welding (laser, spot)

3 Contact quality and flexibility

- a Potential damages in case of vibrations
- b Burning risks
- c Components mechanical properties modification
- d Components material and surface treatment to be identical
- e Components dimensions to be similar

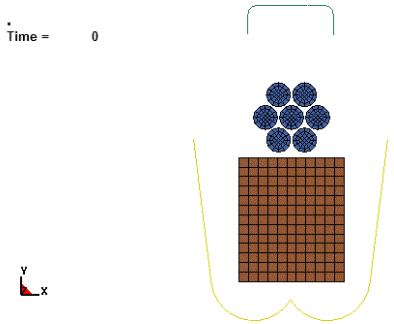
4 Environment and accessibility

- a Chemical process: generates smoke
- b Energy consuming

SPLICE CONNECTIONS.
ENGINEERING EXPERTISE

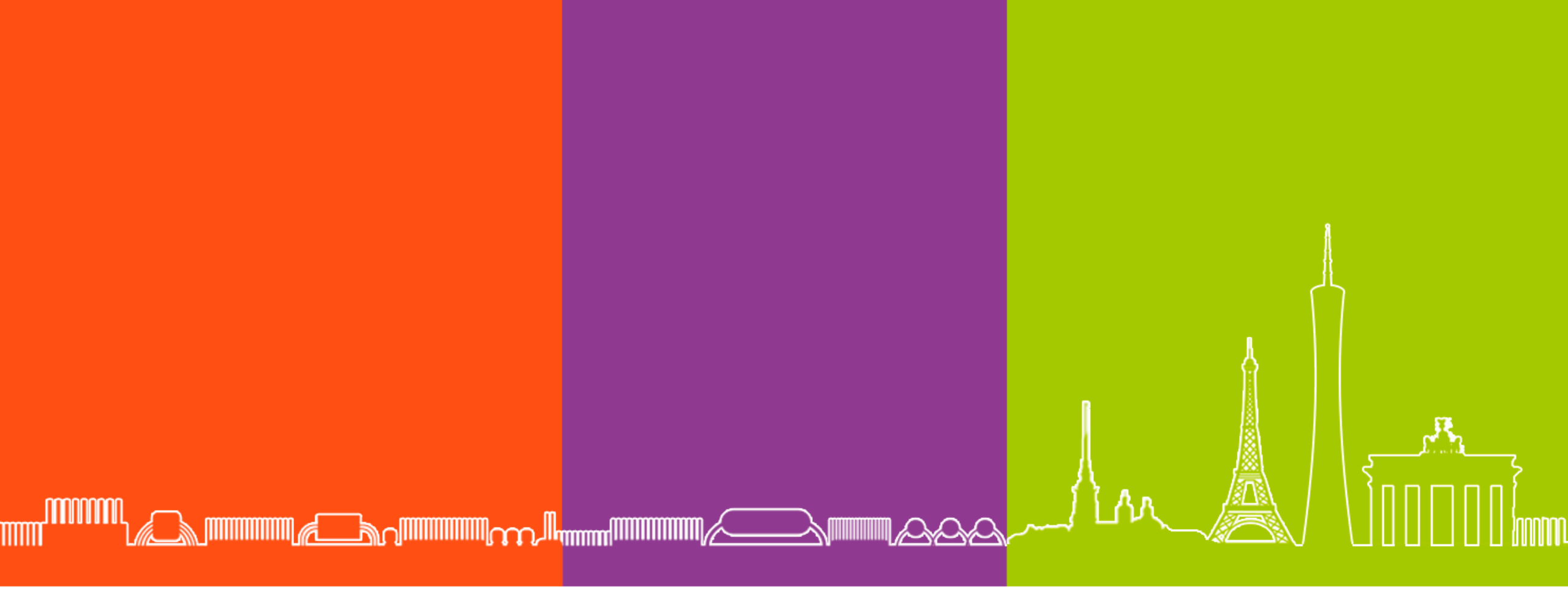
1 Customer components

2 Simulation process

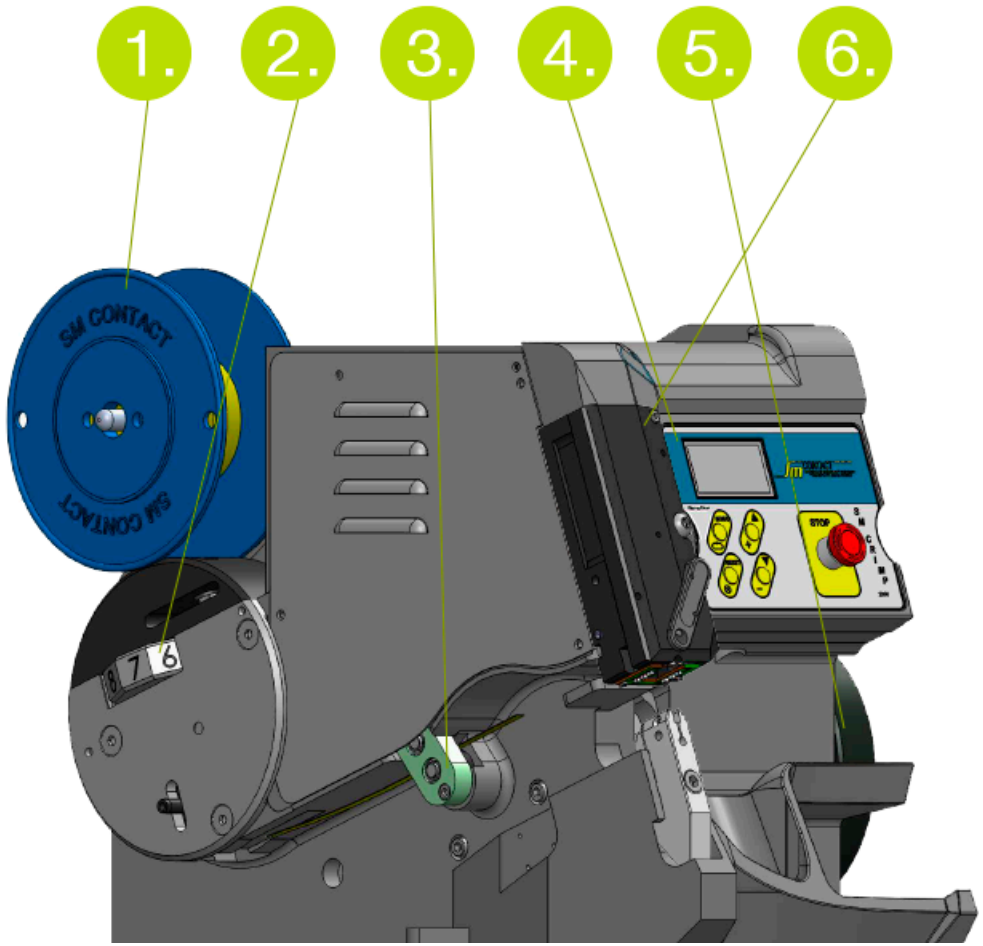


3 Validation process

4 Crimped assembly



SPLICE EQUIPMENT



STANDARD TOOLING

1. SPLICE BAND UNREELER
2. CRIMP HEIGHT ADJUSTMENT
3. BAND FEEDING SYSTEM
4. CONTROL PANEL
5. WHEEL FOR MANUAL CYCLE

6. CRIMPING TOOL:

Quick-change tooling cassette can be changed within 1 minute

Clincher with a pre-defined position doesn't require hight adjustment

Finger guard lighting cap guarantees easy & safe operation

Splice length control sensor

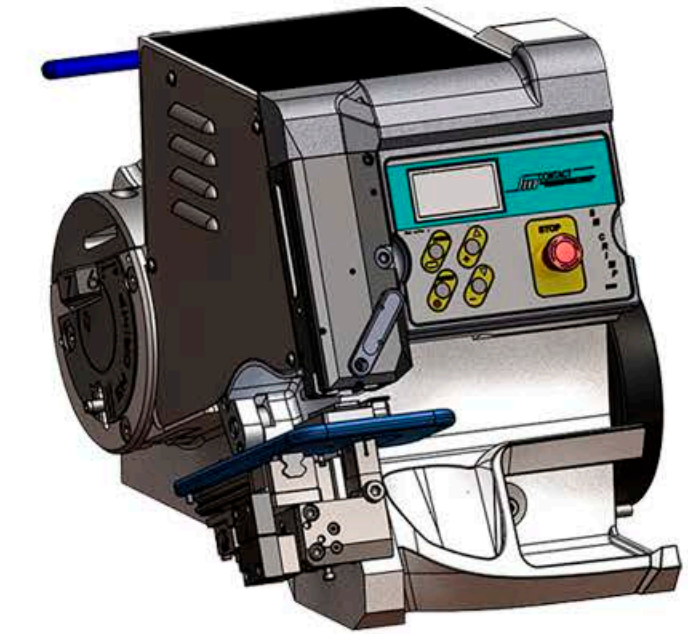
OPTIONS

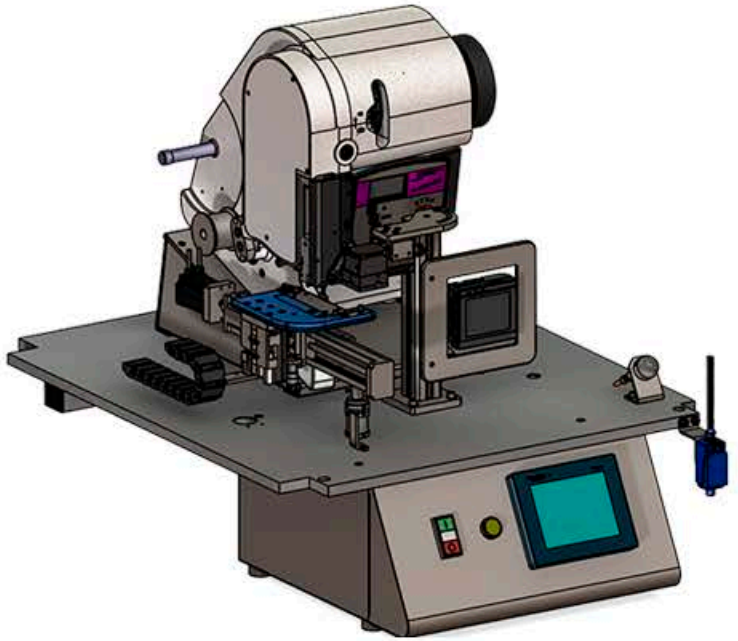
Crimp Force Control monitor STARLITE

Component position video verification

SM CRIMP 2000 | STANDARD

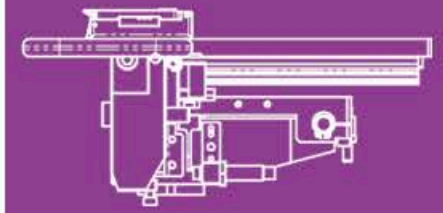
1. SM CRIMP 2000 W/ MANUAL FIXTURE





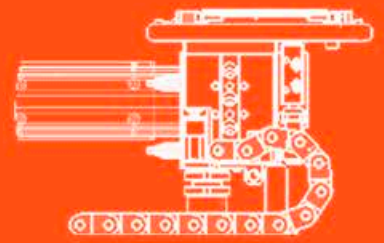
2. SM CRIMP 2000 W/ AUTOMATIC FIXTURE

MANUAL FIXTURE



- Allows accurate positioning of the components
- Fine adjustment of the heigh position of components
- Prevents double crimps in the same position
- Improves quality

AUTOMATIC FIXTURE



- Allows preparing jigs to preload the components while the machine is in process
- Controlled by servo motor for accurate positioning
- Guarantees fast operating

