

# Application Tooling and Equipment

# TE Connectivity Technology Portfolio



■ Connector Systems /  
Electromechanical Components

■ Relays

■ Wireless Products

■ Sensors

■ Fiber Optic Products

■ Wire & Cable

■ Application Tooling

■ Antennas, GPS Antennas  
Integrated Antenna Systems

■ Circuit Protection Devices

■ Tubing & Harnessing Products

■ Touch Screens Displays

■ Power Systems

■ Electronic Modules

■ Resistors and Inductors

■ Battery Connectors &  
Assemblies

■ Heat Sinks & Thermal Solutions

■ Switches and Knobs

■ Identification Labeling Products

■ Racks and Panels

■ Smart Cards / Leadframes

# TE Application Tooling

## Introduction

TE Application Tooling is dedicated to providing high quality equipment options to meet all levels of our connector products specifications. We are also able to provide a broad range of equipment for other manufacturer's products.

Our equipment range is vast and almost unmatched by others operating in the same industry segments, as is our global presence and support network in the form of field service engineers and product managers. You will see from browsing this catalogue; we supply everything from simple hand tools to the most complex automated systems - you name it, we supply it!

Equipment is segregated into two types and managed accordingly:

### Generic equipment

Where we can supply you with sufficient information referenced by Part Number such that you can identify and order what you need yourself.

### Specialised Equipment

Where you will need help from our specialist product managers to identify what's just right for your application.

## Finding Equipment online

[www.tooling.te.com/europe](http://www.tooling.te.com/europe) - a dedicated European Tooling Website with:

- Powerful searches to find generic equipment options (Hand Tools / Applicators)
- Brochures and more detailed flyers for the specialised equipment along with local contact information.

It's quick, easy and more importantly the latest and most up to date information is available online.

The image displays three screenshots of the TE Application Tooling website. The top-left screenshot shows the homepage with a navigation menu on the left and a central banner for 'Join TE for EP China 2011'. The top-right screenshot shows a search results page for 'Hand Tools', listing various tool types and a search bar. The bottom screenshot shows a detailed product page for a 'CRIMP CRIMP II SAH' tool, including a table of specifications and a list of features.

Tool PL. No.	Tool Type	Tool Grade
91572-1	CRIMP CRIMP II SAH AMP ET 3.0 Receptacle	Premium

**Wire range:** 0.12 - 0.4 (25-32)

**Features:**  
• Rack size  
• Straight section jaw design  
• Patented mechanism ensures complete crimp cycle  
• Emergency-only ratchet release  
• Terminal/lane positioning aids & lns. adjustment on main tool  
• Ergonomic grip for hand use  
• Approximate weight 0.9 kg (1.9 lbs)

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# Insertion Machines for Single Contacts

## P 100 Pin Insertion Machine

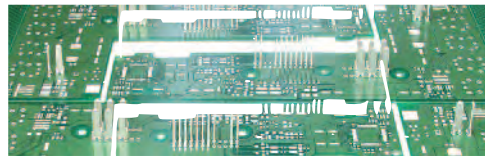
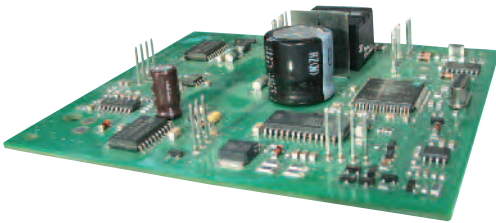


The semi-automatic P100 machine belongs to the TE Connectivity pin insertion system line. Designed and manufactured with a focus on mid-volume level production, the P100 machine provides a broad range of features at a very competitive price. With the ability to apply products from TE Connectivity and other manufacturers, the P100 machine does not limit your production to “TE Connectivity only” applications and provides flexibility to address both current and future tooling needs.

The P100 machine uses a pneumatic power unit together with product specific “quick change” tooling packs. The insertion heads can be equipped with a rotary insertion finger that can apply products at different angles without decreasing the insertion rate. The tooling packs can be exchanged within 30 minutes to meet your full range of application requirements.

CE approval is in process.

- X/Y-Table with stepper motors
- Database driven software for simple programming and automatic setup
- “Quick change” tooling packs allow easy and fast setup
- Wide range of tooling packs for TE and non-TE products available
- Easy-to-use operator interface



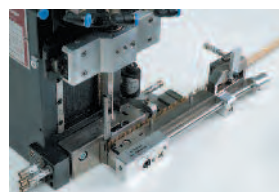
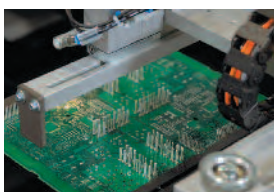
## P 300 Fully-Automatic Machine for PCB Processing



For the automatic assembly of printed circuit boards, the basic P 300 machine is equipped with a product specific insertion head. A speciality is the rotary insertion finger which allows the products to be inserted in different angles of rotation.

A XY table, powered by servo drives, positions the printed circuit boards under the insertion head. Up to 4 motor driven insertion heads, each equipped with a terminal specific conversion kit, allow the application of up to 4 different products. Available accessories like

- Insertion Force Monitoring
- Vision System for position detection and program correction
- Flip unit to insert terminals on both sides of a PCB
- PCB transfer belts for an in-line installation
- Pin length detection
- Traceability features such as reel scan, board scan, etc.
- Motor driven insertion head for continuous wire products
- Tool changer for up to 4 Insertion heads and lower tools allows the P 300 to be adapted to the most varied manufacturing tasks.



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# Insertion Machines for Single Contacts

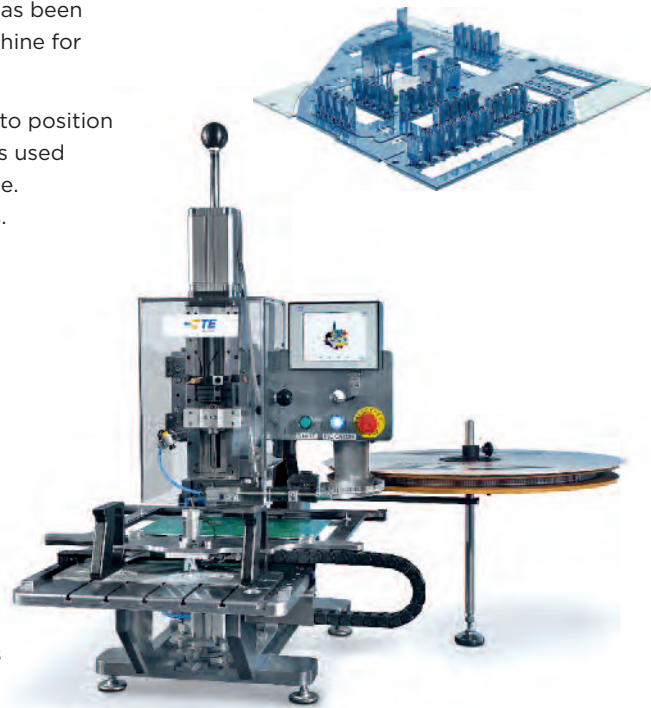
## P 50 Insertion Machine

The successful product line of single pin insertion machines has been expanded with the addition of a manual operated bench machine for low volume production, repair work and sample production.

The P 50 manual bench insertion machine uses a tracer slide to position the PCB under the pneumatic insertion head. A regular PCB is used as master to position the indexing pin above the insertion hole. When activating the two hand start, the indexing pin extracts. If a hole is detected, the terminal is inserted into the board in production.

To fulfil automotive requirements, the P 50 insertion machine can be equipped with an insertion force monitoring system. In cooperation with an optional barcode scanner, the insertion forces can be stored for traceability purposes.

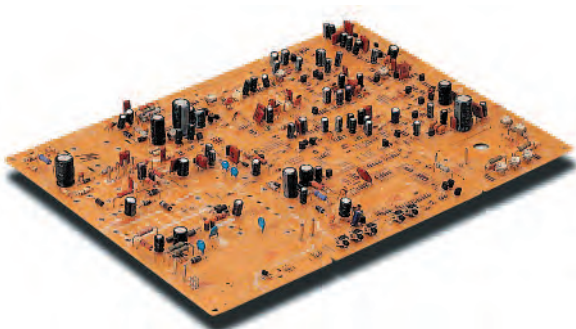
- Pneumatic insertion head can also be used on other machines of the product line.
- Conversion kits can be changed without too much difficulty to run different terminal types.
- Conversion kits can also be installed on motor-driven insertion heads used on P 200, P 300 and P 350 machines
- Terminal insertion is possible at different angles without the need to re-load the PCB in different orientations.



## M200C Mulserter Insertion Machine

The Mulserter series of insertion machines from TE Connectivity provides the flexibility and the cost savings to meet a wide range of customer requirements in the through hole technology. Our full range of systems can help with the application of insertion from reeled components, loose components to odd shaped components.

The M200C Mulserter machine is designed to insert eyelet, round pin, gripper, etc. into PCBs automatically with insertion program made by operator. The head for tooling can be chosen from 1 to max. 4 and each head can have individual tooling depending on customer's parts.



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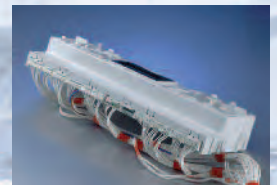
## IHM Mark III IDC Harness Maker

The IHM Mark III is a high performance, fully-automatic machine to manufacture parallel jumper harnesses using IDC technology. The simultaneous feeding of up to 21 wires and mass termination technology guarantees highest productivity. The gripper unit on the left side of the machine is able to spread the wires in both directions to enable the production of harnesses using 2.5 mm and 5 mm pitch connectors at the same time with short wire length.

The IDC workstations are easily interchangeable and include all the necessary processing operations for the particular connector. Fully integrated control systems guarantee highest quality harnesses in every production run.

IDC Workstations are available for the following IDC Connector Systems:

- AMP DUOPLUG 2.5
- AMP DUOPLUG 2.5 Mark II
- AMP DUOPLUG Power
- AMP multifitting Mark II
- AMP MONO-SHAPE
- AMP MONO-SHAPE Mark II



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# IDC Machines

## FHM IDC Flexible Harness Maker

The new FHM IDC offered by TE Connectivity is a fully-automatic machine for cost effective harness production. Used in conjunction with our well known interchangeable SIM XX E work stations, it is able to process RAST 2.5 and RAST 5 connector systems at the same time, specifically designed for the household appliance market.

The machine excels in the flexibility it offers. It is capable of processing cross sections in a range from 0.22-1.5 mm<sup>2</sup>. The wire selector allows as standard to have 6 different wires loaded.

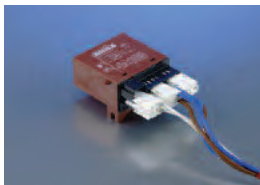
This modular designed fully-automatic machine is capable of producing IDC-harnesses, featuring, apart from parallel wiring, also crossovers and into one cavity.

Its is specifically designed to meet customer's demands for minimal set-up and changeover times, while providing highest output including various quality assurance checks.



Flexible Harness Maker-IDC consists of:

- FHM IDC base machine with operating interface via touch screen
- Universal wire selector up to 12 positions, prepared for 6 wires
- Servo controlled transport gripper system
- Possibility to run with one or two SIM



Applicable semi-automatic IDC Machines economy or flexible Versions and Connectors:

- SIM 25 E or F for AMP DUOPLUG 2.5 Mark II and AMP DUOPLUG 2.5 Power
- SIM 26 E or F for AMP DUOPLUG 2.5
- SIM 27 E or F for AMP DUOPLUG 2.5 Power 10A
- SIM 50 E or F for AMP multifitting Mark II
- SIM 51 E or F for AMP MONO-SHAPE Mark II
- SIM 52 E or F for AMP MONO-SHAPE

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# IDC Machines

## SIM 50E / 51E / 52E / 25E / 26E / 27E Modular IDC Workstations

These semi-automatic machines have been designed to apply all TE Connectivity RAST 2.5 and RAST 5 connectors used within the Household Appliance Industry. The machines are configured as base machines which can be extended through a variety of production enhancing options. The machines configurability leads to an economical and application specific solution.

Connectors are separated automatically within the machine. Key cutting and checking are all automatic processes. The wires are inserted one by one manually and the machine controls the wire insertion length automatically. Any rejects are separated automatically. One sequence can contain up to 12 positions in a 5 mm pitch or up to 23 positions in a 2.5 mm pitch. The SIM Economy Series are designed to be used either with FHM Mark II and FHM IDC fully-automatic machines or as stand alone machines.