SM CRIMP 2000 | ADVANCED

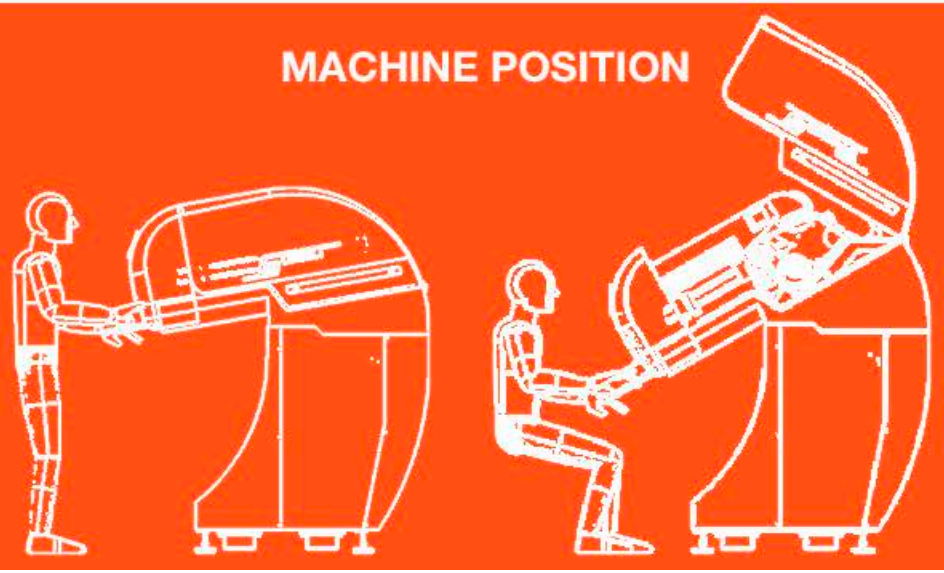
UNITS

- Fixture
- Transfer
- Crimp Force monitor
- Camera control & screen

OPTIONS

- Stripping unit
- Poka Yoke

MACHINE POSITION



TURN KEY SOLUTION

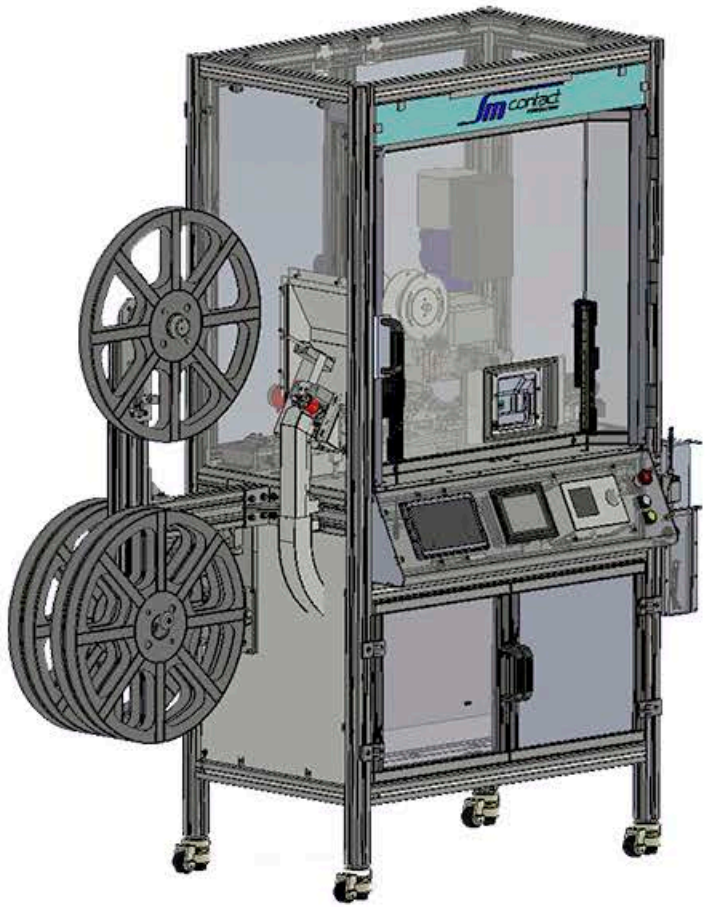
STRIPPING + CRIMPING

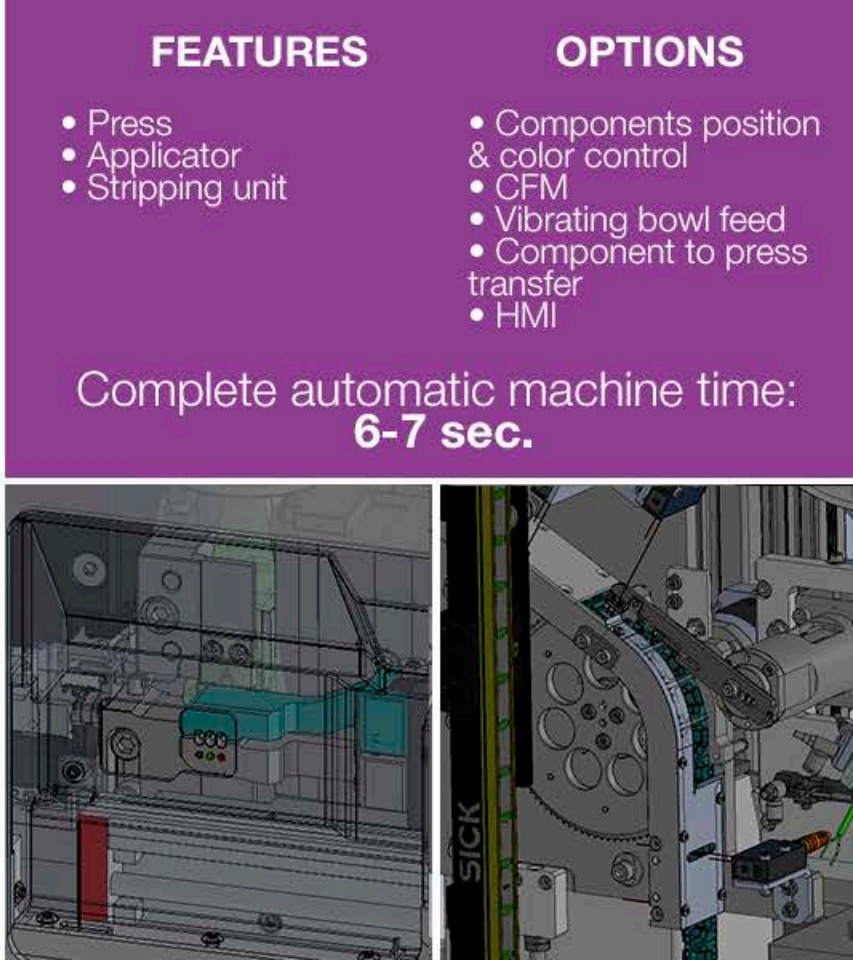
- Solid cast machine frame
- Tooling cassette
- Motorized feeding system
- 100% process control

HIGHLY PRECISE POSITIONING

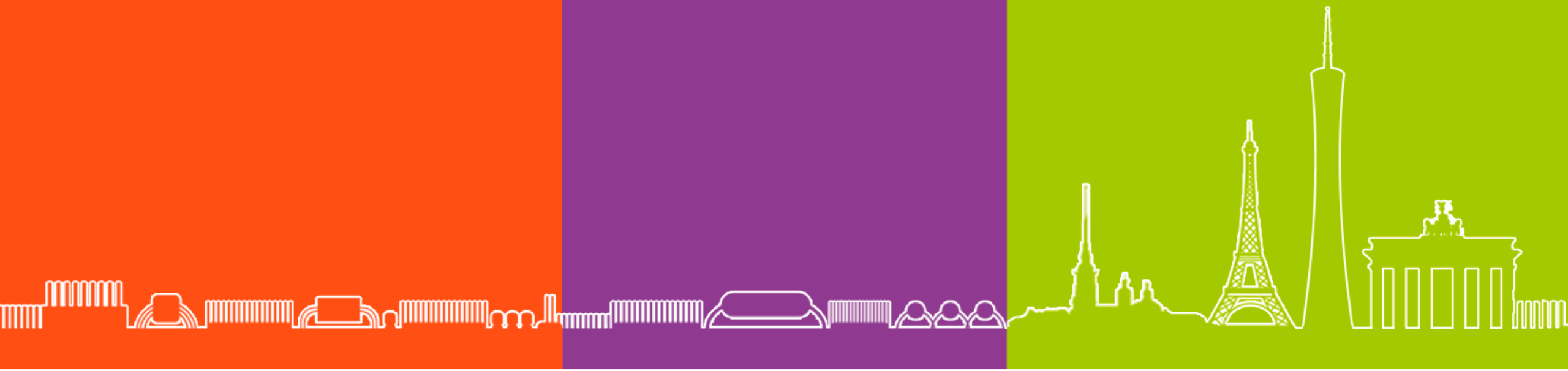
BEFORE PROCESSING CONNECTION SCS MAKES REFERENCES TO THE COMPONENTS

SPLICE CRIMPING STATION (SCS)

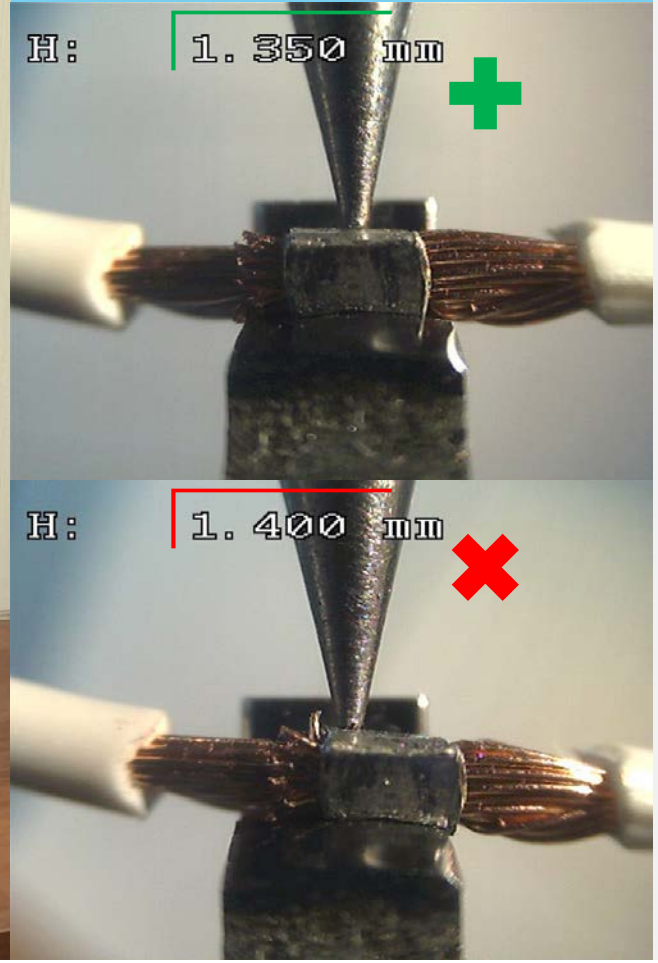




HIGH-SPEED SPLICE CRIMPING STATION (HSCS)



SPLICE QUALITY CONTROL



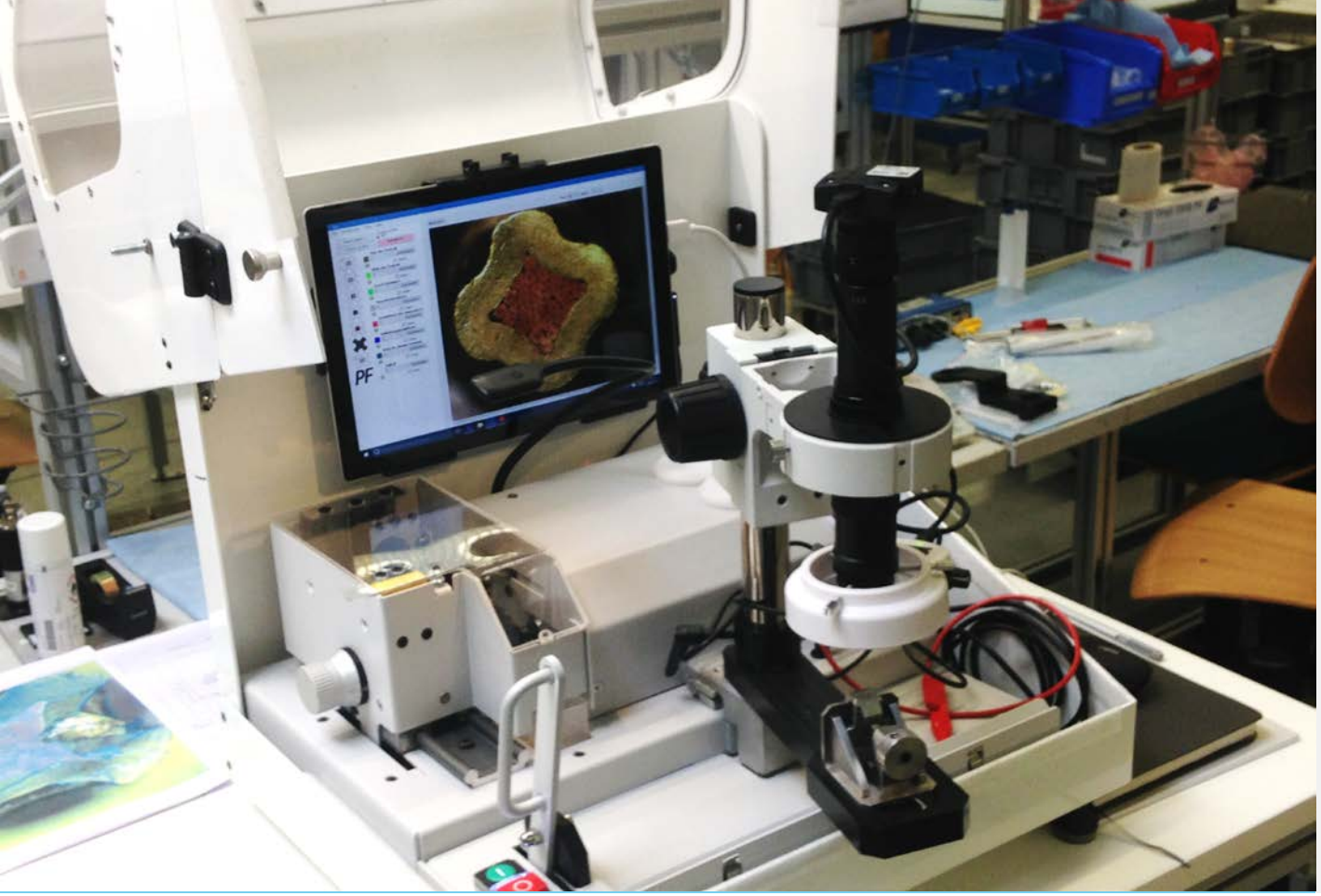
- Holder shape adapted to the crimp - reliable positioning
- Camera & monitor positioning control
- Height digital dial indicator
- Results wifi transfer to VISO software
- VISO software for CPK calculations
- SD-card

SPLICE QUALITY CONTROL

CRIMP HEIGHT MEASUREMENT TOOL

- Fast interface change between clamp and terminal selector
- Up to 1000 Newtons
- Selector for different size of terminal
- Touchscreen graphic interface
- Results wifi transfer to VISO software
- VISO software for CPK calculations
- SD-card

SPLICE QUALITY CONTROL | EPT 1000



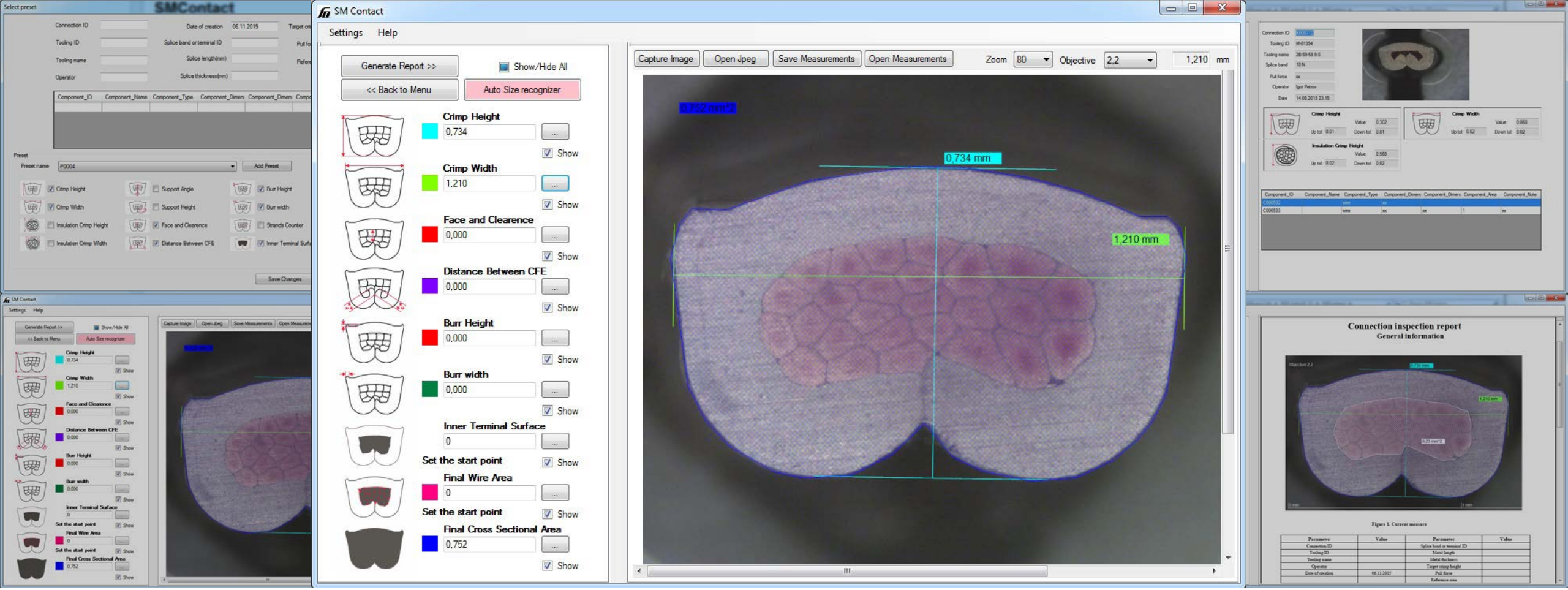
- All in one, cutting, polishing, etching, microscope (computer and monitor in table version).
- Easy transportable suitcase
- From 5.000 to 20.000 rmp for cutting
- Up to 80 mm^2 (overall rectangular surface)
- Holding clamps exactly adapted to the splice to cut for excellent positioning
- 3 megapixel camera
- VISO software

SPLICE QUALITY CONTROL

SKB 4000

- Rotation for polishing/cut and feeding speed adjustable in front panel
- Up to 3000 rmp for cutting and polishing
- Up to 240 mm^2 (overall rectangular surface)
- Up to 3000 rpm using powerful step motors
- 3 megapixel camera
- VISO software

SPLICE QUALITY CONTROL | SK 6000



SPLICE QUALITY CONTROL | VISO

PIN INSERTION EQUIPMENT

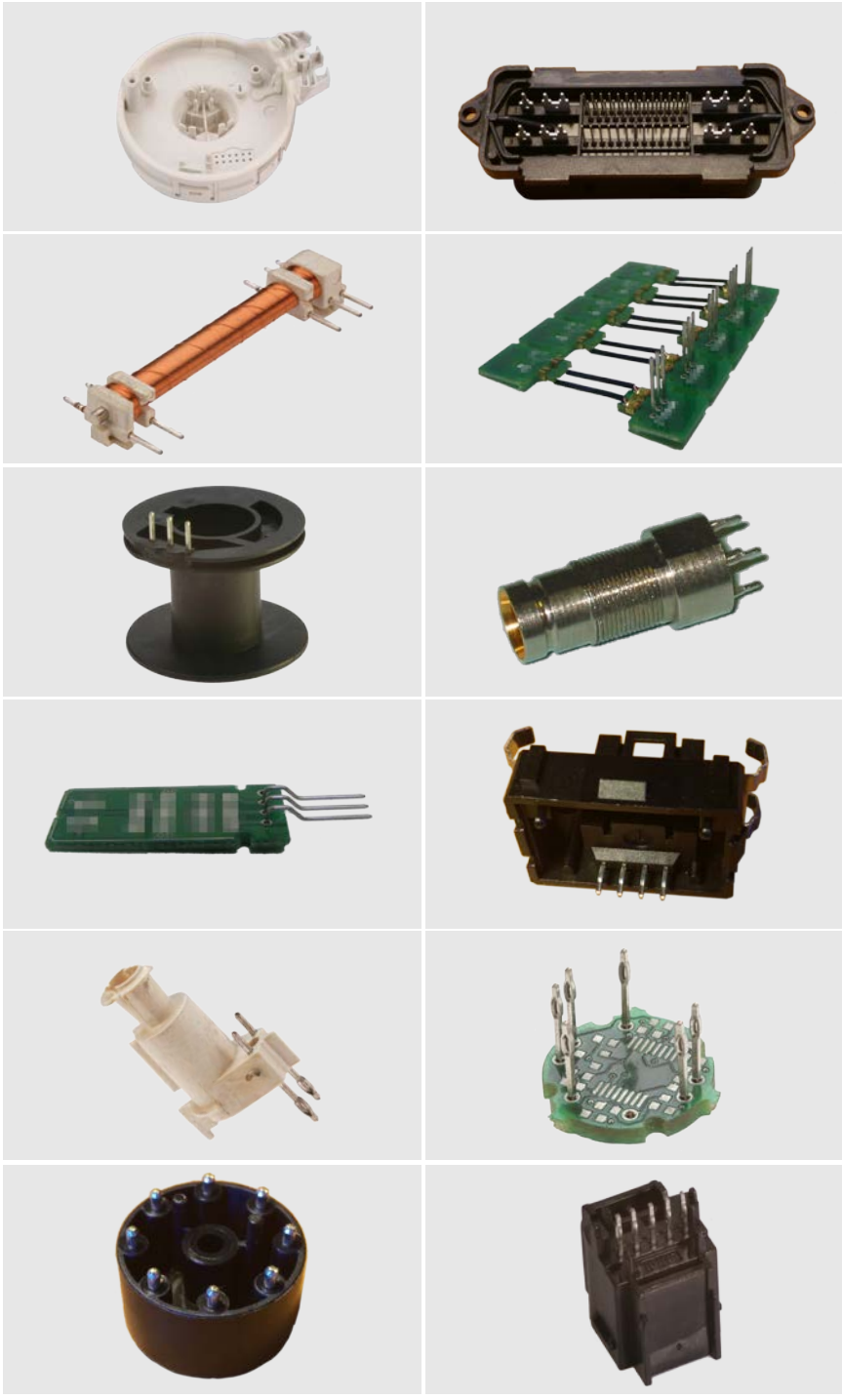
WHAT IS PIN CONNECTION?

COMPONENTS

- PCB
- COIL FRAME
- PLASTIC CONNECTOR
- ETC.

APPLICATIONS

- AUTOMOTIVE
- TELECOMMUNICATIONS
- ALTERNATIVE ENERGY
- ETC.