### Basic configuration:

- Automatic product feeding:
- Latch-cutting and separation
- Key cutting and checking
- Wire termination
- Wire length checking
- Cover closing
- Good bad sorting
- Simple and ergonomic operator interface with touch screen control

### Available options:

- Active wire clamping
- Electrical continuity test
- Wire bending (not for SIM 25E)
- Cover marking
- Conversion kit for AMP DUOPLUG 2.5 Mark II (only for SIM 25E)
- Conversion kit for AMP DUOPLUG Power (only for SIM 25E)
- Conversion kit for FHM Mark II and FHM IDC
- Modem remote maintenance



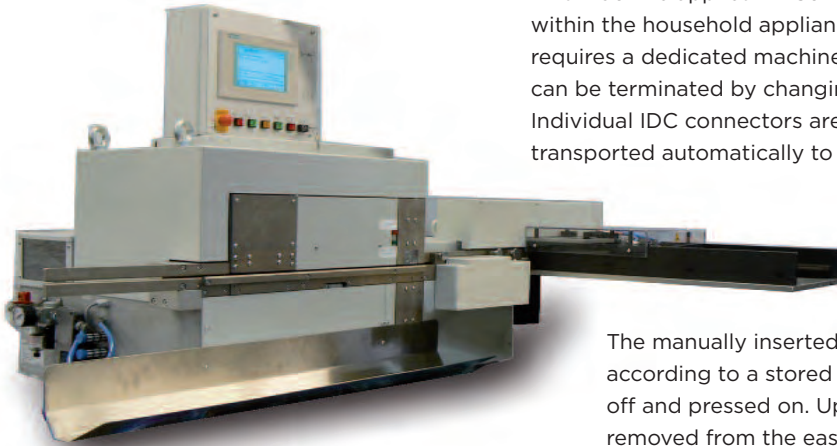
These Machines are compatible with following IDC Connector Systems:

- AMP DUOPLUG 2.5
- AMP DUOPLUG 2.5 Mark II
- AMP DUOPLUG 2.5 Power
- AMP DUOPLUG 2.5 Power 10A
- AMP multifitting Mark II
- AMP MONO-SHAPE Mark II
- AMP MONO-SHAPE

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# IDC Machines

## AMP DUOPLUG 2.5 Bench Machine



This machine applies TE Connectivity connectors, which are used within the household appliance industry. Each connector type requires a dedicated machine. Connectors with different positions can be terminated by changing or adjusting the connector locator. Individual IDC connectors are placed manually into a fixture and transported automatically to the termination station.

The manually inserted wires are pressed into the IDC contacts according to a stored programme. After this the lids are cut off and pressed on. Upon completion, the connector is removed from the easily accessible feed track together with the produced harness sets.

## Semi-Automatic Bench Machine for Micro-MaTch Connectors

This semi-automatic machine can process dependent on version AMP-LATCH or Micro-MaTch connectors with ribbon cables. The housings are fed into the bench machine from a reel and terminated onto ribbon cable. Female connectors with and without center polarisation can be processed, oriented in both directions, utilising the integrated turn-table.



A completed harness assembly is ejected from the bench machine and a new connector is automatically fed into position. In this simple way, over 1000 connections can be produced per hour. The sensor-controlled operation of the machine guarantees ease of use and high-quality ribbon cable assemblies.



# IDC Machines

## Hand Operated Bench Machine for AMP-LATCH Connectors

Operation without too much difficulty is a feature of this manual press for the application of AMP-LATCH connectors and ribbon cables.

A ribbed cable guide plate in the die ensures an exact positioning of the ribbon cable during processing. The swiveled cable stop ensures that the cable end finishes flush with the housing.



## Hand Operated Bench Machine for HDE-20 Connectors



With two manual processing steps the hand operated toggle machine terminates multi-way AMPLIMITE HDE-20 connectors. The connector is positioned in the holder via a connector fixture with connector outline and centering pin. During processing wire and cable are centered and held. And a press cycle terminates one side of the connector.

A die set for the AMPLIMITE HDE-20 connector consists of a lower and an upper tool. A die set of similar design is also available for the TS-100 Mark I connector.



## CHAMPOMATOR 2.5 Semi-Automatic Bench Machine

The CHAMPOMATOR 2.5 terminating machine is a compact, semi-automatic bench machine for terminating multiconductor, jacketed cable with a variety of TE Connectivity connectors having insulation displacement contacts.

- Low applied costs
- Terminates most jacketed cable
- Straight (180°) or right-angle (90°) wire dress
- Microprocessor controlled
- Programme storage capability
- Selective termination of connector positions
- Rapid tooling changeover for different connector types



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# IDC Machines

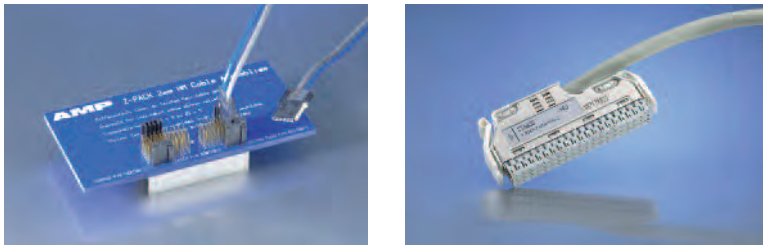
## MT-Matic Mark III for IDC Connectors



Dependent on type the machine is able to terminate different IDC connectors semi-automatically. Placement of the connectors in the magazine and positioning of the wires is a manual process, termination of the wires into the connector is automatic. The connector and wire layout is programmable via keyboard or touch screen.

As a help to the operator the wire insertion sequence is displayed in color on the monitor.

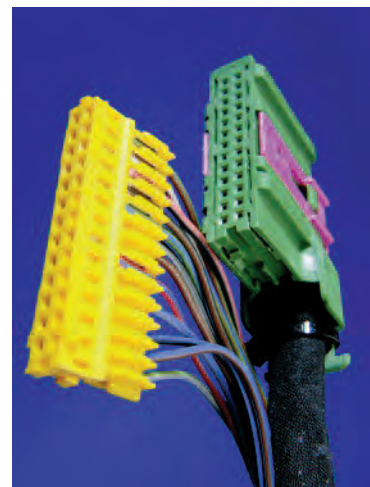
Different machines are available to terminate different connectors.



## MT-E2 F Semi-Automatic Machine

The development of this termination machine was necessary to be able to process high cavity-count female connectors in IDC technology. The new multi-cavity motor-control interface connectors are used in damp areas in cars and must be completely water-proof, hence the use of a family seal over the insulation displacement contacts.

The pitch of the cavities in the family seal corresponds to that of the connectors with their insulation displacement contacts. The cavities in the family seal are closed by a membrane. An integrated programme controlled unit pierces the membrane, prior to the IDC termination.



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# Lead Makers

## Application Tooling for Processing Small Wire Sizes

A range of application tooling solutions is available to embrace the current trend in the automotive industry towards using wires with increasingly smaller cross sections.

Thinner stranded wires require crimp connections with smaller contacts such as the NanoMQS, MQS and other contact systems that allow stranded wires to be processed up to a minimum of 0.13 mm<sup>2</sup> cross section.

Miniaturization of the connectors place higher demand both on the processing machines and tools as well as the machine operator. The hand tool, crimp tool, and fully automatic machine manufacturers have addressed the issue of processing small wire sizes by equipping the machines with tailored components to ensure reliable and secure processing.

To process crimp contacts both hand tools and applicators with pneumatic feed or motorized contact feed can be used.

For automatic processing the quality of the crimp connection can be recorded with standard commercial crimp monitoring systems, modified to accommodate the small cross section.

Available tooling and accessories for the processing of small wire sizes:

- Hand tools for crimping NanoMQS and MQS contacts
- Ocean Applicator with pneumatic or servo-motor contact feed
- Fully automatic crimping machines, equipped with special part kit to apply small wire sizes from 0.13 -0.22 mm<sup>2</sup>.
- Komax Zeta, with automatic housing loading, customized for small wire applications



Example: The Komax Alpha 355 lead maker can be equipped with special application tooling kits and applicators for small wire sizes.



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# Lead Makers

## Gamma 255 Fully Automatic Crimping Machine

The Gamma 255 lead maker is a flexible fully automatic crimping machine for efficient wire processing. It processes cross sections in a range from 0.0123 mm<sup>2</sup>/AWG 36 to 2.5 mm<sup>2</sup>/AWG 14. It is compatible with all commercially available applications. It also handles double-sided crimped wires as short as 20 mm. The entire cross section is processed using programmable, highly dynamic servo-drives and V stripping blades.

As part of its standard equipment, the machine has a prefeeder, splice, wire-end and knot detection, as well as two wire straightening units. A bad wire handling system with automatic post-production is also integrated in the Gamma 255 lead maker. To verify quality, you can also integrate devices for measuring crimp height and pull-out force right into the production process. The compact layout is carefully thought-out and allows you to change over from crimping to twisting, fluxing and tinning very fast.

With its vertically opening safety cover, the Gamma 255 lead maker is readily accessible from all sides. Operations and material handling are convenient and simple. The reliable TopWin software user interface adds to this high level of user convenience in over 20 different languages.

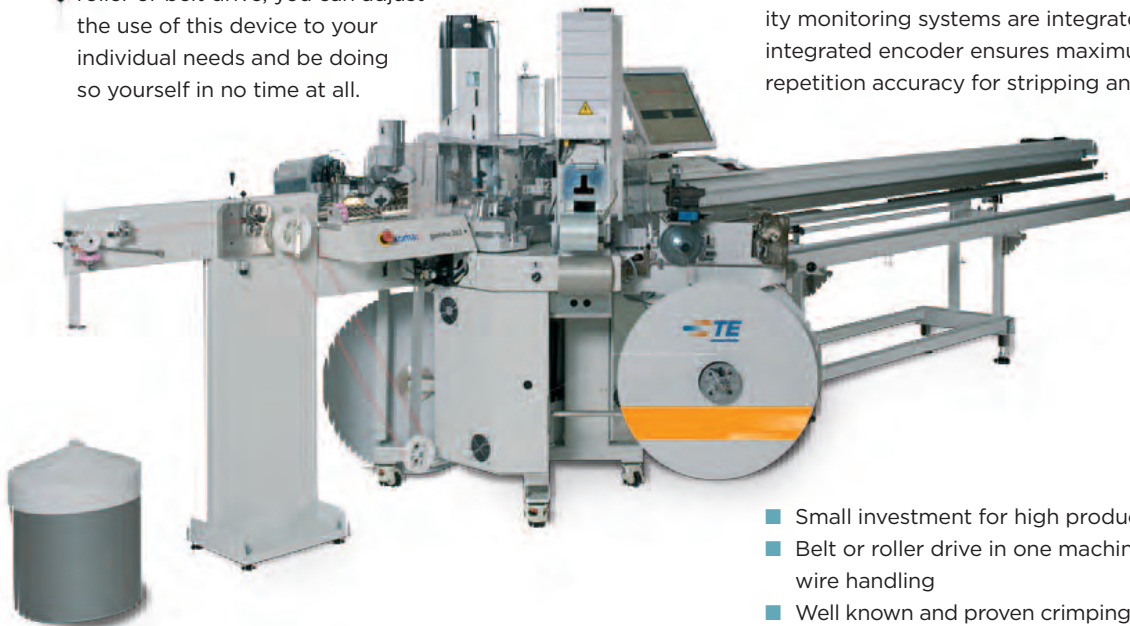


## Gamma 263 Fully Automatic Crimping Machine

Although compact in size, this fully automatic crimping machine combines simplicity and functionality with economy and process reliability to deliver a high piece output. It is a real hit when it comes to obtaining excellent value for money. Whether you opt for the

- roller or belt drive, you can adjust the use of this device to your individual needs and be doing so yourself in no time at all.

The machine is designed for one and two-sided crimping and for one-sided seal loading. The wire transport system ensures gentle processing of varying conductors with cross-sections ranging from 0.13 mm<sup>2</sup> to 4 mm<sup>2</sup> (26–12 AWG). Proven quality monitoring systems are integrated. A second integrated encoder ensures maximum length and repetition accuracy for stripping and wire length.

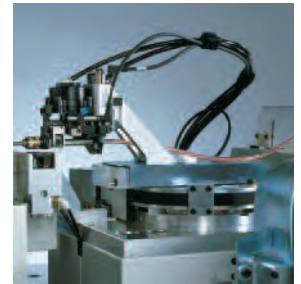


- Small investment for high production output
- Belt or roller drive in one machine for gentle wire handling
- Well known and proven crimping press technology
- Compact and user friendly on smallest floor space
- Highly ergonomic thanks to the touch screen control

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# Lead Makers

## Gamma 333 PC-B Flexible Wire Processing



The Gamma 333 PC-B lead maker is a flexible fully automatic crimping machine for efficient wire processing. It processes cross sections in a range from 0.13–5.0 mm<sup>2</sup> (AWG 26–AWG 10).

Short conversion times, additional applications and a user-friendly user interface with multiple-language capability. The Gamma 333 PC-B lead makers with belt-drive makes it all possible! With its third processing station and state of the art control software, you are provided high flexibility and an even more efficient way of meeting your wire processing needs.

With an additional processing station on side 1, the Gamma 333 PC-B lead maker enables you to crimp both ends of the wire, to create double crimp connections with three different contacts, to carry out one-ended seal application, tinning or ink-jet marking.

In addition, process monitoring is all integrated to ensure that the wire is cut to length and stripped perfectly.

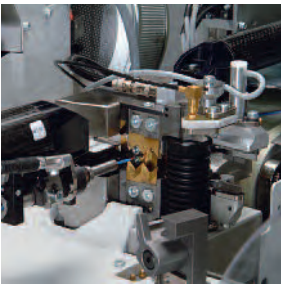
- Exact reproducible settings for processing stations
- Maintenance-free step and servo motor of top quality
- Very short conversion times thanks to integrated processing modules
- Highly comfortable and convenient to operate thanks to graphic-based Top-Win software
- User specified language - more than ten different languages to choose from
- Integrated good/bad sorting
- Can be networked with additional WPCS (Wire Processing Communication Standard) software

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# Lead Makers

## Alpha 355 and Alpha 355 S Fully Automatic Crimping Machines



Short setup and changeover times, integrated quality measurements, and top performance are the three main features of the Alpha 355 fully automatic crimping machines.

### Alpha 355 Lead Maker

The Alpha 355 lead maker is designed for one and two-sided crimping and seal loading. It even handles double-crimp connections involving varying lengths and the same wire types without any problem. The precise dual-channel blade system allows for a large range of wire sizes without blade changes. With options like the manual wire selector and/or the quick-change system for crimping tools, materials and tools can be prepared for the next job while the machine is running.