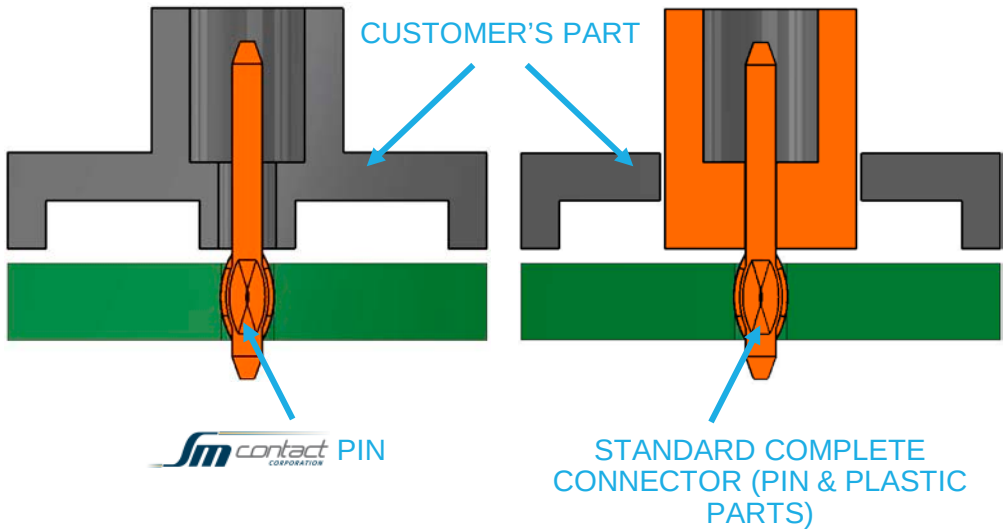
PIN CONNECTIONS VS. COMPLETE CONNECTOR

SM Contact pin interconnection

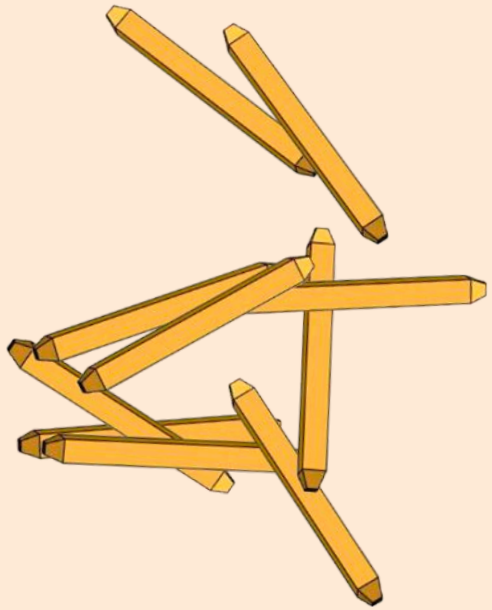
1. Pay only for a pin
2. 100% customized:
   - Adjustable in height and position;
   - Insert just the quantity of pin needed.
3. Low insertion force
4. Wide hole tolerances compliance
5. Solderless

Standard complete connector (pin & plastic parts)

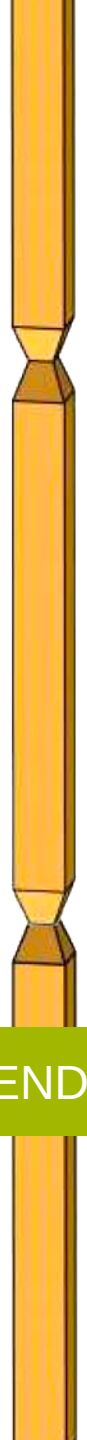
1. Expensive and inflexible connectors
2. Limited application



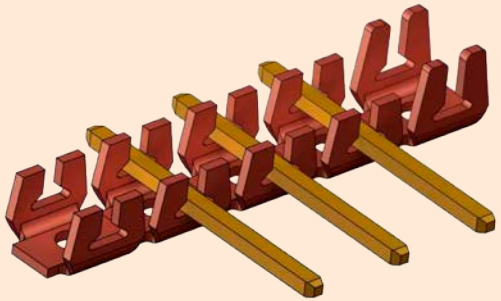
PIN TYPES



IN BULK



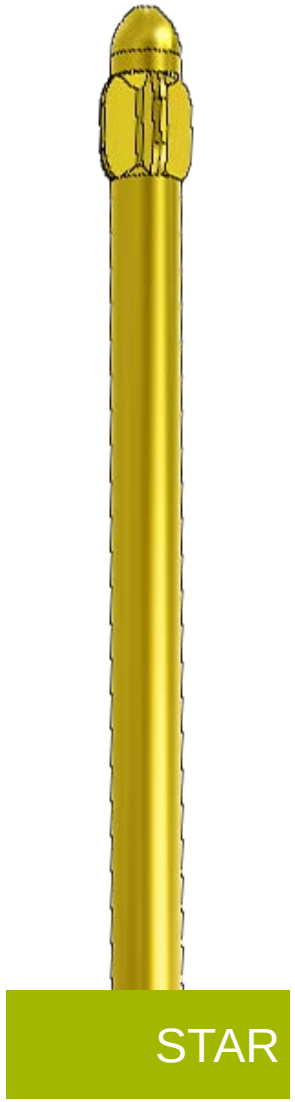
END-TO-END



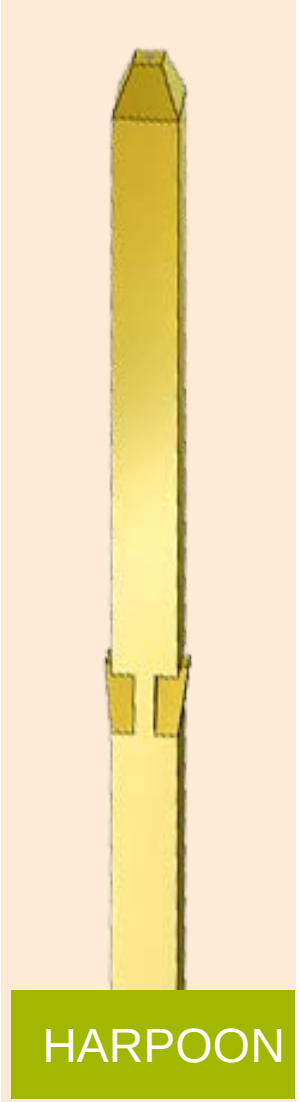
BANDOLIER

PRESS-SHAPES

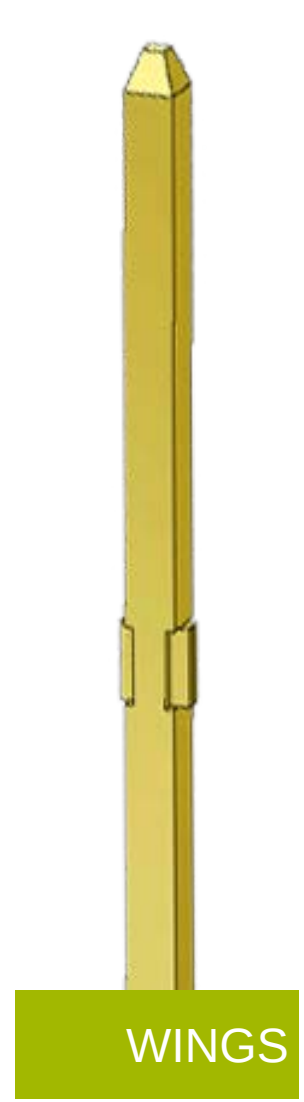
SMOOTH



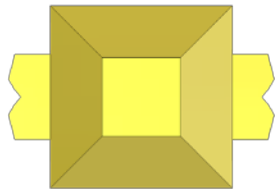
STAR

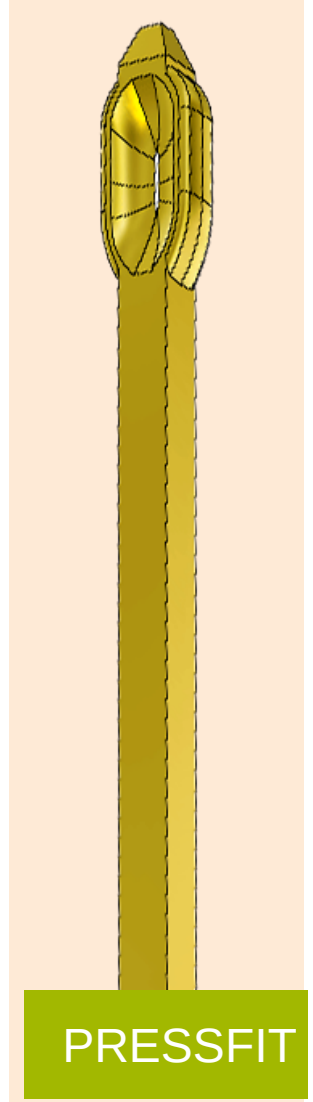


HARPOON

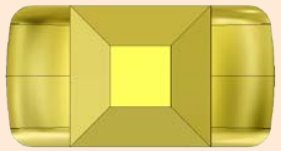


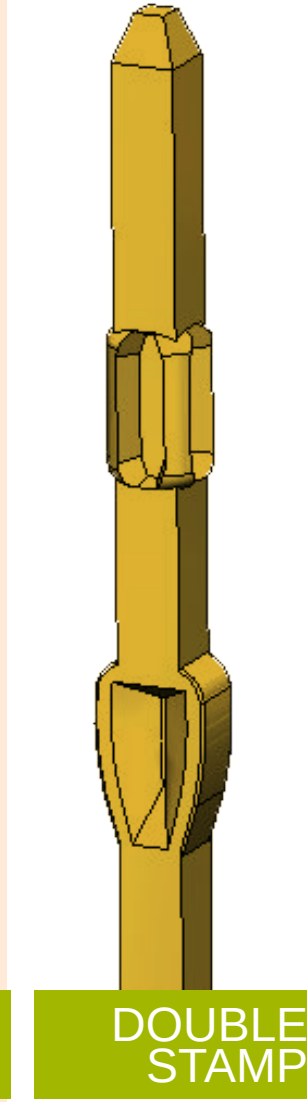
WINGS





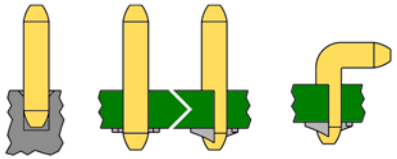
PRESSFIT





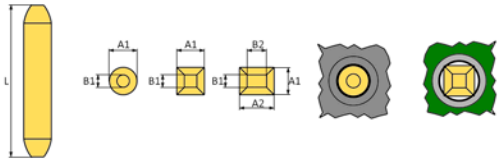
DOUBLE STAMP

Smooth



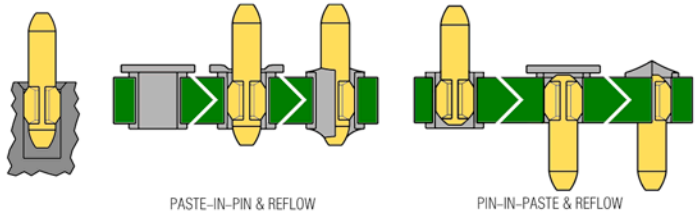
Application: Ex.: coil frame, printed circuits without metalized holes, over-molding.

Shapes:



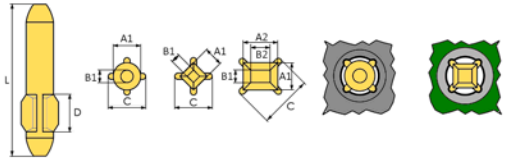
WIRE SHAPE	Square				Round		Square			Round	Square
A1	0.3	0.4	0.46	0.5	0.5	0.63	0.71	0.91	1	1	1.14
A2	-	-	-	-	-	-	-	-	-	-	-
C	-	-	-	-	-	-	-	-	-	-	-
D	-	-	-	-	-	-	-	-	-	-	-
B1	0.2	0.25	0.25	0.25	0.3	0.3	0.35	0.45	0.55	0.4	0.6
B2	-	-	-	-	-	-	-	-	-	-	-

Star



Application: Ex.: single- or double-sided printed circuit, coil frame.

Shapes:



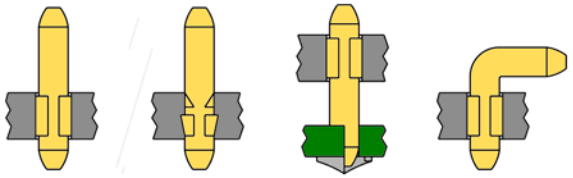
WIRE SHAPE	Square								Round		Square	
A1	0.3	0.3	0.4	0.4	0.46	0.46	0.5	0.5	0.5	0.5	0.63	0.63
A2	-	-	-	-	-	-	-	-	-	-	-	-
C	0.5	0.55*	0.63	0.7*	0.73	0.8*	0.78	0.84*	0.66	0.7*	0.97	1.07*
D	1.1	1.1	1.1	1.1	1.5	1.5	1.5	1.5	0.8	0.8	1.5	1.5
B1	0.2	0.2	0.25	0.25	0.25	0.25	0.25	0.25	0.3	0.3	0.3	0.3
B2	-	-	-	-	-	-	-	-	-	-	-	-

WIRE SHAPE	Rect.	Square				Round		Square	
A1	0.63	0.71	0.71	0.91	0.91	1	1	1.14	1.14
A2	1	-	-	-	-	-	-	-	-
C	1.27	1.17	1.24*	1.5	1.55*	1.73	1.8*	1.93	2*
D	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
B1	0.3	0.35	0.35	0.55	0.55	0.55	0.55	0.6	0.6
B2	0.5	-	-	-	-	-	-	-	-

WIRE SHAPE	Round		
A1	1.5	1.5	1.5
A2	-	-	-
C	1.78	1.78	1.78
D	1.5	1.5	1.5
B1	0.7	0.8	0.9
B2	-	-	-

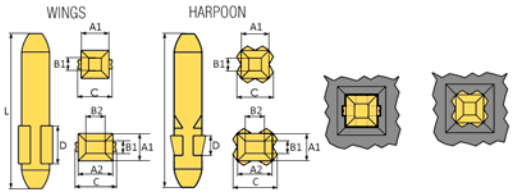
* Reinforced star

Wings – Harpoon



Application: Ex.: plastic connector, insertion in stages.

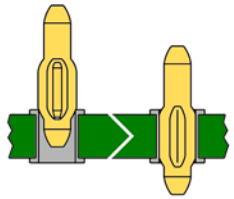
Shapes:



WIRE SHAPE	Square	
A1	0.63	0.63
A2	-	-
C	0.93	0.84
D	1	1
B1	0.3	0.3
B2	-	-

WIRE SHAPE	Square
A1	0.63
A2	-
C	0.85
D	0.65
B1	0.3
B2	-

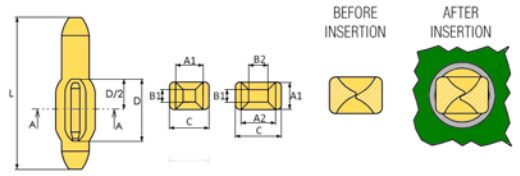
PressFit



Application: Ex.: double-sided printed circuit.

PARTICULARLY FOR AUTOMOTIVE INDUSTRY

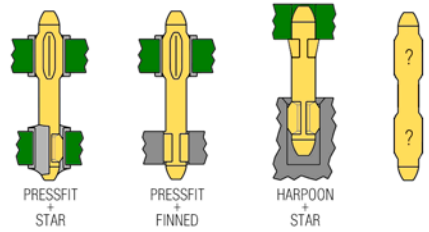
Shapes:



WIRE SHAPE	Rect.	Rect.	Square							Rect.
A1	0.4	0.6	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
A2	0.5	1	-	-	-	-	-	-	-	0.8
C	0.7	1.34	1.12	1.12	1.12	1.12	1.12	1.12	1.1	1.15
D**	1.8	3	1.8	1.8	2.66	2.66	3	3	3	3
B1	0.2	0.27	0.25	0.3	0.25	0.3	0.25	0.3	0.3	0.24
B2	0.25	0.5	-	-	-	-	-	-		0.45

**D=1.8 - pressfit short D=2.66 - pressfit medium D=3 - pressfit long

Dual Impression

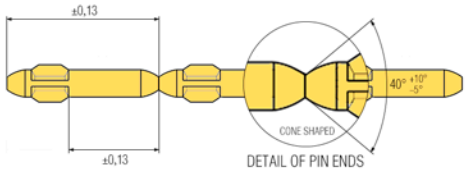


Application: Ex.: stacking of printed circuits.

Varied pins section, length & impression

- TO SUIT SPECIFICALLY YOUR APPLICATION

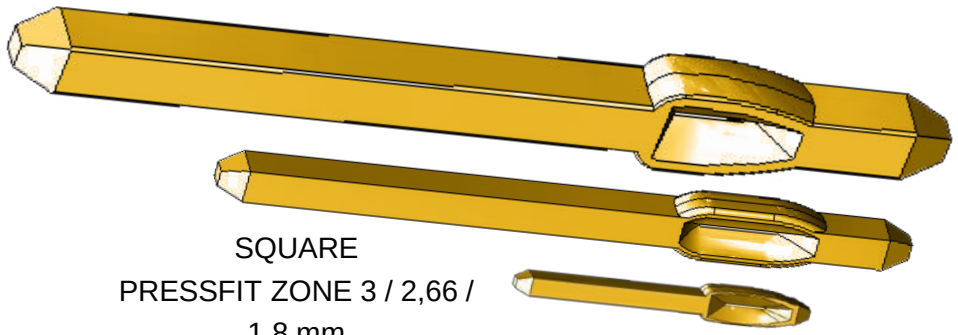
GENERAL CHARACTERISTICS



Materials & Coating

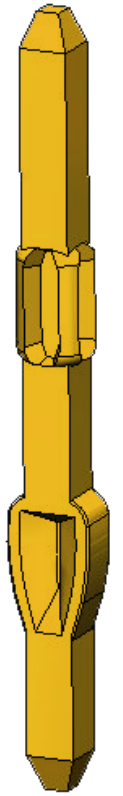
- Bronze (CuSn0,3, CuSn4, CuSn5, CuSn 6, CuSn8)
- Brass (CuZn15, CuZn30, CuZn33, CuZn36, CuZn37)
- CuFe2p
- CuMg0.1
- CuNi3Si1Mg
- CuNiSi
- Staku30

Various Ni-based coatings 1.3-3 µ: Ag, Au, Sn

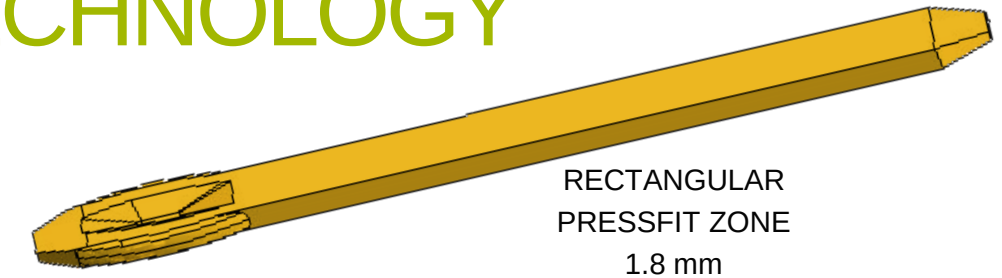


SQUARE
PRESSFIT ZONE 3 / 2,66 /
1.8 mm

DOUBLE STAMP
PRESSFIT ZONE 1.8 mm



HEADLINER
PRESSFIT
TECHNOLOGY



RECTANGULAR
PRESSFIT ZONE
1.8 mm

NEW

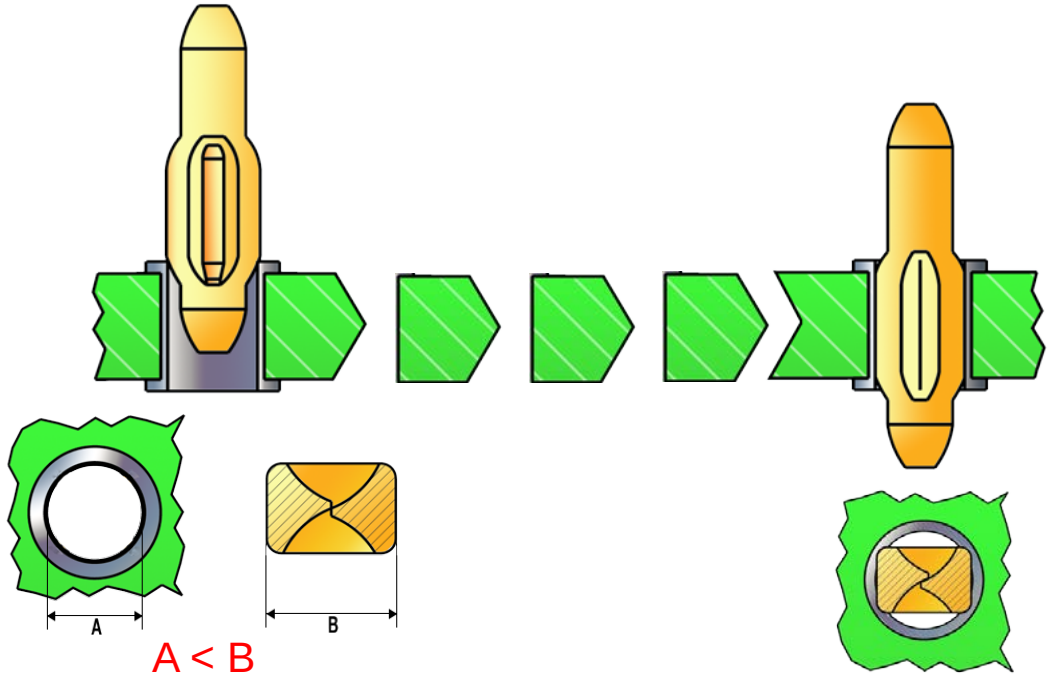
0.50x0.40 mm

0.60x1.00 mm

NEW

0.60x0.60 mm

PIN CONNECTIONS.
PRESSFIT ADVANTAGES



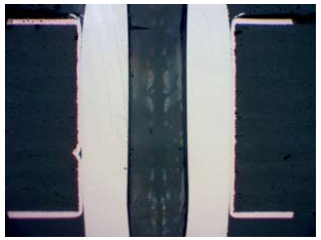
Size difference between PCB hole (A) and pressfit zone (B) leads to pressfit deformation during insertion.

Compression of a pin guarantees reliable connection.