- Short changeover times
- Reliable process monitoring
- High production output
- Setup of next job while production of current job is underway
- WPCS (Wire Processing Communication Standard)
- Q-monitoring, CFA+ (Crimp Force Analyzer), SPM (Seal Position Monitor)

### Alpha 355 S Lead Maker

The Alpha 355 fully automatic crimping machine is a proven performer and now available in a model offering the flexible selection of modules. The high safety cover and the flat table design is the most striking difference between this version and the Alpha 355 lead maker. It allows processing modules not specifically designed for certain machines to be mounted. One of the two module slots on each processing side is fitted with special mounting tables to accommodate the various mounting methods. Combined with the ingenious open-ended software interface, the flexibility of the Alpha 355 S lead maker can be increased.

- Flexibility in module selection
- Reliable basic machine
- Open-ended software interface
- WPCS
- Q-monitoring, CFA+ (Crimp Force Analyzer), SPM (Seal Position Monitor)

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## Alpha 356 Fully Automatic Crimping Machine



The Alpha 356 fully automatic crimping machine has room for up to seven processing stations.

A wide variety of configurations are possible, in fact, almost any combination of crimping, seal loading, fluxing/tinning, twisting, fitting with insulating sleeves and end sleeves for strands as well as bulk turned contacts and customer-specific processes. In a configuration featuring three crimping presses, for example, you can crimp the three wire ends for double-crimp connections with different contacts or select different articles without a machine changeover.

With the rotating wire selector and the TopWin user software, you can complete most of the preparations for the next job while the current one is still being produced on the machine.

Crimping tools, contact rolls and other application-specific parts can be changed without tools. Thanks to the use of the modern technology, the production output – and the degree of process control – is extremely high in this machine generation.

- High flexibility with up to seven processing stations
- Both standard and customer-specific processes can be integrated
- Wide choice of different processing configurations
- High productivity thanks to the latest technology
- Integrated quality measurements
- Next job can be prepared while machine is processing current job
- Combinable in networks using WPCS (Wire Processing Communication Standard) interface



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# Lead Makers

## Alpha 433 H Fully Automatic Crimping Machine



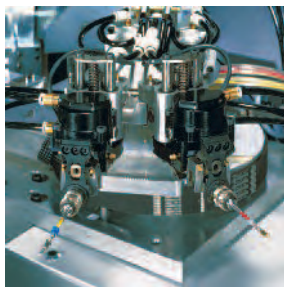
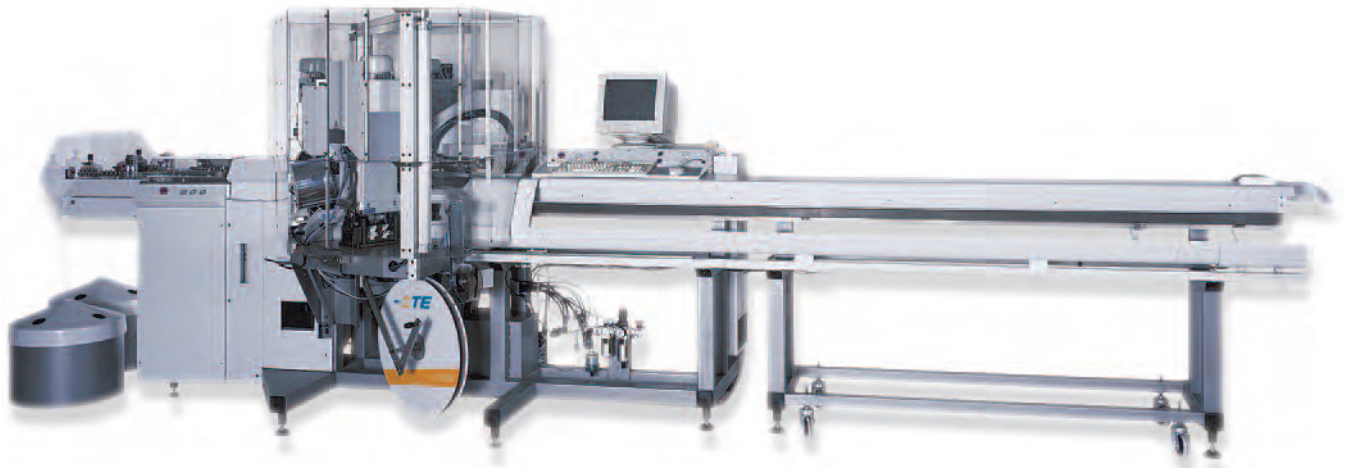
The Alpha 433 lead maker is a flexible fully automatic crimping machine for efficient wire processing. Large wires no longer pose a problem. The machine is capable of processing large wires from 0.20–16 mm<sup>2</sup> / AWG 24–6 (fine-wire conductors). The P104 crimping press delivers the requisite force to process large terminals. Terminals can be crimped on both ends but seals can also be loaded at one end. Wire processing to the most exacting standards – great versatility without conversion. The Alpha 433 fully automatic crimping machine is based on state of the art technology and is designed for processing single conductors as well as double crimp connections.

- High flexibility with up to five processing stations
- Short conversion times
- Maximum ease of operation thanks to TopWin user software
- Networkable with WPCS interface
- Modern quality monitoring
- Belt drive for high processing speed
- Extensive range of accessories



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## Alpha 477 Fully Automatic Crimping Machine



The Alpha 477 fully automatic double crimping machine allows you to process two different wires simultaneously to produce your choice of double crimp or single wires. The two wire drives are fitted with highly dynamic AC-servo axes and an integrated anti-slip system. With this sophisticated handling technology, two wires can be fed in parallel and their ends cut to length and terminated in a controlled process. Wires are handled gently throughout.

With four processing stations at the lead termination and two at the trailing end, you have a large number of possible processes at your command.

- No conversion required when switching from double crimp to single wire production
- Double crimp connections can be produced side-by-side or one above the other
- Integrated head separation and batch sorting
- Active good/bad wire sorting
- An ergonomic layout assures the operator optimum accessibility and minimal walking/reaching distances
- mci 722/mci 712 module assure superb flexibility and shorter changeover times
- Integrated quality monitoring
  - CFA (Crimp Force Analyzer),
  - SPM (Seal Position Monitor)with automatic post-production of defective parts
- Accommodates up to six processing stations
- Great ease of operation thanks to TopWin software
- Networking possibilities with reliable WPCS and special software

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# Lead Makers

## Alpha 488 Fully Automatic Processing Machine



The high machine output of twisted wires results from the parallel processing of the two conductors and a division of overall processing into three main processes, all optimally synchronized with each other. The linear wire draw-in unit with integrated delta length analyzer (DLA) assures the gentle handling of the wires. The twisting head with AC servo-drive is the heart of the Alpha 488 lead maker. The integrated twist force analyzer (TFA) enables uniform twisting by analyse the forces during the twisting process.

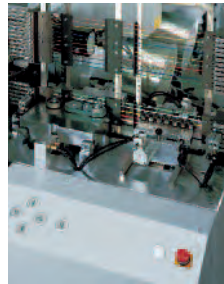
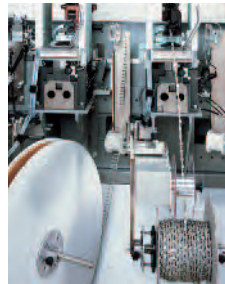
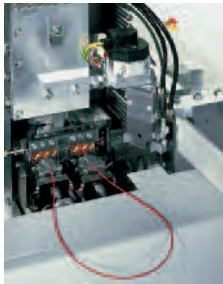
Drawing on continuous stock, the Alpha 488 fully automatic twister produces twisted pairs completely cut to length and terminated. It can handle wire cross sections ranging from  $2 \times 0.13 \text{ mm}^2$  to  $2 \times 2.5 \text{ mm}^2$  with no trouble at all. Four stations on side 1 and two stations on side 2 open up flexible processing possibilities such as two-ended seals loading and crimping.

- Complete processing of continuous stock into twisted pairs with processed ends
- Gentle handling of base stock to ensure high-quality end products
- Also possible to process different open ends up to 125 mm in length on side 1 (as an option)
- Usable as well for two-end crimping and seal loading on two identical single wires
- High degree of flexibility and reduction of conversion times
- Integrated quality monitoring
  - DLA (Delta Length Analyzer),
  - CFA+ (Crimp Force Analyzer),
  - SPM (Seal Position Monitor), also during twisting
  - TFA (Twist Force Analyzer)
- Active good/bad sorting
- Accommodates up to six processing stations
- Great ease of operation thanks to TopWin software
- Networking possibilities with reliable WPCS (Wire Processing Communication Standard) and special software



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## Zeta 633 L Fully Automatic Processing Machine



Zeta 633 harness maker is a highly flexible fully automatic crimping machine used for just-in-time production. With its flexible machine concept, the Zeta 633 harness maker opens up many possibilities for handling small jobs and wire sequences.

Up to 36 conductors are available for wire feed without changeover. Wire transport can be adapted to the specific properties of each conductor. Applying the loop transfer principle, the device feeds the two wire ends of the loop individually one after the other to the appropriate processing station.

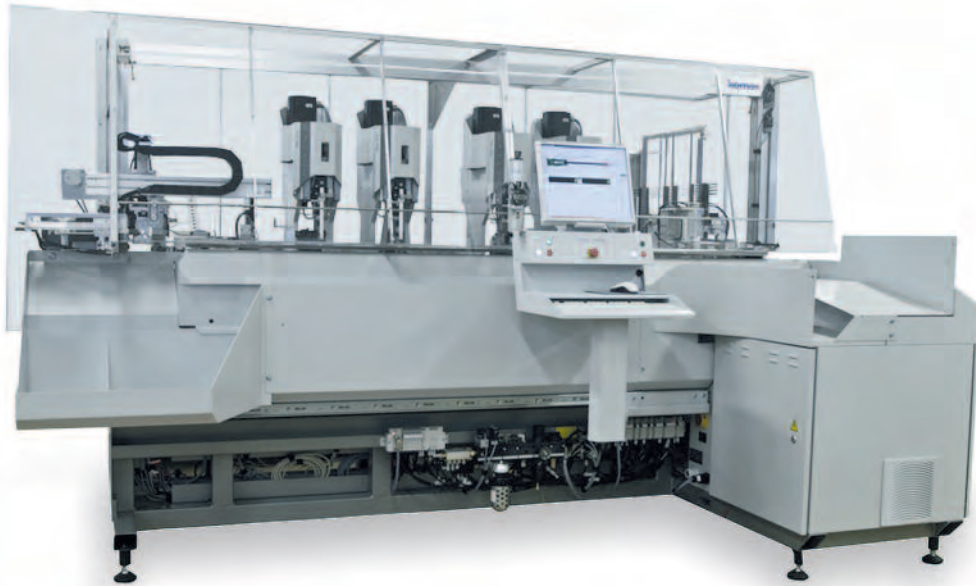
Modules can be configured as desired along the entire length of the Zeta 633 harness maker. That means total flexibility for each area of application. The Zeta 633 standard machine accommodates up to five processing stations, the Zeta 633 L Version even 8 processing station. If need be, both Zeta versions can be successively expanded and still have space for additional processing stations.

The wires can be bundled or deposited in predefined order as a chain.

- Up to 36 different conductors can be processed without changeover
- Station layout can be defined as desired
- Full integration of existing processing stations
- High processing quality
- TopWin software: Existing user expertise can be applied immediately.
- Excellent accessibility and safety
- Expandable
- Prepared for Zeta 651 and Zeta 655 machines
- Fully integrated quality monitoring with good/bad sorting
- Customer specified special applications possible

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## Zeta 651 Fully Automatic Processing Machine



Together, the Zeta 633 and Zeta 651 harness makers offer a reliable and attractively priced complete solution for the single-sided loading of single and double row blocks.

The Zeta 633 fully automatic crimping machine applies the loop transfer principle to feed the two wire ends of the loop individually one after the other to the appropriate processing station. With the Zeta 651 harness maker, the contacts are mechanically centered prior to loading and optionally rotated, if need be. The use of the reliable loading head and the process monitoring systems of the Zeta 655 harness maker ensure optimum loading. The entire loading process is monitored, from insert in chamber to correct locking. Blocks are fed automatically and can be replenished while the machine is running.

Feed and deposit can be adapted to meet the respective needs of the specific customer.

The long deposit system with batch separation and integrated bad part cutter is used for producing harnesses with long conductors up to 3000 mm in length.

- Fully automatic block loading
- Full integration into TopWin software
- Integrated process monitoring with good/bad separation
- Automatic block feed
- Blocks can be replenished while machine is running.
- Economical production of harnesses undergoing single-sided loading



## Zeta 656 Fully Automatic Processing Machine



The Zeta 656 harness maker is a block loading robot designed to take into account the ever smaller sizes of production batches. Thanks to its machine design, the Zeta 656 harness maker allows investment costs to be amortized in parallel on different types of wire harnesses, markedly reducing the cost per lead set. The Zeta 656 harness maker allows new applications to be subsequently incorporated. With the flexible pallet carousel, the most varied types of wire harnesses can be produced just-in-time and changeover times are very short. All the operator has to do to change over to a new type of block is switch the two pallets. The loading of each and every block is monitored and controlled by a force sensor.

The Zeta 633 basic machine has a 36-wire changer and several crimping stations with automatic crimp height adjustment, allowing far more than 300 different wire/terminal variations to be processed without any changeover

at all. In combination with a machine extension, another four processing stations can be accommodated. Moreover, wire marking systems can be connected, allowing different wires within the same harness to be marked with the operator's choice of black or colored text.

- Extremely broad variety of harnesses on one machine – no application-specific parts
- New applications can be easily added later on
- Economical even for tiny production batches
- Non-contact position recognition for the terminals
- Uniform top quality processing – high degree of process reliability
- Integrated quality monitoring with good/bad sorting
- Short amortization period

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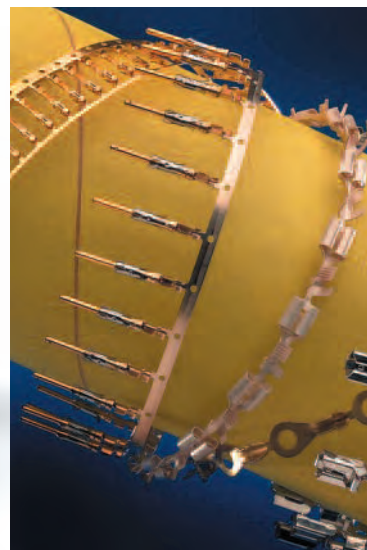
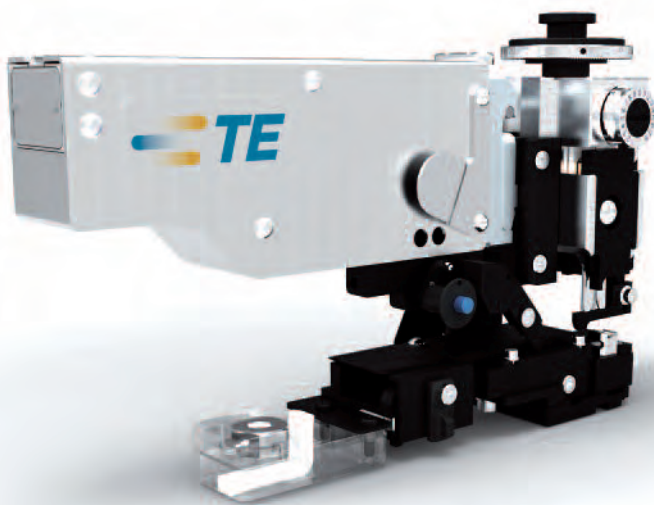
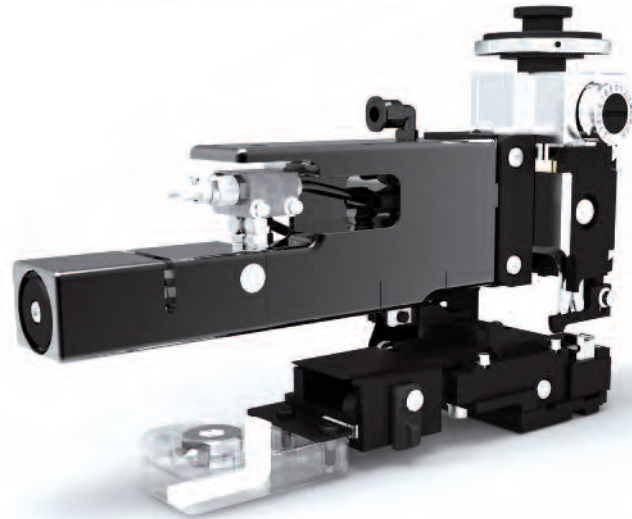
# Applicators

## Ocean Applicator Series

Crimping standards continue to rise to higher levels of quality and repeatability. Taking customer input and market demands into consideration, TE Application Tooling has created the Ocean Applicator series to meet those higher demands and to take terminal crimping to a new level.

By consolidating our applicator offering, TE can provide design consistency and tooling standardization to the market. One of the resulting benefits to customers of this consolidation is flexibility in the choice of feeding options: new and improved mechanical and pneumatic feeds along with the innovative and precise servo feed option. The Ocean Applicator series design also allows customers to perform field upgrades to system III technology. It provides an upgrade path for terminal intelligence that allows the machine to obtain set-up features as the applicator is upgraded.

- One applicator platform - modular family design
- Two ram interface styles
- Three interchangeable feed options:
  - Mechanical
  - Pneumatic
  - Servo



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## Applicator Wear Parts

### Applicator Wear Parts Stocking Programme

To ensure the support of our installed Applicator base, we have established a stocking programme for wear parts. Subsequently, all crimpers and anvils for your applicator are normally available ex stock, ensuring the shortest possible lead times.



### Wear Tooling to Apply Stainless Steel Contacts

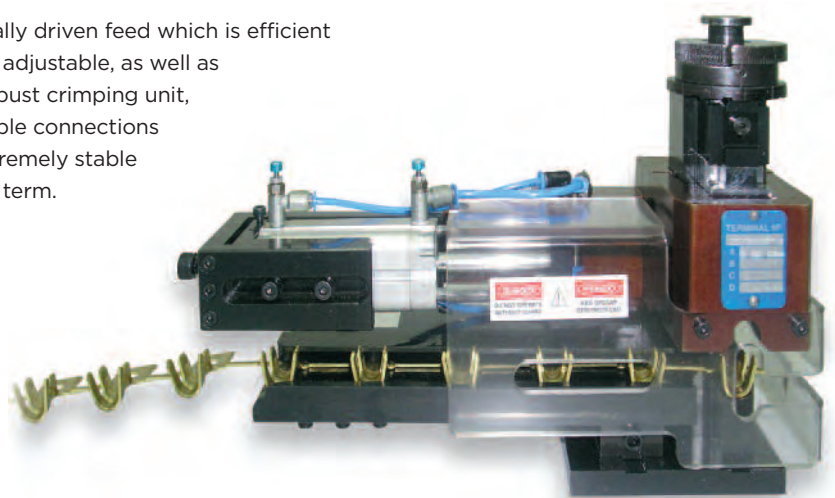
The application of nickel plated stainless steel terminals has always been a problem with regard to the uptime of the crimp tooling. We have developed crimpers and anvils, using special base materials and surface treatments in the crimp area. These have enabled us to significantly increase the tool life and thus reduce the applied cost of these products.

If you are experiencing specific wear problems in your production, please contact your TE Connectivity Service representative.

## Applicator for Large Wire Sizes

For processing of large contacts, eg for battery terminals, we offer heavy and solidly built tools, which are extremely precise in repetitive work for end-feed and side-feed contacts with large cross sections.

A pneumatically driven feed which is efficient and precisely adjustable, as well as a specially robust crimping unit, produce reliable connections which are extremely stable over the long term.



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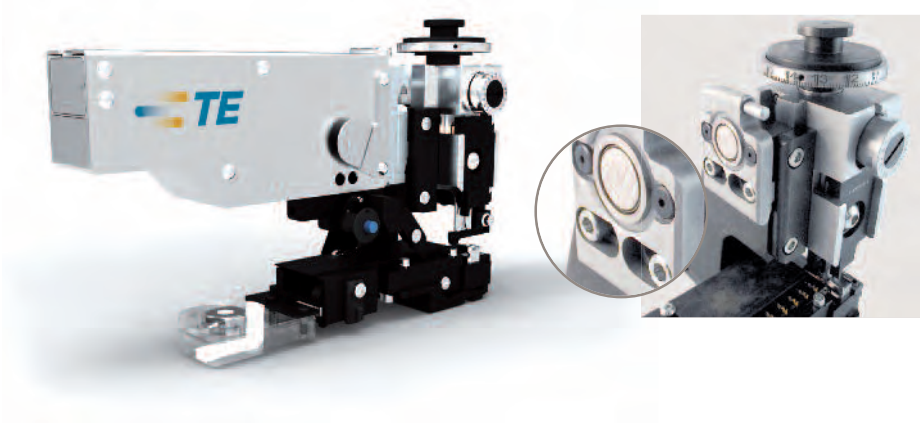
# Applicators

## Smart Applicator

Now it is possible to have smart applicators in any of the feed styles of the Ocean Applicator series. The system III applicator data is now extended to an entire smart applicator strategy. It allows the operator to conveniently view all the data about the applicator. The data contains serial numbers, part numbers, wearable tooling part numbers (and tooling cycle counters), strip length, instruction sheet numbers and more. This data includes the terminals, with acceptable crimp heights, that can be terminated with the applicator. With this information conveniently available to the operator, programming and verifying the crimp application has never been easier. Setup will be less time consuming and more accurate.

This system also extends the availability of the high-precision servo feeder technology recently developed by TE Application Tooling.

- Smart applicator data module stores complete information about the applicator
- Feeder automatically reads terminal information from the applicator data chip



TE Application Tooling has teamed up with Komax Wire to provide a fully integrated smart applicator system into a wire-processing machine. This smart applicator solution is a must for any demanding harness manufacturer. Your wire-processing machine is now able to verify that the applicator installed in the machine is capable of terminating the programmed terminal and that the crimp height specification is correct. This integration allows the operator to view all the applicator data and maintenance counts, wearable tooling, crimp heights, strip length and list terminals that can be used. When a smart applicator is attached to the machine, the operator can select the terminal from a list while programming the article. This makes setup less time consuming and more accurate. With other information provided by the applicator programming parts and verifying application is easy.

- Verification of the installed applicator
- View applicator data
- Less time consuming and more accurate setup



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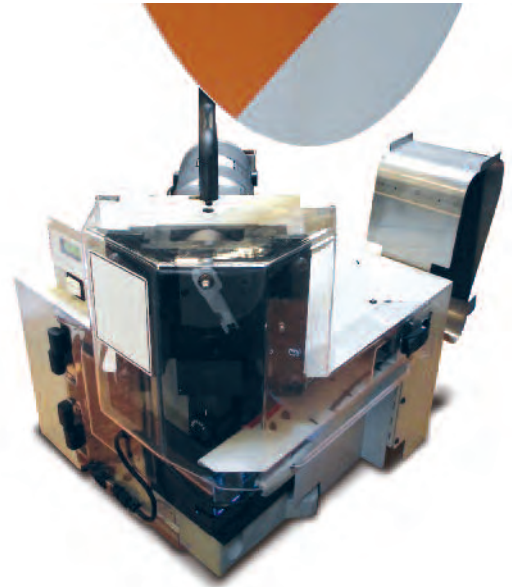
# Crimping Machines and Accessories

## AMP 5K/40 Splice Terminator

Applying thru-splices is fast and efficient when you have access to both sides of the applicator for placing and holding the wires. The AMP 5K/40 splice terminator and splice applicator have been designed with this efficiency in mind. Specifically designed for thru-splice and short lead length applications, the AMP 5K/40 splice terminator combined with a splice applicator provides open access in front of and behind the crimper for controlled wire placement close to the crimping area in order to maximize production efficiency. The splice terminator also has full guarding with interlocks that meet the latest CE requirements for operator safety.

The splice terminator is offered in two versions, with and without crimp quality monitoring (CQM II). Equipped with optional CQM II, five different crimp analysis methods, including crimp height, can be used during every crimp cycle, providing real-time monitoring.

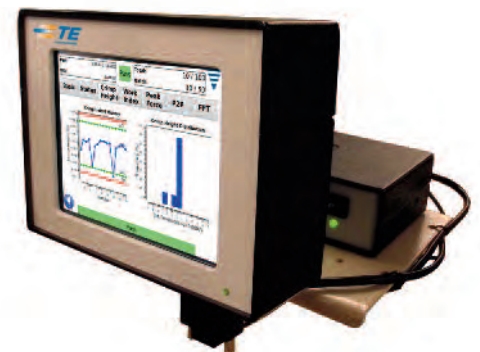
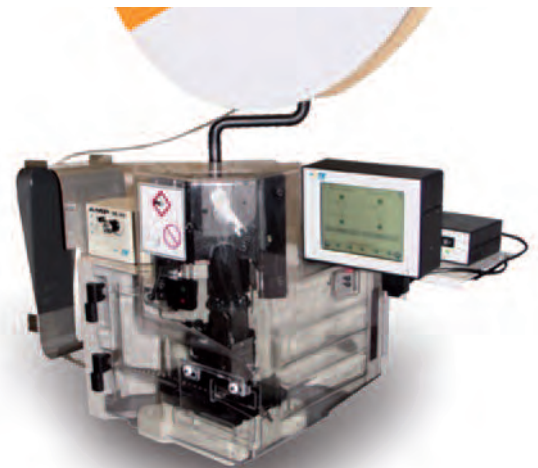
Each unit includes fine crimp height adjustment, total/batch counters and capabilities for jog operation. The AMP 5K/40 splice terminator does not accept heavy-duty (HD-M or HD-I) applicators.



## Crimp Quality Monitor II (CQM II)

Simply put, crimp height measurement is the best non-destructive way to meet the stringent mechanical and electrical properties of the crimp. The CQM II is the only crimp monitoring system that offers continuous crimp height analysis for every crimp produced. This analysis helps produce quality crimps and helps detect faulty crimps. In fact, the new CQM II features five different methods of process analysis to give you more choices to observe and monitor the process than ever before. These five analysis methods can be used individually or in combination to provide flexible, complete coverage of the crimping process. All functions are controlled through the touch screen, with a new, intuitive and easy-to-use graphical interface. Now, for the first time, the CQM II can be used on non-TE terminators, allowing you to standardize and provide TE crimp quality monitoring across your production area.

Look no further than the TE Application Tooling CQM II for an effective, easy-to-use crimp quality metric and real time 100% crimp height measurement when used on TE terminators.



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# Crimping Machines and Accessories

## SC15 Stripper Crimper

The pneumatically and electrically driven SC15 crimping machine is a particularly efficient and operator friendly crimping machine with outstanding repetitive precision, which satisfies the highest requirements. It can be adjusted to the specific requirements of any given contact/cable connection.