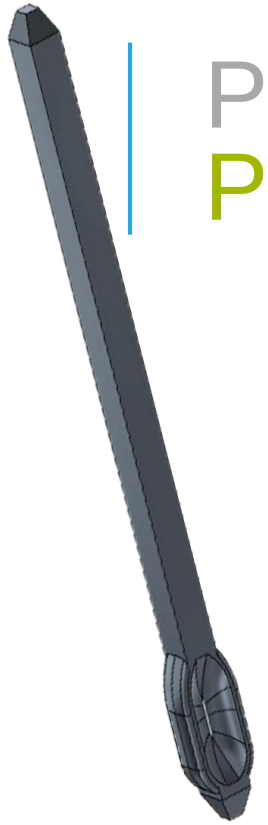
ADVANTAGES:

- ✓SOLDERLESS
- ✓BIG TOLERANCES
- ✓LOW INSERTION FORCE
- ✓COST-EFFECTIVE ASSEMBLY PROCESS
- ✓SEAMLESS

Transverse sectioning



Longitudinal sectioning



PIN CONNECTIONS.
PRESSFIT QUALIFIED* IN ACC. TO EN 60352-5

Glossary of Terms

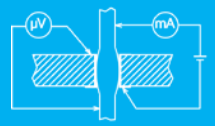
R_c - contact resistance

A_{max} - drilled hole contour deformation

B_{min} - remaining thickness of the plating

C_{max} - outer layer deformation

*TECHNICAL REPORTS COULD BE PRESENTED ON YOUR REQUEST



CONTACT RESISTANCE

✓ $\Delta R_c < 0.5\ m\Omega$

DEFORMATIONS

✓ No cracks
✓ $a_{max} < 70\ \mu m$
✓ $b_{min} > 8\ \mu m$
✓ $c_{max} < 50\ \mu m$

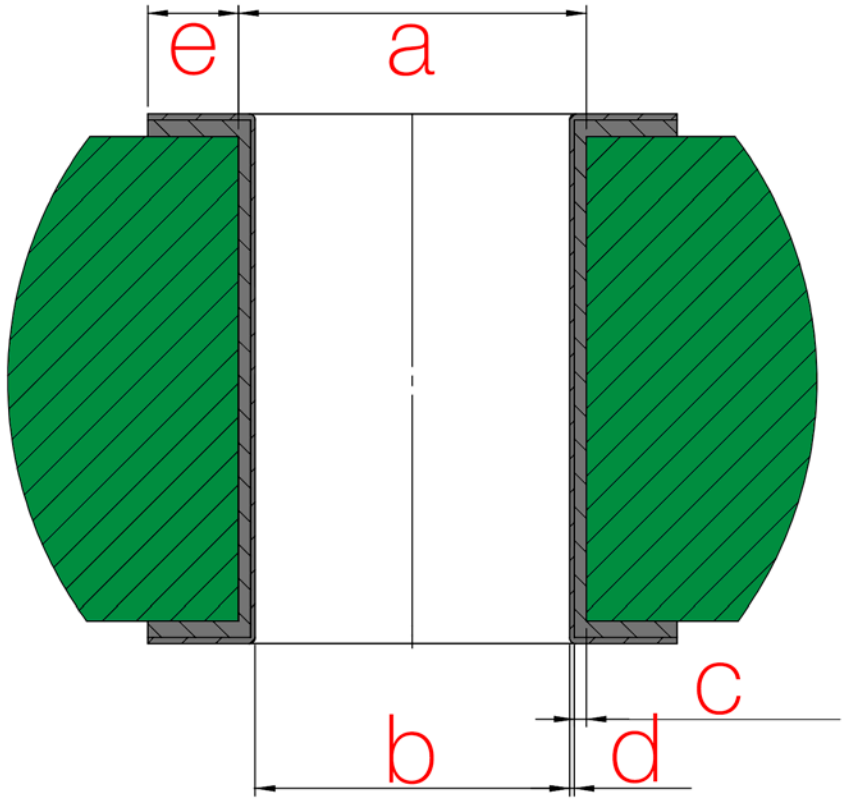
RAPID TEMPERATURE CHANGE

✓ 10 cycles
✓ −40 °C/+85 °C
✓ $t^1 = 30$ min

CLIMATIC SEQUENCE

✓ +85 °C, 16 h
✓ +25 °C/+55 °C, 90% RH/95% RH
✓ −40 °C, 2 h

PIN CONNECTIONS.
QUALIFIED PRESSFIT CONFIGURATIONS



	0.50x0.40 mm	0.60x1.00 mm	0.64x0.64 mm	
A [mm]	0.675 ±0.025	1.325 ±0.025	1.13 ±0.02	
B [mm]	0.60 ±0.05	1.25 ±0.05	1 +0/-0.1	
C	25µm Cu	25µm Cu	25-50µm Cu	
D	Sn	Sn	0.8-1.2µm Sn	
E [mm]	0.05 min	0.05 min	0.05 min	
Material	Cu Ni Si	Cu Sn6	Cu Sn6	Cu Ni Si
F_{in} [N]	74.4-91.1	66.2–134.6	<100	<100
F_{out} [N]	54.4-72.9	145.3–235.0	>20	>50

Glossary of Terms

A - Diameter of finish plated through hole

B - Diameter of drilled hole

C - Inner coating (min.)

D - Coating

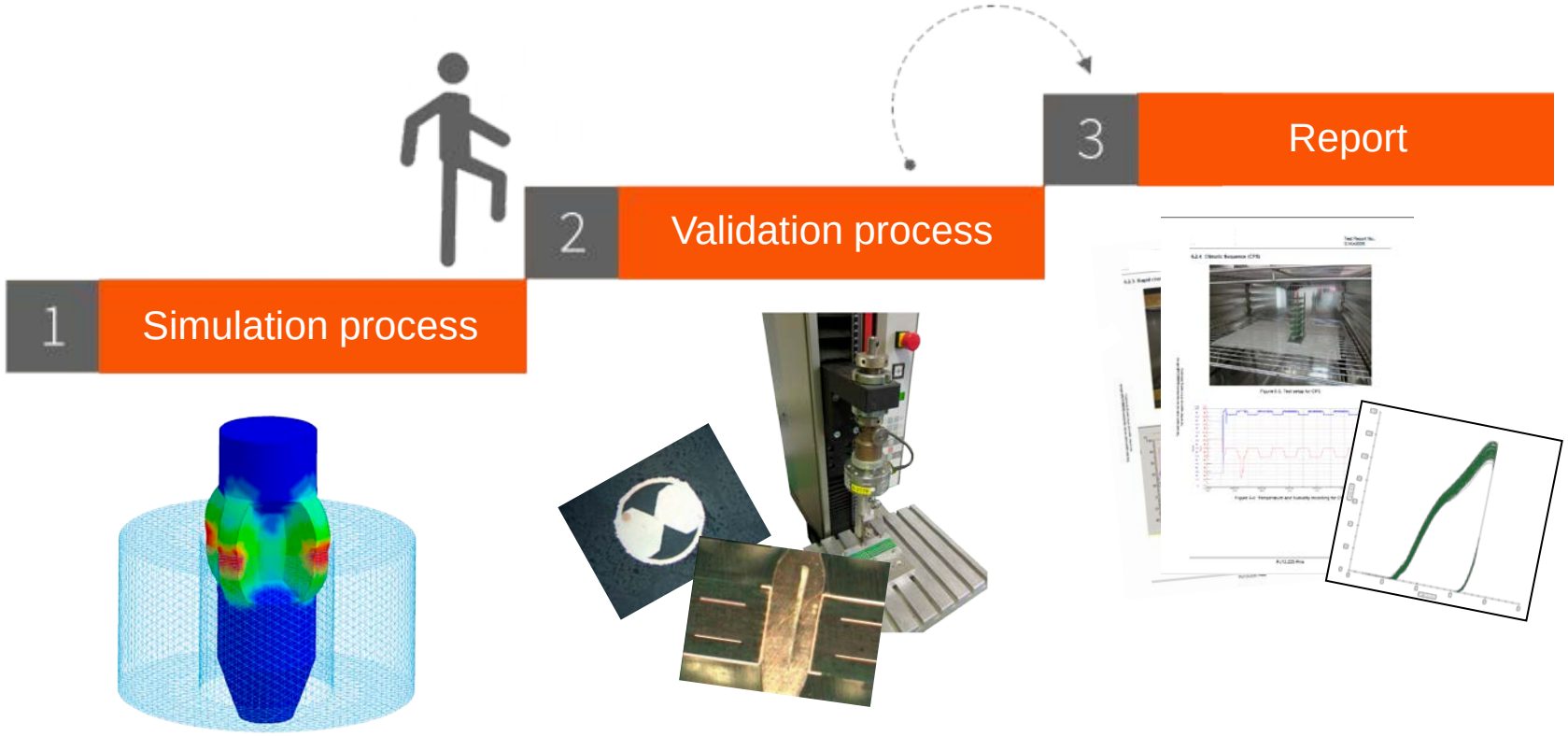
E - Restring width

Material – Pin material

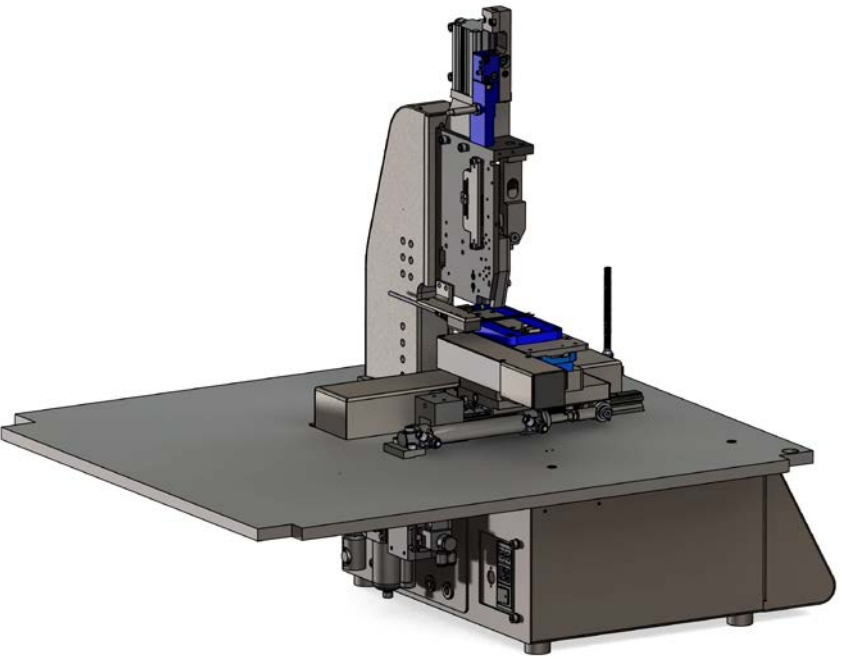
F_{in} - Press-in force

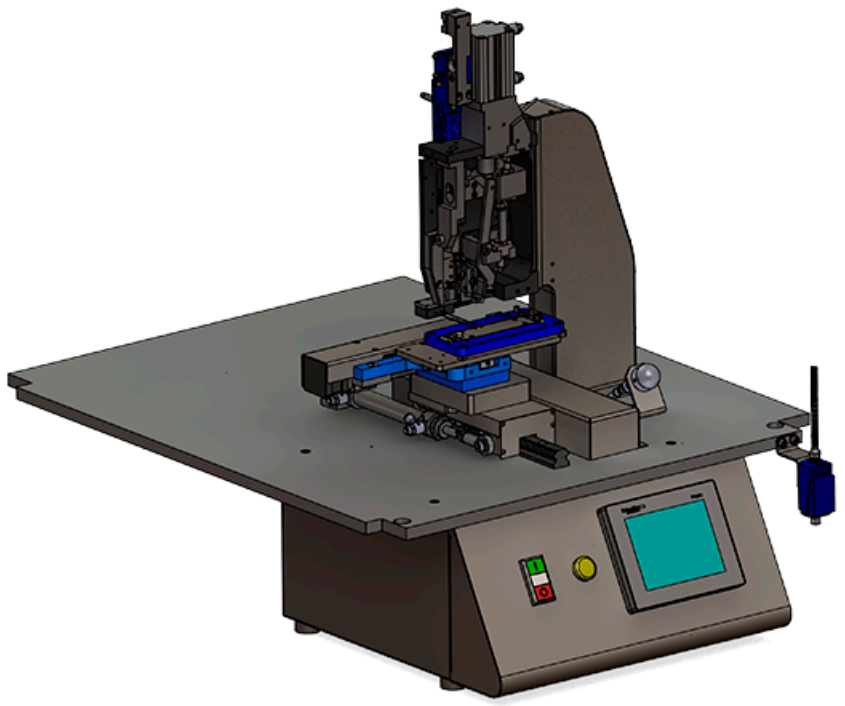
F_{out} - Push-out force

PIN CONNECTIONS.
ENGINEERING EXPERTISE



PIN INSERTION EQUIPMENT





PININSERT 2100
W/ AUTOMATIC X/XY TABLE

STANDARD FEATURES

Pneumatic/servo motor insertion head
Right angle pin / U band pin line / terminals insertion
End-to-end pins feeding system

OPTIONS

- X / XY table
- Poka Yoke
- Working table w/lighting & safety beams
- Camera control
- Pin laser control
- Insertion force control STARLITE
- Barcode reader

TÜV CERT

PININSERT 2100

HIGH-VOLUME PRODUCTION

- 7.000 - 8.000 PINS PER HOUR (SINGLE HEAD)
- UP TO 15.000 PINS (DOUBLE HEAD)

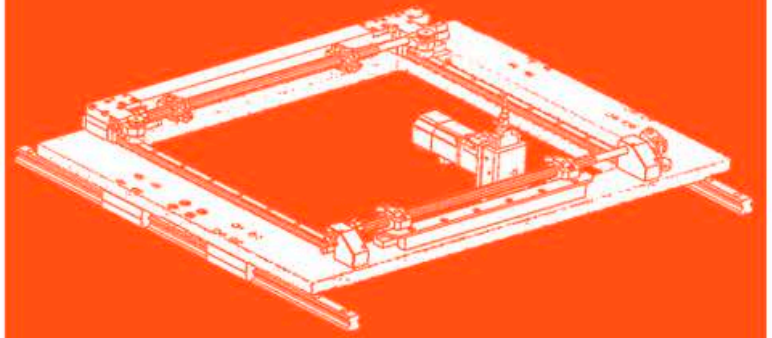
High precision guide system controled by servo motors.