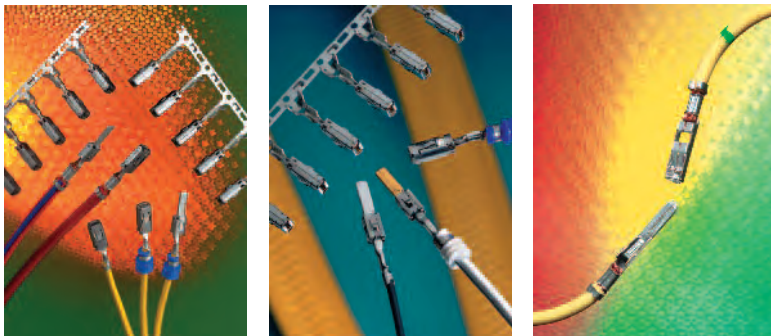
If you

- want to strip a cable composed of many wires down to only 13 mm,
- would like to then insulate these single wires at 2 mm to 6 mm and thereby
- cover a wire size area of from 0.09 mm<sup>2</sup> to 4 mm<sup>2</sup>

then with the stripper crimper SC15 you have made the right decision.

Further features are:

- Automatic bare wire recognition
- Crimp force monitoring
- Remote diagnoses via serial interface



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# Crimping Machines and Accessories

## BT 752 Stripping, Sealing and Crimping Machine

The BT 752 delivers three processes in a single device: stripping, seal loading and crimping. Reliability and top production performance coupled with the user friendly TopTouch interface are the features that make this semi-automatic device such a compelling product. The BT 752 is an economical alternative to fully-automatic machines.



- Ultra-short setup and cycle times
- Ultra-simple changeovers
- Active quality control
- Integrated crimp force analysis
- Simple operation with TopTouch
- Seal applications compatible with mci 761, mci 762 and bt 700

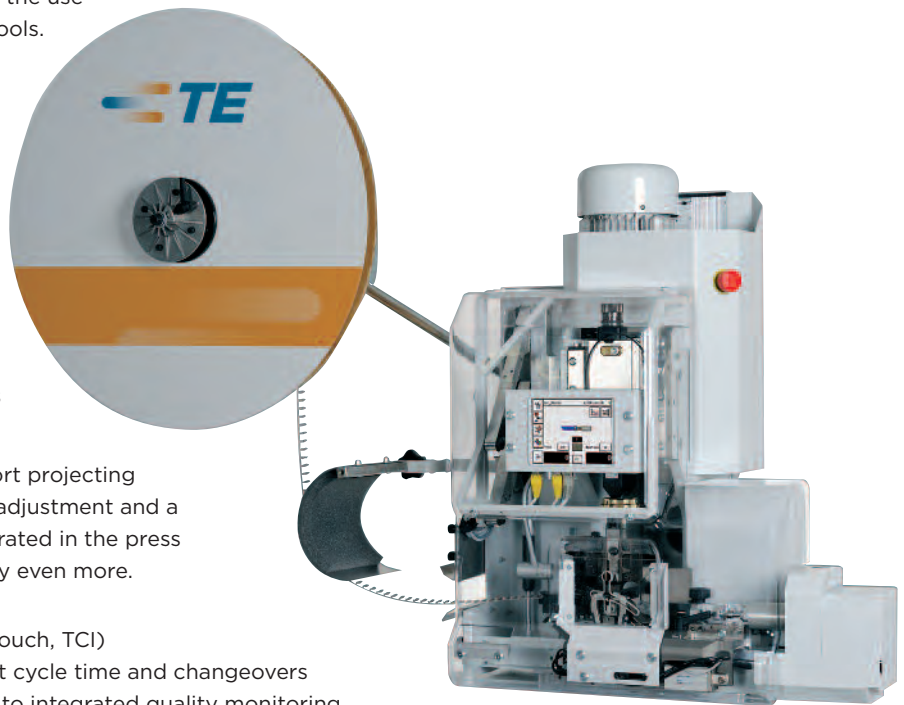
## BT 712 Bench Top Crimping Machine

This all-purpose press accommodates the use of all common commercial crimping tools.

The software (in 12 languages) can be operated from a small touch screen interface (TCI). The bench top press is also a service tool with a data memory for storing up to 500 articles, for making backups and for uploading updates. The crimp force analyzer that comes with the press detects good and bad wires reliably and gives a detailed description of errors.

Proven and useful options such as short projecting cable, bad contact cutter (BCC), fine adjustment and a contact strip chopper can all be integrated in the press to boost efficiency and process quality even more.

- Simple and intuitive controls (TopTouch, TCI)
- High daily output due to ultra-short cycle time and changeovers
- Reliable bad part detection thanks to integrated quality monitoring
- Integrated crimp force analysis
- Good value for the money



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# Crimping Machines and Accessories

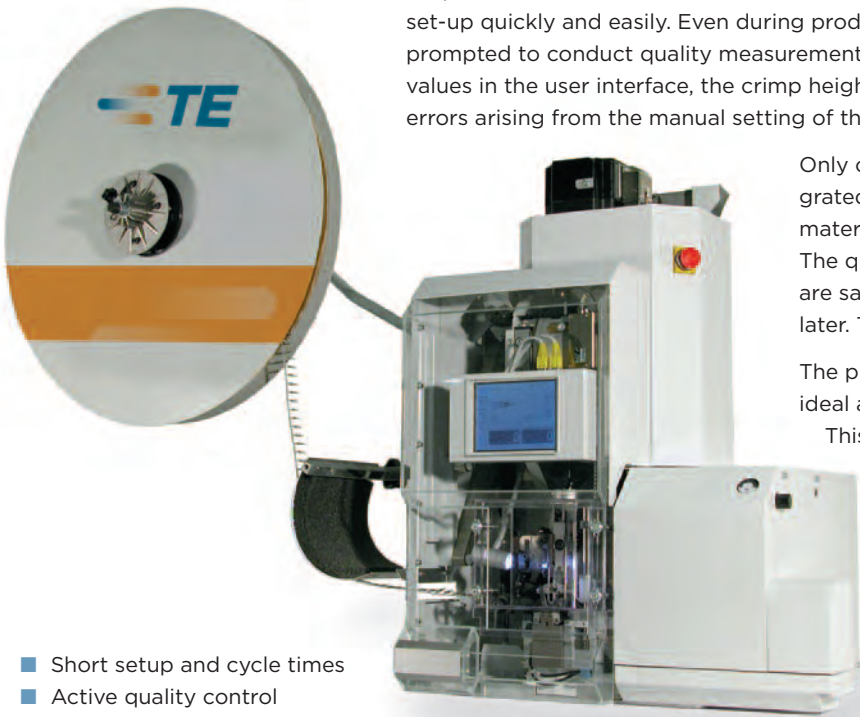
## BT 722 Crimping Machine

The BT 722 crimping machine is used for the manual crimping of contacts. The BT 722 is operated from a touch screen. The new TopTouch user interface allows jobs to be set-up quickly and easily. Even during production set-up, the machine operator is prompted to conduct quality measurements. Following the input of the calculated values in the user interface, the crimp height is automatically corrected. This prevents errors arising from the manual setting of the crimp height.

Only one crimp is needed for referencing the integrated crimp force monitoring. This reduces waste material consumption and minimizes set-up time. The quality values measured during production are saved and can therefore always be called up later. This ensures traceable quality at all times.

The programmable DigiStripper (Option) is an ideal accessory to the BT 722 crimping machine.

This can be set-up without any mechanical adjustment. Thanks to the functions zero cut and pull back, as well as the pre-programmable cutting depth, the perfect stripping is ensured.



- Short setup and cycle times
- Active quality control
- Simple operation with TopTouch
- Integrated crimp force analysis
- Integrated handling of bad terminals

## Gauge for Presses

In order to help you to ensure that our applicators are placed correctly in the presses we offer you this press gauge.

It is possible to have a mis-alignment between the center of the applicator and the terminator due to the way they mount in the terminator. If this happens, a side load is applied to the applicator which can lead to pre-mature wear and/or quality problems with the crimped terminals.

The use of the gauge is simple: You install the press gauge into the press like an applicator. Then you unlock the gauge head, on which is mounted a gauge ring. A spring in the gauge is now pressing the gauge head upwards. The gauge ring should now fit easily into the press head. If this is not the case the applicator ram would not be in a centred position and the mounting plate of the press has to be adjusted. The special design of the press gauge base plate allows free access to the press mounting plate fixing screws.



# Crimping Machines and Accessories

## Crimpmatic 970/971 Crimp Machine for Reeled or Loose Piece Terminals

Both machine versions permit the cost effective manufacturing of crimp connections with a high production efficiency. The Crimpmatic 970 machines are capable of processing wires of up to approx. 16 mm<sup>2</sup> (AWG 5), depending on the terminal stock thickness.

- Compact, space-saving design
- Compatible with MQC applicators
- Step mode during set-up

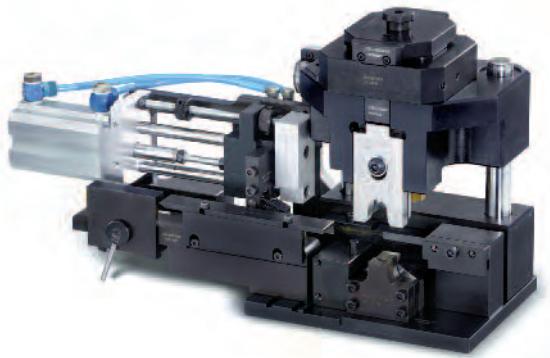
The Crimpmatic 971 machine is capable of processing wires of up to approx. 50 mm<sup>2</sup> (AWG 0), depending on the terminal stock thickness. The machines can be equipped with a quick change device for power crimp tools. MQC applicators with a lower dead center of 135.78 mm can be mounted by means of an adapter plate. These machines can be utilized as manual work stations and can be integrated into fully-automatic processing lines. The terminator as shown is a manual work station Crimpmatic 971. The unit can be supplied with or without crimp process monitoring, or it maybe retrofitted later.

Options are available upon request

- Crimp force monitoring
- Paper spooler
- Adapter plate for MQC applicator

Applicators

- Especially designed for larger wire sizes
- Pneumatic feed
- Can be used with both crimp presses Crimpmatic 970 and Crimpmatic 971



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# Crimping Machines and Accessories

## AT-SC Pneumatic Safety Crimping Machine for Loose Piece Terminals

Maximum ease of use with optimum safety was the challenge when developing this pneumatic crimping machine for loose contacts.

This pneumatic crimping machine features a newly developed safety mechanism, and is designed to crimp connections up to 50.0 mm<sup>2</sup> depending on the terminal design. By means of a fitted safety valve, crimping is not released where the size of the opening between the impact surfaces of the dies exceeds 5.9 mm. Consequently, there is no need to specify any safety covers to protect the operator.

- Parallel closing mechanism
- Variable closing speed
- Electronic piece counter
- Safety system



## AT-55 Pneumatic Crimping Machine for Loose Piece Terminals

This pneumatic crimping machine was designed for crimping insulated and non-insulated terminals from 0.14 mm<sup>2</sup> to 120.0 mm<sup>2</sup> depending on the terminal.

With the additional of an optional cutting unit, the AT-55 crimping machine is able to cut ribbon cable up to a width of 30.0 mm as well as copper conductors up to max. Ø 28.0 mm.

This series is equipped with a battery cycle counter. Safety guards allow crimp terminals up to a diameter of 25.0 mm. Larger terminals can be applied upon request.



## AT-66 Hydraulic Crimping Machine for Loose Piece Terminals

The AT-66 hydraulic crimping machine features an extremely compact design resulting in low space requirement. The hydraulic power is provided by a separate hydraulic unit with main switch, power distribution and pump. The machine offers possibilities for various applications with a crimp force of 150 kN and an open operating space of 100.0 mm in height.

A key operated switch protects the basic and operation data. It permits adapting and safeguarding the particular procedure for the application. The fitted memory module allows 250 different programs to be stored.

- Programmable
- Key operated switch protected user interface
- Fast changeover times
- Compact design
- Short cycle time



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# High Voltage Applications

## High Voltage Terminator (HVT)

With fossil fuels in increasingly short supply and a growing environmental awareness, almost all car manufacturers are now offering electric powered vehicles. The current focus is on hybrid technology. To direct the power created to the various units, the contact components need to be sized accordingly. The new high voltage contact system covers the 16–50 mm<sup>2</sup> cross section range.

To date the batch totals have been relatively small, which means that the manufacturing process has been carried out by hand in several stages. Special stripping devices with a coil mechanism are used in the wire preparation, which consists of separate phases of marking the wire, stripping, trimming and reeling. The challenge here is to handle this kind of wire dimension, as the process can quickly produce wire weighing in excess of 30 kg.

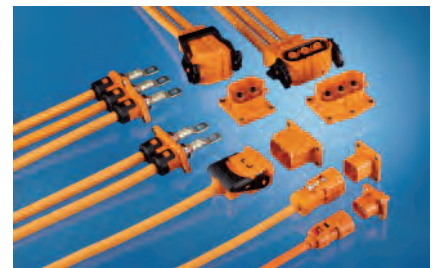
Another challenge is to process the braid. Here we now apply the processing concept developed by TE Application Tooling, thus making the process steps of crimping the wire and shield into a semi-automated and checked process operation.

The crimping machine uses applied encodings to detect whether the right tool has been used. The operator now joins the contact part to the wire in the specified crimp position and fixes the wire with a clamping device. The crimping process can now begin through two-handed operation. When the wire has been crimped, the crimp cavity carriage is moved to crimp the braid.

Monitoring the crimping process with proven crimp monitoring systems and using a PLC ensures a high quality crimp connection. It also ensures that the operator carries out the processing stages in the right order using all the components. Only when the crimp monitoring system certifies a good crimp and the programmed process stages have been observed can the fully crimped wire be removed.

The crimping machine used has been designed to allow the applicator to be replaced by another without too much effort. This allows all the latest high voltage contact systems to be processed.

Depending on the contact being used, crimping force monitoring can be used for checking the wire crimp. The PLC that is used ensures that all the processing steps are performed in the specified sequence and with the necessary care.



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# High Voltage Applications

## Hydraulic Crimp Tool

Owed to the increasingly limited fossil fuel resources and a generally growing environmental awareness, practically all vehicle manufacturers offer vehicle models with electric drive train components. The current focus in Europe, for instance, is on hybrid electric cars.

To conduct the necessary high voltages and currents to the individual components within this type of application, the terminals need to have a sufficient dimension. Therefore the current high voltage interconnection system covers wire sizes between 16 and 120 mm<sup>2</sup>. The hydraulic application tool is suited for the ultimate interconnection quality.

TE Application Tooling together with renowned tool manufacturers offers application tooling based on a hand tool in order to support the economic production of high voltage harnesses in low volumes. During development of the hydraulic manual crimp tool and crimp dies for connections of the highest quality, tool ergonomics ranged particularly high. The portfolio includes dies with contact locator for the wire crimp and shield crimp. In addition the manual hydraulic crimp tool can be mounted on a rack which is equipped with a cable clamp. The rack can be fixed onto the workbench.



Among the many advantages of this design are:

- High-quality crimp connections
- High-precision contact and crimp barrel positioning
- Easy set-up
- Safe and simple operation
- Cable clamp prevents tensile loads during crimping
- Economic and flexible production of small lots

**TE Connectivity Crimp Technology**  
TE APPLICATION TOOLING

### Quality Guidelines

Correct		Incorrect	Test
<p><b>WIRE CRIMP</b> Correct crimp height and insulation thickness</p> <p>Use correct pressure Locking force not too high All crimps are equally consistent and uniform</p>	<p><b>WIRE CRIMP</b> Incorrect crimp height and insulation thickness</p> <p>Too high and too low Too low and too high Too high and too low Too low and too high</p>	<p><b>WIRE CRIMP</b> Correct crimp height and insulation thickness</p> <p>Correct crimp height and insulation thickness</p>	<p><b>WIRE CRIMP</b> Correct crimp height and insulation thickness</p> <p>Correct crimp height and insulation thickness</p>
<p><b>INSULATION CRIMP</b> Correct insulation thickness, application and location</p> <p>Insulation is correctly held Crimp barrel closed</p>	<p><b>INSULATION CRIMP</b> Incorrect insulation thickness, application and location</p> <p>Insulation is not correctly held Crimp barrel open</p>	<p><b>INSULATION CRIMP</b> Correct crimp height and insulation thickness</p> <p>Correct crimp height and insulation thickness</p>	<p><b>INSULATION CRIMP</b> Correct crimp height and insulation thickness</p> <p>Correct crimp height and insulation thickness</p>
<p><b>SHIELD CRIMP</b> Correct crimp height and insulation thickness</p> <p>Insulation is correctly held Crimp barrel closed</p>	<p><b>SHIELD CRIMP</b> Incorrect crimp height and insulation thickness</p> <p>Insulation is not correctly held Crimp barrel open</p>	<p><b>SHIELD CRIMP</b> Correct crimp height and insulation thickness</p> <p>Correct crimp height and insulation thickness</p>	<p><b>SHIELD CRIMP</b> Correct crimp height and insulation thickness</p> <p>Correct crimp height and insulation thickness</p>
<p><b>WIRE BUSH CRIMP</b> Correct crimp height and insulation thickness</p> <p>Insulation is correctly held Crimp barrel closed</p>	<p><b>WIRE BUSH CRIMP</b> Incorrect crimp height and insulation thickness</p> <p>Insulation is not correctly held Crimp barrel open</p>	<p><b>WIRE BUSH CRIMP</b> Correct crimp height and insulation thickness</p> <p>Correct crimp height and insulation thickness</p>	<p><b>WIRE BUSH CRIMP</b> Correct crimp height and insulation thickness</p> <p>Correct crimp height and insulation thickness</p>

All figures are schematic depictions. In every case, relevant product and application specifications take precedence.

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# Cross Section Laboratories

## Micrograph Laboratories for IDC and Crimp Contact Systems

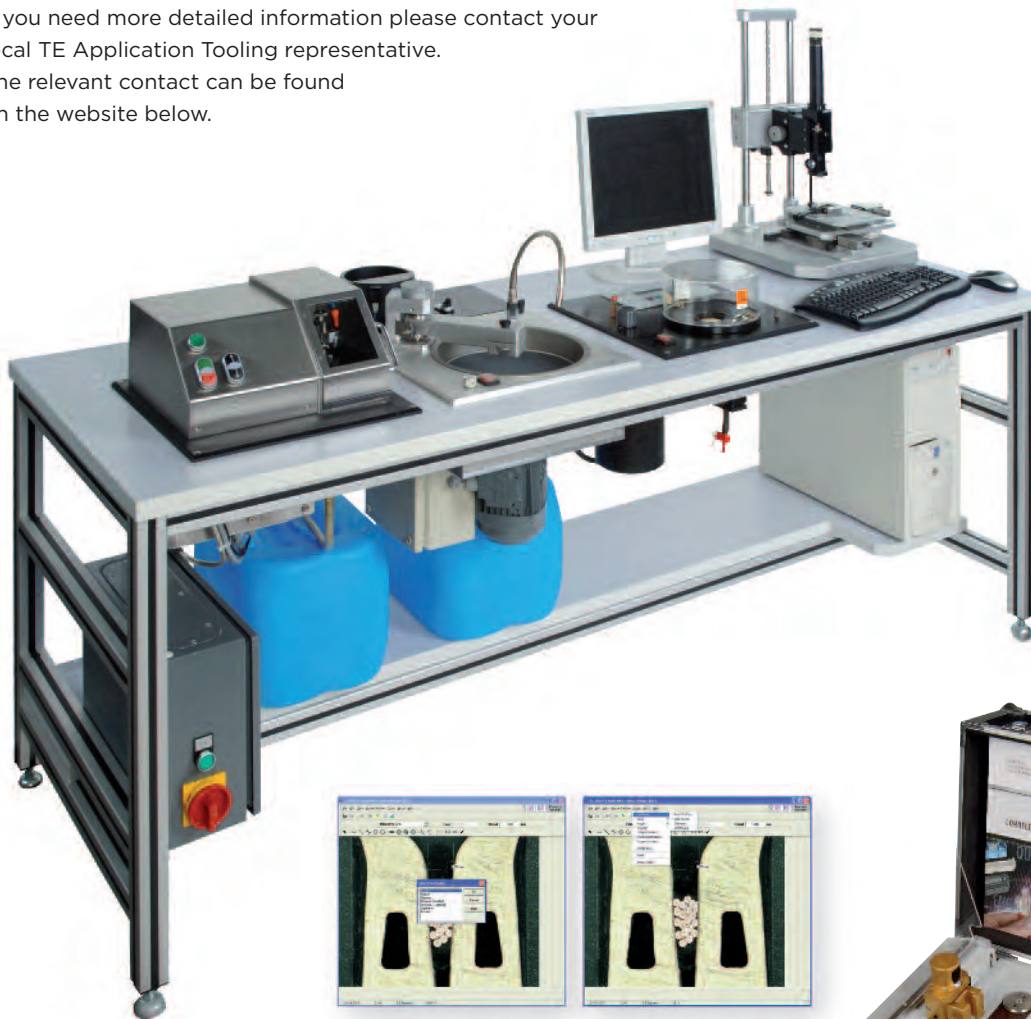
The micrograph laboratory is designed for TE Connectivity terminal systems but is not restricted to them. With a modified sample holder, cross sections of competitors products are also possible. The flexibility of the laboratory allows cross sections of a variety of terminals.

Better than conventional processes the new cutting method makes potting and long drying times a thing of the past. So processing time can be reduced dramatically.

For special requirements an optional impregnation module is available. With it the cutting area can be lightly fixed.

If you need more detailed information please contact your local TE Application Tooling representative.

The relevant contact can be found on the website below.



- Quick process flow of 5 to 10 minutes
- Sample range: 0.22 mm<sup>2</sup> up to 100 mm<sup>2</sup>, depending on sample holder
- No cross section potting
- Evaluation according to DIN and different electrical and physical parameters
- PC specific software for micrograph evaluation

- Compact, easy to operate
- Sample range: 0.22 mm<sup>2</sup> up to 6 mm<sup>2</sup>
- Optional electrolyte etching module
- Easy fixation station for sample holder
- Secure mechanism for optic during transportation
- 1.3 megapixels USB 2.0 camera with SL Vision II evaluation and documentation module

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# Cross Section Laboratories

## Automatic Micrograph Laboratory for Crimp Terminal Systems

The automatic micrograph laboratory allows continuous preparation and analysis of micrographs.

It is the ideal solution for production lines especially in the automotive wire harness industry, thanks to small footprint, low weight (app. 35 kg) and short cycle time for micrograph production time down to 1 minute per sample.

Cutting and grinding are done fully automatically. Therefore the automatic micrograph laboratory provides excellent repeatability.

- Compact automatic micrograph laboratory for production of micrographs within shortest time.
- Automatic sample transport system conveying the mobile sample holder through the stations for sample cutting and grinding
- Accurate alignment of the sample with the sample holder by laser
- Sample range: 0.08 mm<sup>2</sup> up to 6 mm<sup>2</sup>
- Integrated etching system
- Integrated optical evaluation system for micrograph analysis



# Wire Preparation Equipment

## AT-SC Wire Stripping and Twisting Machine



The AT-ST machine strips and twists wires with sizes from 0.03 mm<sup>2</sup> up to 6 mm<sup>2</sup> /

AWG 32-10. The adjustable turret head with 8 guide tubes for different wire sizes centralizes positioning of wires. Special ground blades cut and strip special insulations.

The machine can be set either clockwise or anticlockwise dependent on wire drilling direction.

- Adjustable turret head
- Cutting/Stripping blades for special insulation
- Stripping and twisting process

## AT-FE 0400 Strip Box

The strip box is an electric driven machine to strip standard PVC (polyvinylchlorid) wires up to an outside diameter of 4.2 mm. Except of power supply no further equipment required. Due to the low weight the AT-FE 0400 machine can be placed on nearly every workplace.

- Electrically driven
- Simple adjustment
- Easy handling
- Stepping switch for manual operation
- Small space required
- Practically maintenance-free
- Clear cut through insulation by special shape of cutting blades / 4 cutting blades
- Continues adjustment of wire size and stripping length



## Universal Stripping Machine

The machine is a pneumatic wire and cable stripping machine and the perfect solution for stripping discrete wires and small multi-conductor cables up to 3.2 mm (0.12") outer diameter. The compact machine strips lengths up to 20 mm (0.78").

- Pneumatically driven
- Short cycle times
- Strips very short cables
- No blade change necessary
- Simple machine operation
- Robust & reliable



## Jacket Automatic Stripping Machine

The machine automatically strips jackets or insulation from thin round cables to difficult to hard-to-process power cables with an outer diameter up to 26 mm (1").

This versatile machine performs full strips, partial strips and window strips up to 200 mm (7.87") stripping length.

- Handles thick cables and tough insulation materials
- Partial and window strip capability
- Rotary incision head with 4-blade technology
- No blade changes required
- High flexibility



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# Wire Preparation Equipment

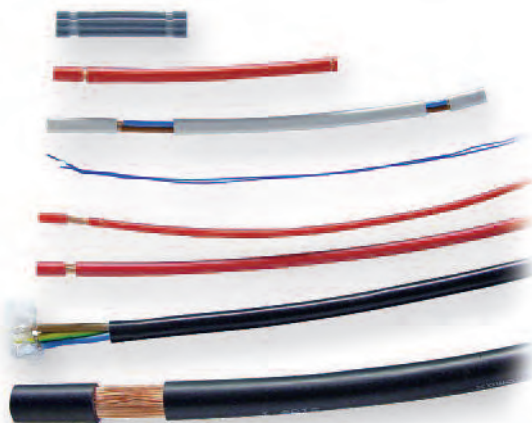
## Kappa Cut and Strip Family

The Kappa family strippers are ideal for cutting individual and special wires to length and stripping them. They can strip in sections, allowing them to strip even extremely long length in perfect quality. The machines cover an extraordinarily broad range of cross sections.

Kappa 310, 320, 321, 330 and 350 strippers support a variety of processing options such as wire marking with hot-stamp or ink jet markers. Hot stamp marking can even be done on the Kappa 310 stripper, the entry-level model.