Supervised by PC.

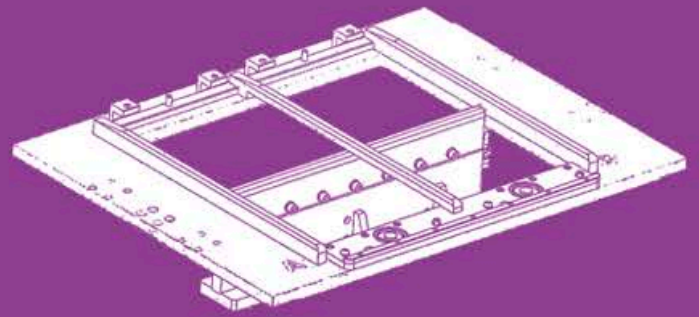
Programmable insertion heigh.

Easy interchangeable tooling for different kind of pins.

UNIVERSAL FIXTURE 400X400
FOR PCB
INCL. ANVIL 10/20 MM STROKE

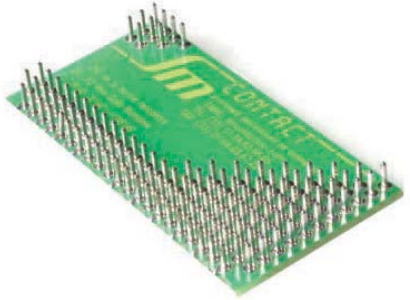


Y TABLE
FOR ADAPTING FIXTURES
(FOR PLASTIC CONNECTORS)