New Kappa Generation:

- Dynamic, flexible cutting and stripping unit
- New intelligent sensors
- New electronic and software
- Optional TopWin™ connection



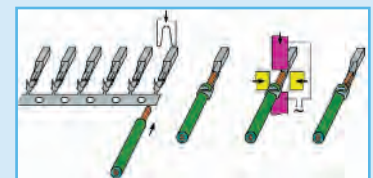
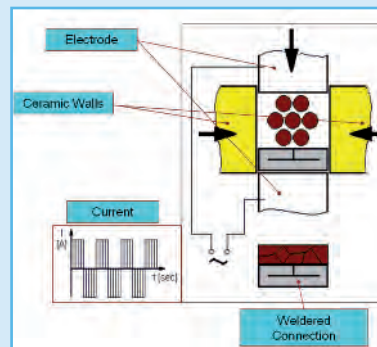
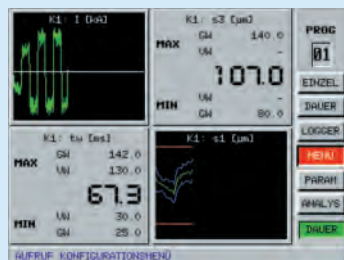
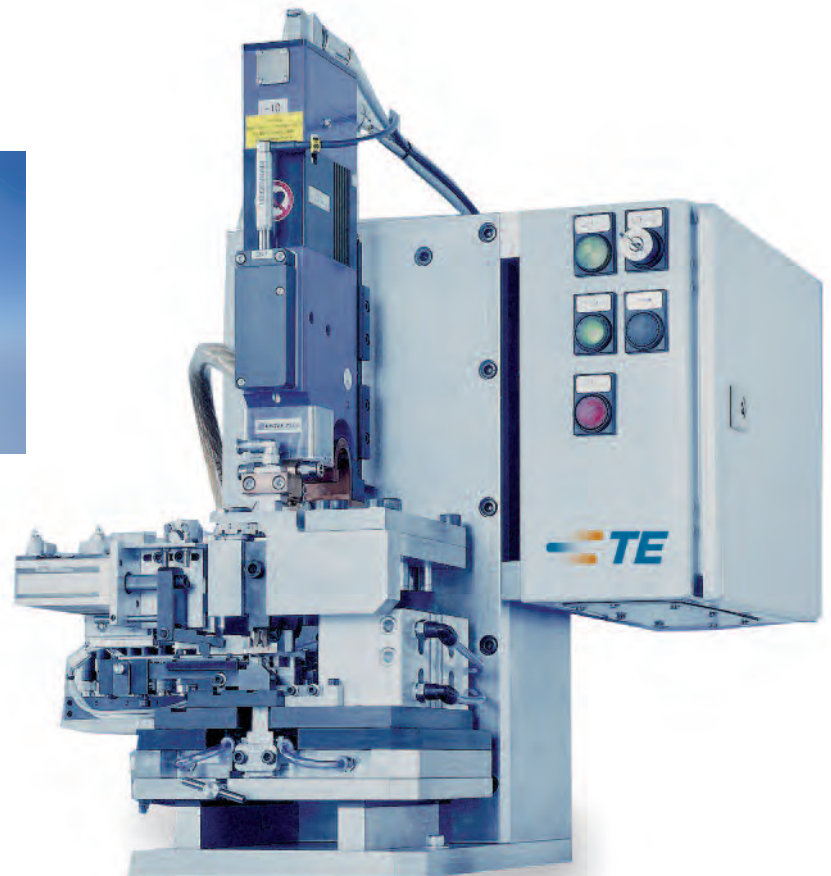
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# Resistance Welding Equipment

## Resistance Welding Module

TE Application Tooling offers semi- and fully-automatic modules for resistance compact welding of terminals. This resistance welding process allows us to achieve minimum transitional resistance between conductor and contact, higher current capacity and long-term stability of the wire termination.

In this process, the bundle of strands in the conductor is condensed into a block by side-mounted ceramic plates. After this the strand bundle is welded to the contact by the introduction of a powerful current via an electrode. Typical features of the resistance welding unit offered by TE Application Tooling are a very short cycle time, a long electrode life time, a fully-automatical parameter setting process and the recording of all process relevant data.



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# SOLARLOK Equipment

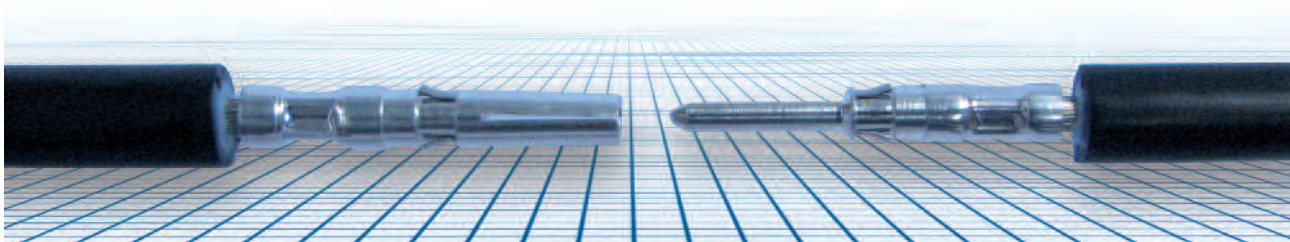
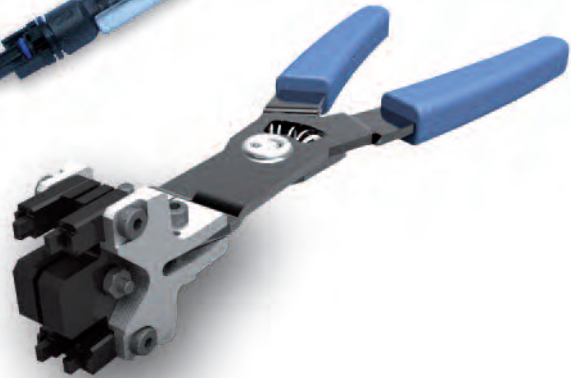
## Application Tooling for SOLARLOK Interconnecting Systems

A large share of the primary energy demand is covered by utilising solar energy. A significant part of photovoltaic installations are interconnection devices, featuring SOLARLOK terminals. TE Application Tooling offers the required tools and machinery for the production of related wiring.

Prior to the termination of the contacts to the wires (crimping), the solar cables must be stripped. This operation is performed either by hand tools or semi-automatic bench equipment, depending on the volume and the location.

For the termination of the screw machined contacts, hand tools and semi automatic bench equipment can be used.

The deciding factor for the selection of the most appropriate equipment are again the location and the volume of leads to be processed. TE Application Tooling provides their customers with a wide range of tooling to apply SOLARLOK products.



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# MOST Equipment

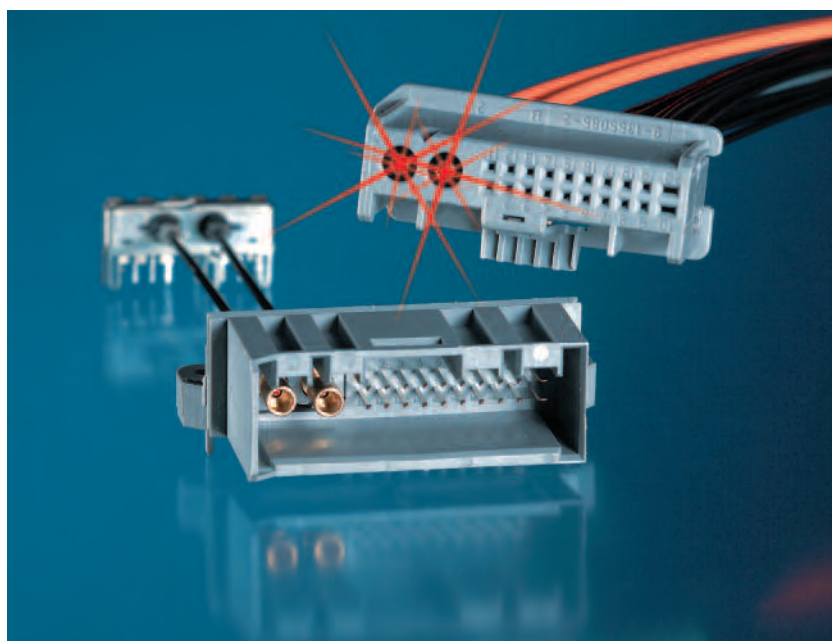
## MOST™ Sets



The MOST Sets are simple and inexpensive solutions for repair work in the workshop. To meet your requirements we offer several different versions of sets.

The basic version is equipped with two hand tools. One for stripping and cutting of POF (Plastic Optical Fibres), another one for crimping of POF and an additional spare cutting unit.

A further version contains such items as a 20 meters POF, some male and female contacts and one position inline couplings. Other accessories are available in different equipment versions.



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# SDE Equipment

## SDE Standard Die Envelope

SDE is a flexible approach to crimp tooling that allows the use of the same dies with tooling across a range of application platforms. A large selection of die options are already available for crimping a broad range of terminals and wire sizes. Many die sets have multiple cavities for crimping more than one wire or terminal size and we can provide custom designs where volumes permit.



## SDE Crimp Tools

SDE dies are interchangeable in tools from portable hand tools (manually or battery-powered) to pneumatic hand tools and electric bench terminators. It's a family of tools that you can take from bench to production or into the field, without the need for different dies to fit each kind of tool.

You can rely on SDE to provide for your long term needs because of our commitment to continued development of dies and the tool range.



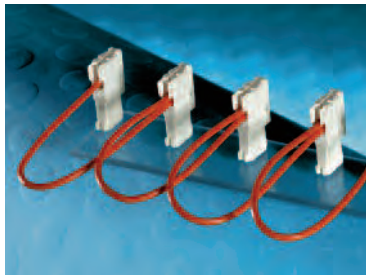
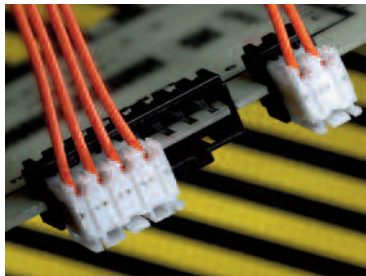
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# Hand Tools

## IDC Hand Tools

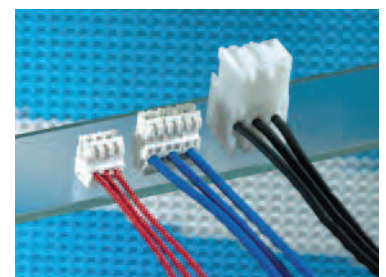
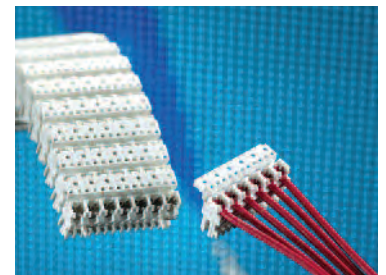
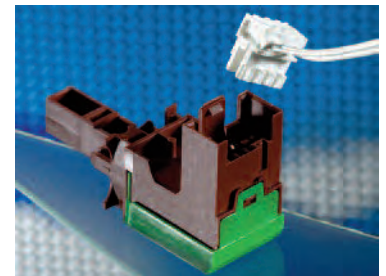
IDC or Insulation Displacement Crimping is based on an entirely different concept to conventional crimping and requires these special types of tool.

We provide a large range of tools for connector families like: MQS Connectors, AMP DUOPLUG, AMP MONO-SHAPE and AMP multifitting and usually based on the well proven Pistol Grip tools, featuring connector holding fixtures that crimp and index one pitch at a time.



An entire range of hand tool types is available to apply following connectors:

- AMP DUOPLUG 2.5
- AMP DUOPLUG 2.5 Mark II
- AMP DUOPLUG 2.5 Power
- AMP multifitting Mark II
- AMP MONO-SHAPE
- AMP MONO-SHAPE Mark II



# Hand Tools

## Hand Tool Kits

TE Connectivity provides standard kits that contain the necessary equipment to carry out specific tasks to the highest professional standards. We can also provide custom kits for volume requirements containing only tools, or a combination of tools and terminals tailored to your specific requirements. Please visit our tooling website to view our online hand tool catalogue for standard kits, or find your local contact to discuss custom kits.



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# Hand Tools

## Insertion and Extraction Tools

Insertion and extraction tools are used for inserting discrete terminals into connector housings or removing them, without causing damage to either the terminals or housings.

Our new standard design features a comfortable handle and snap-in/out protective cover that allows users to stow the business end of the tool to help protect from inadvertent personal injury when the tools are not in use.

Many different design types currently exist for our vast terminal product range, which we continue to convert. If you would like the tool you use converted to the new design, want a custom kit or tools in this design for other manufacturers products - contact us, and where volumes permit we will be pleased to provide you with a quotation for your requirement.



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# Hand Tools

## Heavy-Duty Hand Tools

A comprehensive selection of heavy-duty hand tools for crimping wire diameters up to 120 mm<sup>2</sup> (AWG 4/0) and cable cutters for copper and aluminum wire up to 500 MCM.



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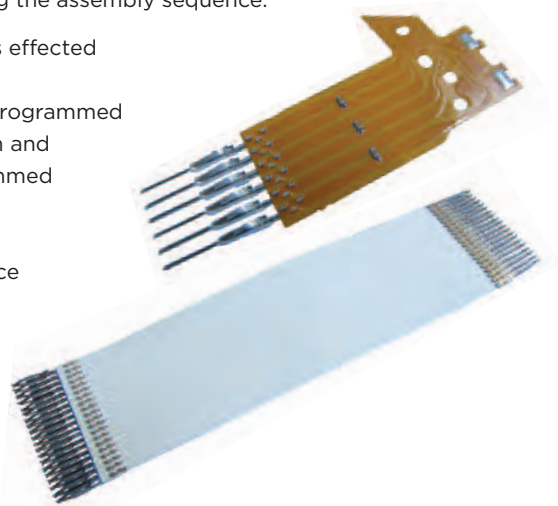
## Flexible Flat Cable (FFC) Termination Machine



The termination machine is an electrical driven semi-automatic assembly machine that uses different applicators to terminate reel-feed FFC contacts to manually supplied FFC cables.

The machine terminates a predefined number of contacts to the supplied cable end. Individual wire positions can be skipped during the assembly sequence.