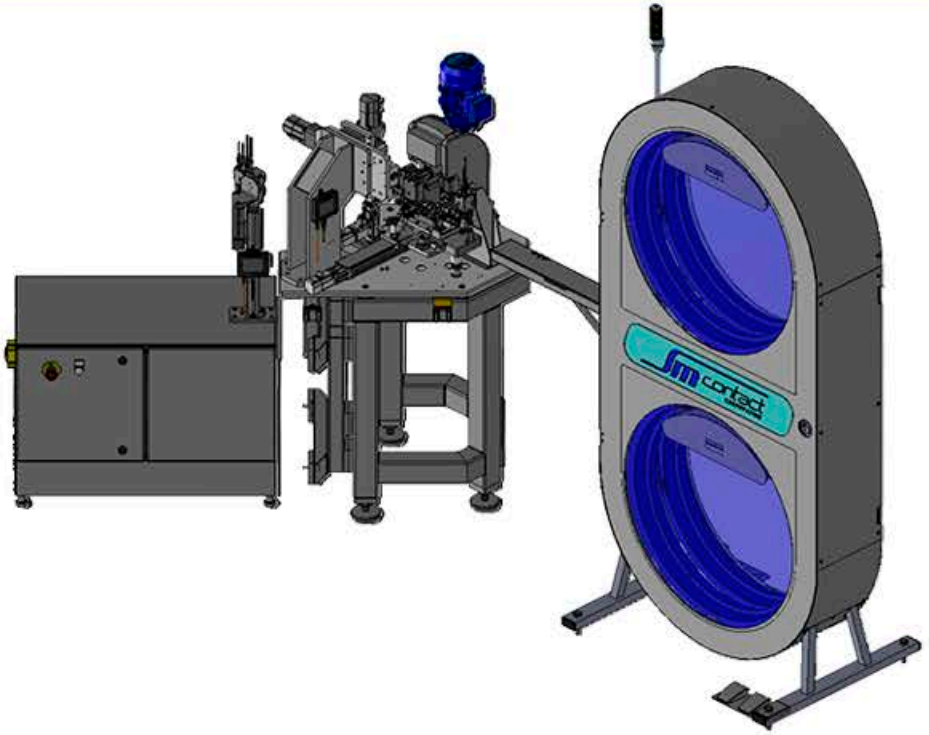


CAN BE INSTALLED SEPARATELY OR INLINE

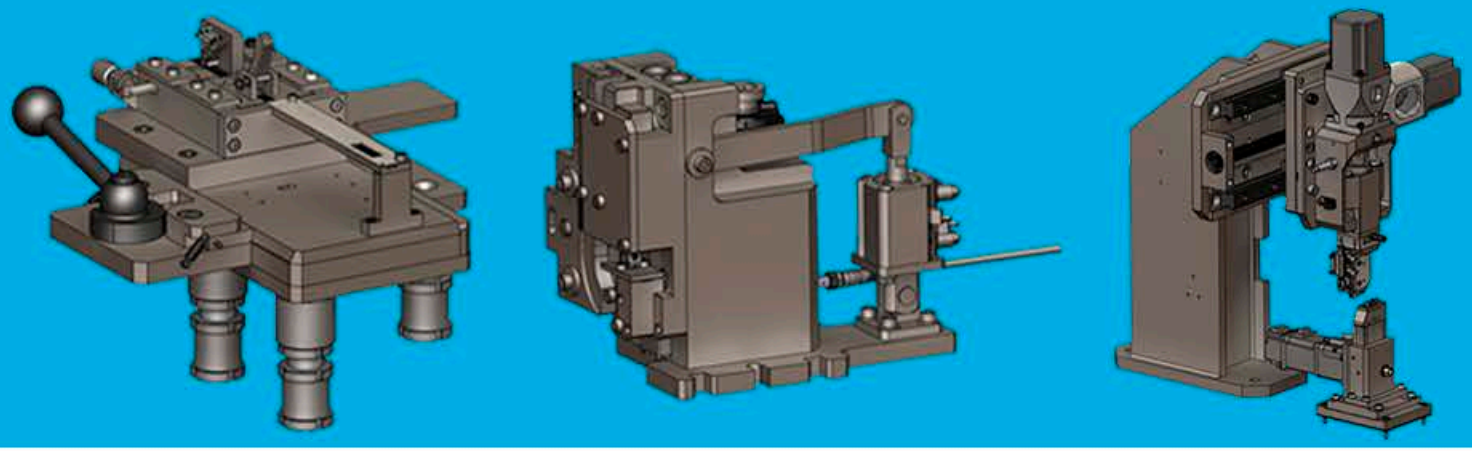
PININSERT 2200

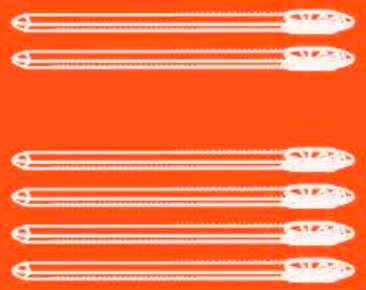


UP TO 10 PINS
CUTTING, BENDING & INSERTION



FEEDING UNIT + BENDING UNIT + INSERTION UNIT



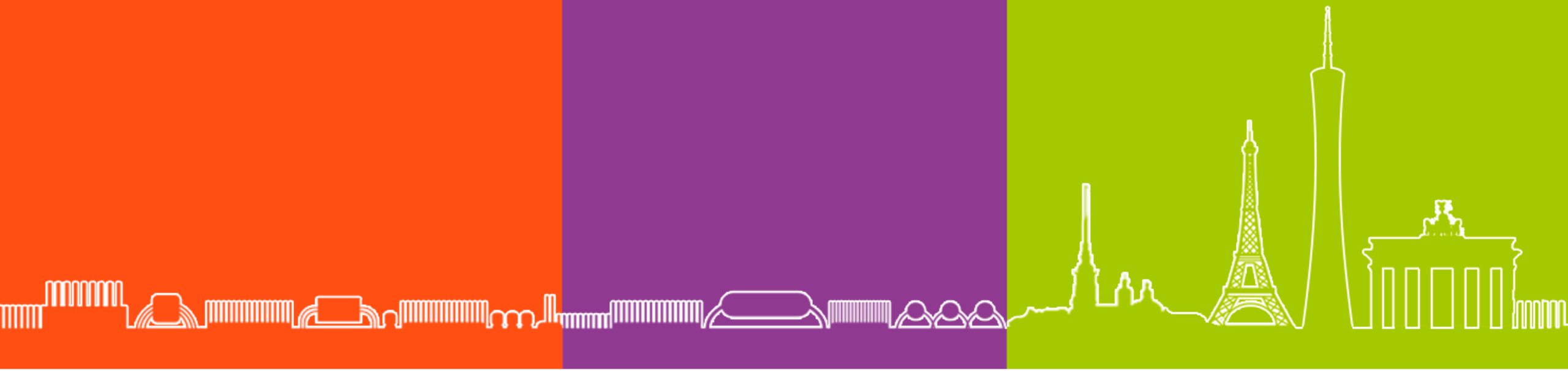


FROM 2 TO 10
PIN LINE SYSTEM

CAMERAS FOR
FEEDING &
INSERTION UNIT

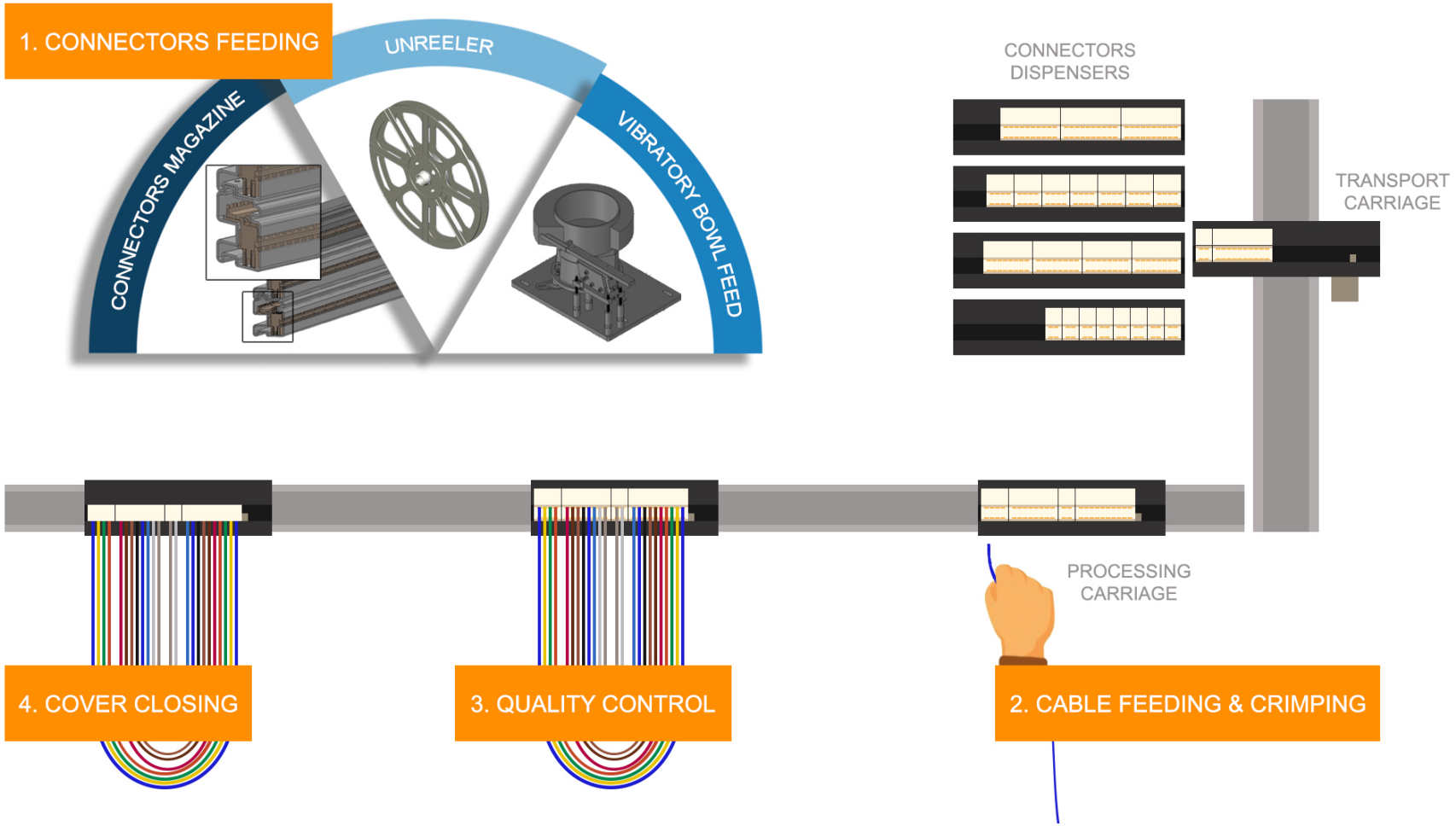
BENDING &
INSERTION
FORCE CONTROL

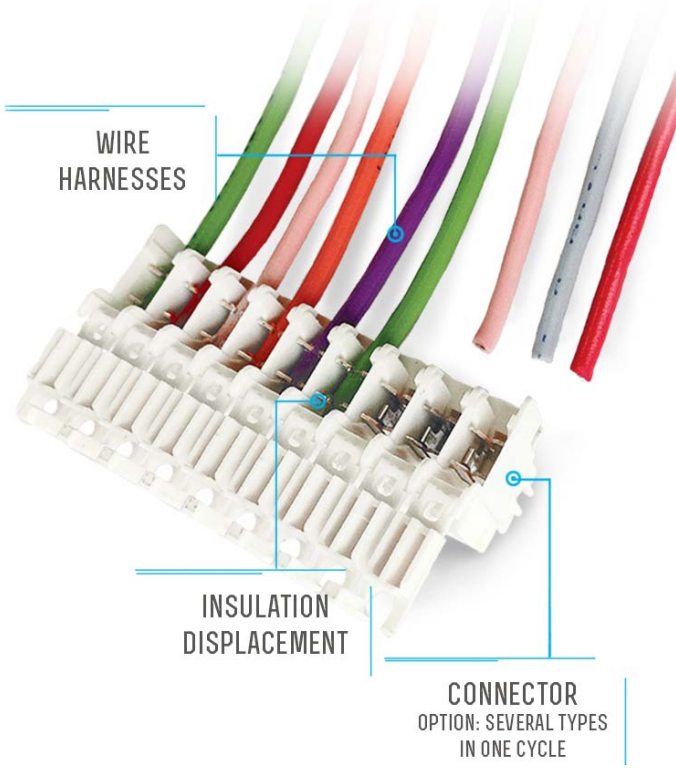
PININSERT 2500



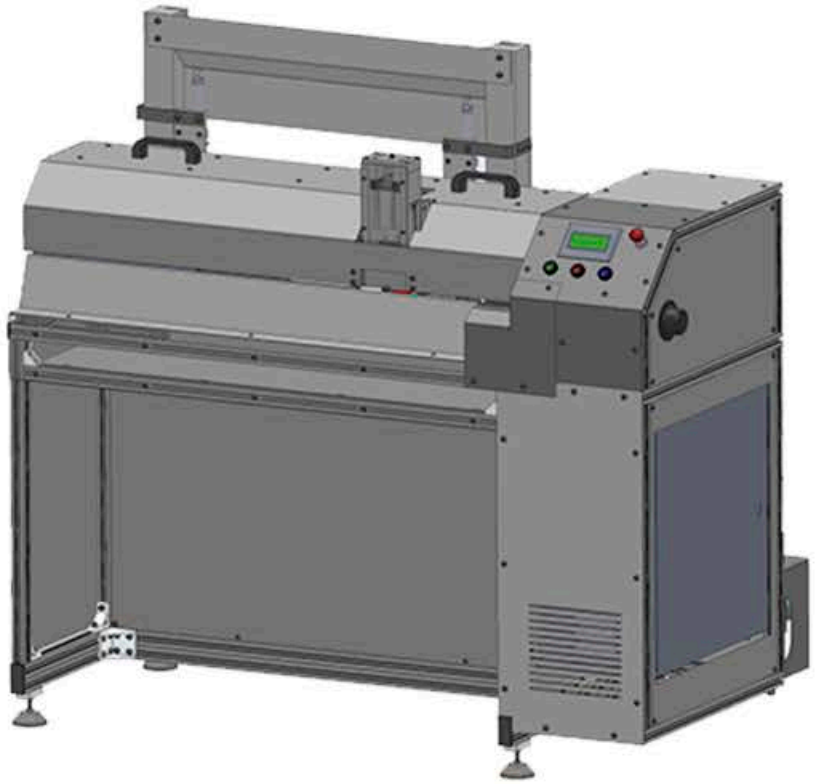
INSULATION DISPLACEMENT CONTACT (IDC)

WHAT IS IDC?


1. CONNECTORS FEEDING
UNREELER
CONNECTORS MAGAZINE
VIBRATORY BOWL FEED
CONNECTORS DISPENSERS
TRANSPORT CARRIAGE
PROCESSING CARRIAGE
4. COVER CLOSING
3. QUALITY CONTROL
2. CABLE FEEDING & CRIMPING


WIRE HARNESSES
INSULATION DISPLACEMENT
CONNECTOR
OPTION: SEVERAL TYPES IN ONE CYCLE

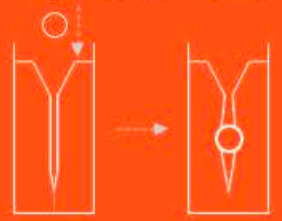
IDC EQUIPEMENT | Sm IDC



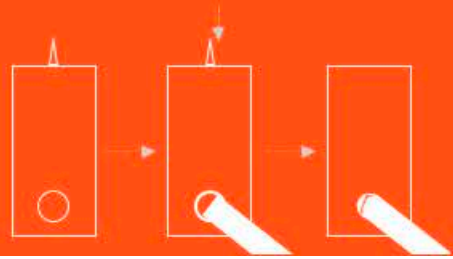
FEATURES

1. AUTOMATIC FEED
2. CONNECTORS TRANSFER TO WORK AREA
3. CRIMPING

TOP WIRE FEED



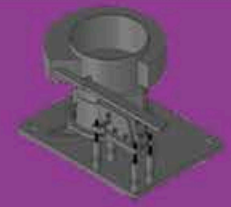
SIDE WIRE FEED



OPTIONS

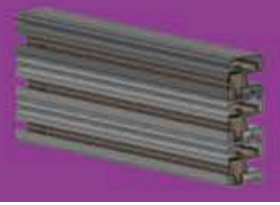
1. CABLE UNREELING & CUTTING
2. WIRE BENDING
3. COVER CLOSING
4. WIRE COLOR DETECTION
5. INSERTION DEPTH CONTROL
6. COMPONENTS POSITION CONTROL
7. ELECTRICAL TESTING STATION

UNREELER



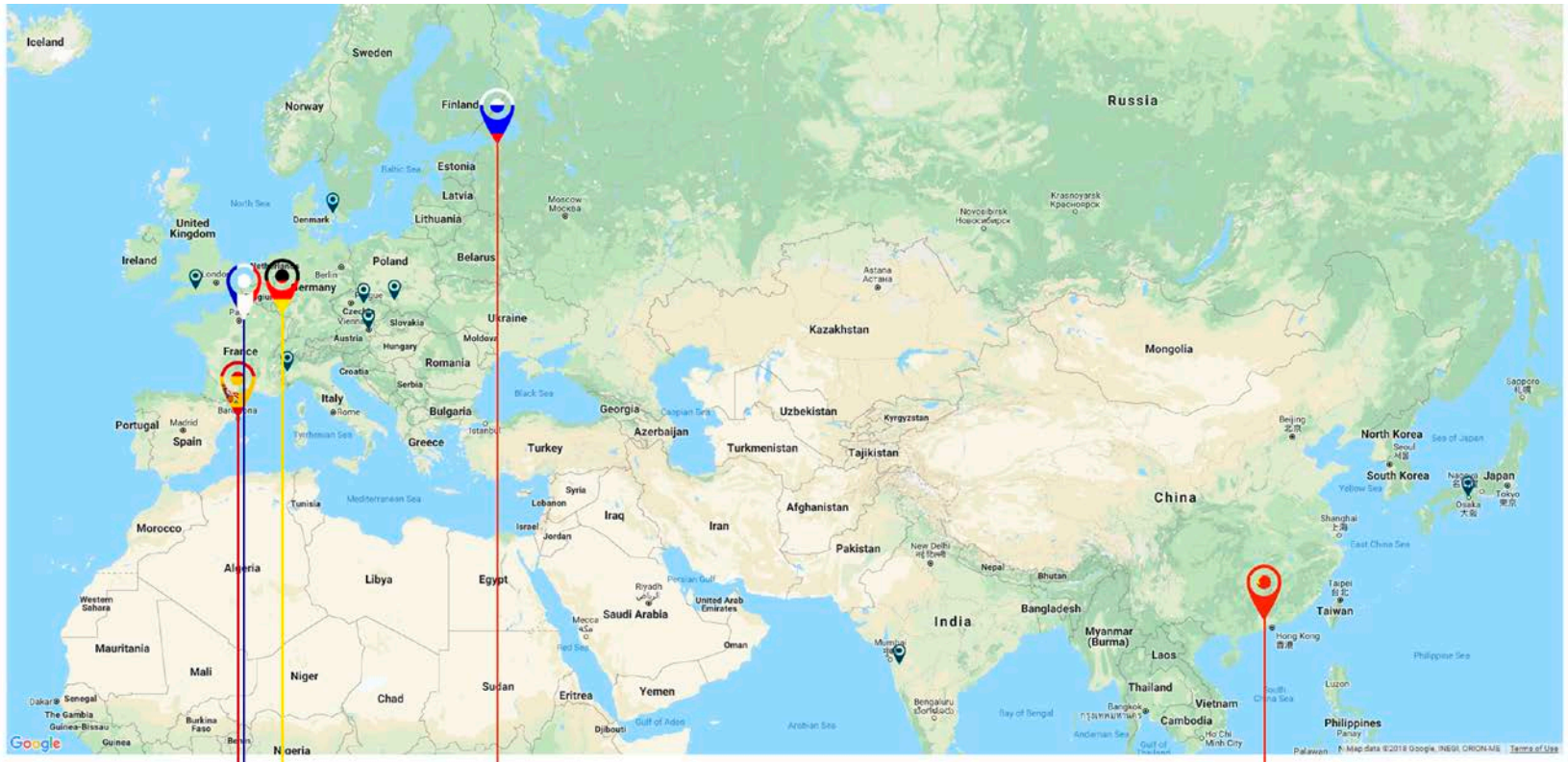
VIBRATORY BOWL FEEDER

CONNECTORS MAGAZINE



Sm IDC

WHERE WE ARE LOCATED



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