- Alignment of the cable is effected in the machine
- Number of pins can be programmed
- Pitches between 1.27 mm and 5.08 mm can be programmed
- Individual wire positions can be skipped
- Operator friendly interface via touch screen
- Interchangeable applicators available for different products
- Quick change of the applicator



## FFC Applicator

The FFC applicator was designed for the FFC termination machine.

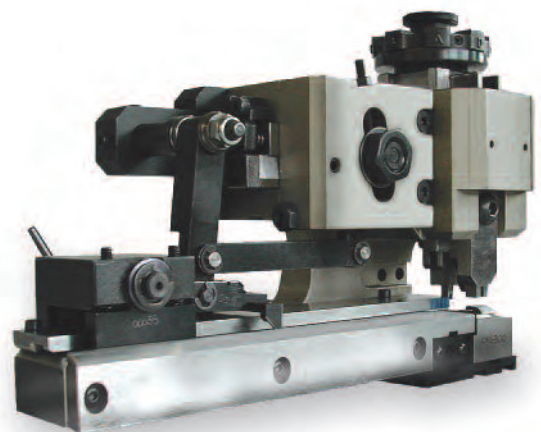
The adjustment of the crimp height is similar to other

TE Application Tooling crimp applicators.

All wear parts are easy to change.

Different types are available for following terminals:

- FFC MQS and MQS+ terminals
- FFC Junior Timer terminals
- FFC AMPMODU .100 terminals
- FFC AMPMODU .050 terminals
- FFC Card Edge
- ACTION PIN contacts
- FFC soldering contacts

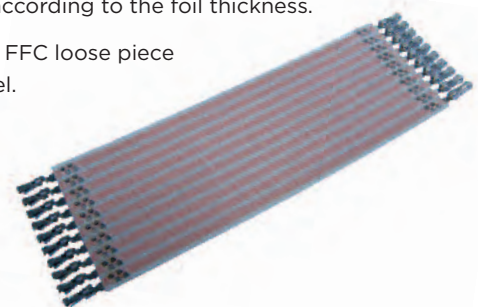


## Hand Tool for FFC Connections

This tool allows crimp connections to be made between foil and FFC terminals. Flexibility is built in, through the hand tools variable settings. The settings have to correspond to the specification. The crimp height is adjustable according to the foil thickness.

The hand tool was designed for FFC loose piece terminals with multi-crimp barrel.

- FFC foils with 2.54 mm pitch
- Max. width of the foil 88 mm
- Manual foil feed by hand wheel
- Table clamp for ergonomic handling



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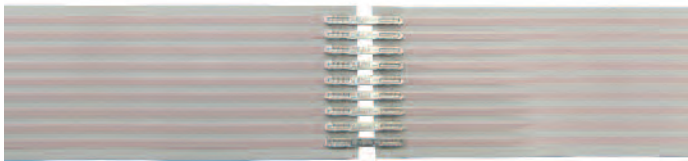
# FFC-FPC Equipment

## FFC/FPC Machine

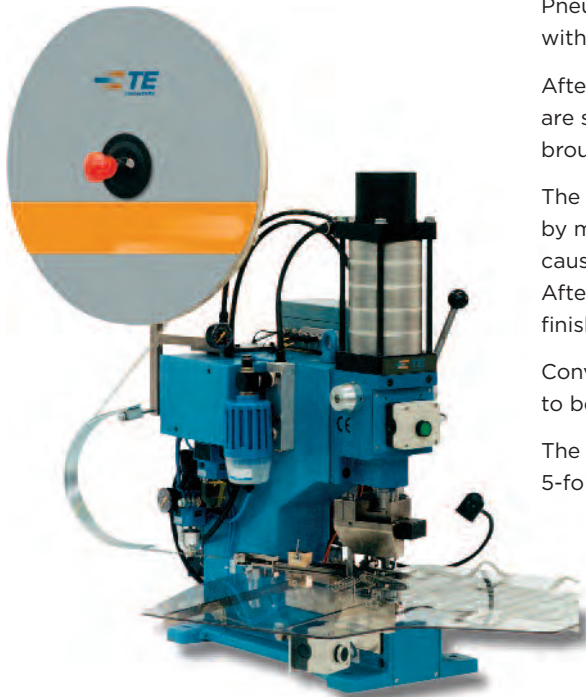
The FFC/FPC bench machine creates electrical connections between TE Connectivity FFC terminals and flexible flat cables. Thanks to its adaptable circuit fixture the machine is simple and easy to load.

Prior to initializing a crimp cycle, the vision system establishes the precise location of the first conductor track. A positional correction is effected as appropriate.

The equipment combines the functions of terminal feed, cutting the product off the carrier strip, crimping and chopping of the carrier strip. An integrated crimp force monitor ensures high quality crimp connections. An optional faulty crimp cut off device prevents the further use of defect circuits.



## Flexible Flat Cable (FFC) Termination Machine



Pneumatic machine for the semi-automatic termination of AMP splices with sensor foil on one side and flexible leads or diodes on the other.

After inserting the sensor foil, diode and the stripped wires, 4 terminals are supplied for each separate function. The upper and lower tooling is brought together with the manual lever.

The power stroke which produces the complete assembly is initiated by means of a 2-handed operation. An automatic back stroke control causes the ram to reverse after Bottom Dead Centre has been reached. After opening the upper and lower tooling with the manual lever, the finished assemblies can be removed.

Conversion kits allow different configurations of foils, diodes and wires to be accommodated.

The maximum pressure of 25 kN at 500 kPa is achieved by means of a 5-fold tandem cylinder with a diameter of 125 mm.

**Compatible TE Connectivity Terminals**  
FFC/F-Crimp Splice



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# Magnet Wire Equipment

## MAG-MATE and SIAMEZE Inserter Mark II with PLC



TE Connectivity magnet wire terminations are a perfect connecting alternative to all soldering techniques used in a lead-free environment. Special knowledge is required to design a mass manufacturing line for insulation displacement crimps on thin lacquered insulated wires with high yield. Design aspects of the terminal, the cavity and the machine all need to be harmonized. With the Inserter Mark II TE can offer an economic solution especially for the application of MAG-MATE and SIAMEZE terminals.

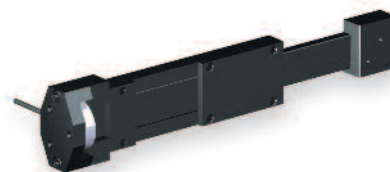


## MAG-MATE Inserter Mark II with PLC and Insertion Force Monitoring



This advanced insertion machine provides the features of the MAG-MATE Inserter Mark II with an additional force and distance monitoring system. The machine is designed to apply multiple different contacts and will be customized according to the customer or product specific requirement. The contacts can be used as single contacts or in strip form (bridge function adjusted "on-the-fly").

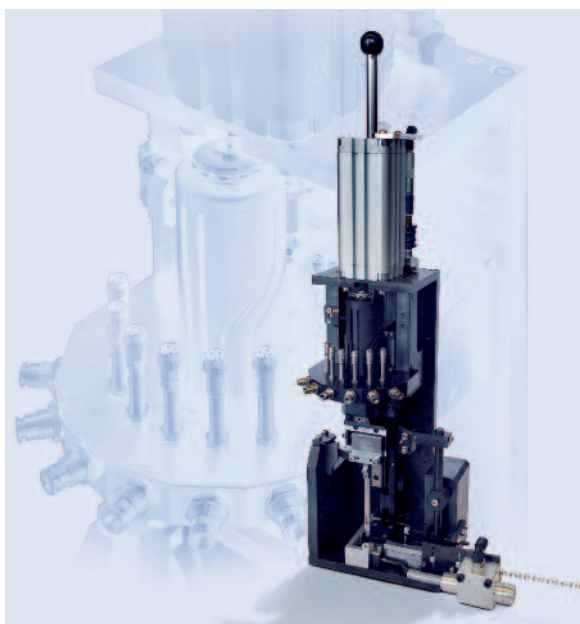
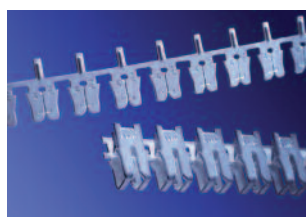
A gauge is available to check the adjusted insertion force and to recalibrate the insertion force control sensor.



## Pneumatic Insertion Tool for MAG-MATE Terminals

The pneumatic tool for MAG-MATE terminals features a rotary insertion finger to facilitate different insertion angles.

This tool is designed for use in TE Connectivity standard insertion machines such as P200 and P300 but can also be integrated into customized production lines or assembly cells.



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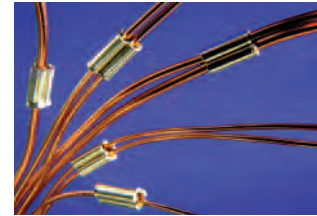
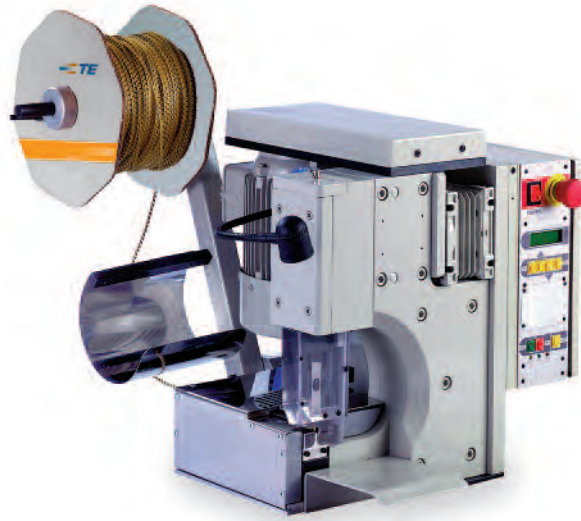
# Magnet Wire Equipment

## AMPLIVAR Terminator for Parallel and End Connections

The machine was especially developed for processing magnet wire connections. Different versions for end-feed and side-feed contacts are available. The design takes into account that the motor windings and coils can be supplied directly to the connectors. The exposed crimp position permits precise handling. In case of end connections the projecting magnet wires are cut off.

AMPLIVAR Splices and Terminals are specifically designed to terminate magnet wires or in combination with standard solid or stranded wire. In a one-step operation the magnet wire is automatically multiple ring stripped of its insulation as it is forced into the serrations during the precisely controlled crimping operation.

As many as three magnet wires can be terminated, simultaneously in one splice. Nearly the entire AMPLIVAR splice programme can be applied with this machine in combination with suitable applicators. The comprehensive range of manufacturing possibilities demands a specific machine and applicator combination.



## APT-5A AMPLIVAR Product Terminator

The newly designed APT-5A AMPLIVAR product terminator, magnet wire splicing machine for pigtail splicing or direct connection of contacts to magnet wire. The APT-5A machine offers a fast and efficient system, with no need to strip magnet wire insulation.

The APT semi-automatic bench machines provide CE compliance and are available in two versions:

- APT-5A with automatic precision adjustment controlled by the crimp quality monitor (CQM), and improved efficiency when running customer-motor assemblies.
- APT-5E with manual precision adjustment.

In addition to providing 100% inspection and automatic adjustment of crimp heights as needed, the CQM also evaluates the quality of each crimp. In addition to the ability to auto adjust for a given crimp height, the APT-5A also provides the ability to program various crimp heights and automatically sequence through them as required to terminate different wire combinations on a given motor.

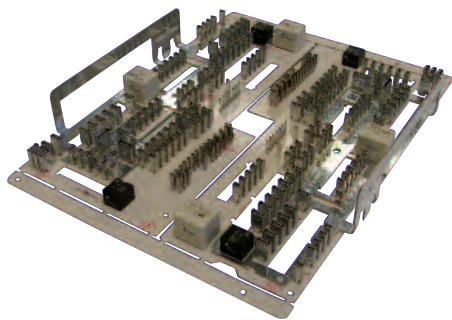
The lower cost, manual adjust APT-5E is a simpler version without CQM capability, with the advantage of faster set-up times. Both machines are built with the quality and reliability our customers come to expect from TE Connectivity.



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# Board Processing Equipment

## Press-Fit Systems



TE Connectivity offers a wide range of machines for processing press-fit connectors.

The range includes bench presses with a press capacity of 5 tons as well as semi-automatic machines with automatic seating of connectors before pressing, including a number of quality assurance systems.

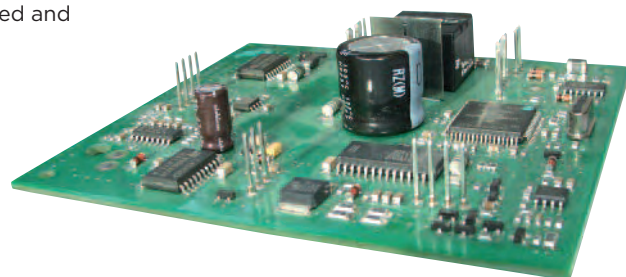
All presses are servo driven, providing a constant press force over the entire press range. In conjunction with the Press Quality Monitor, included with all presses, this ensures a consistently high process quality.

## CSP-3T Shuttle Electric Press

The CSP-3T servo electric press incorporates an automatic shuttle system to the proven TE press line for fast and simple product presentation. Focused at the application of PCB's onto compliant pin housings, this system is provided with full control and monitoring of force, distance and speed for quality assurance of every product applied.

Each system is supplied with a servo electric drive with force feedback control. Force capacity is available up to 27 kN [3 tons] to handle a range of compliant pin housings and connectors on the market today. Compared to pneumatic or hydraulic systems, the CSP Press is quiet, efficient, and does not suffer from oil leaks that can damage PCBs. With PC control, the servo driven CSP Press provides an easily programmed press system with automatic set up from press cycle to press cycle.

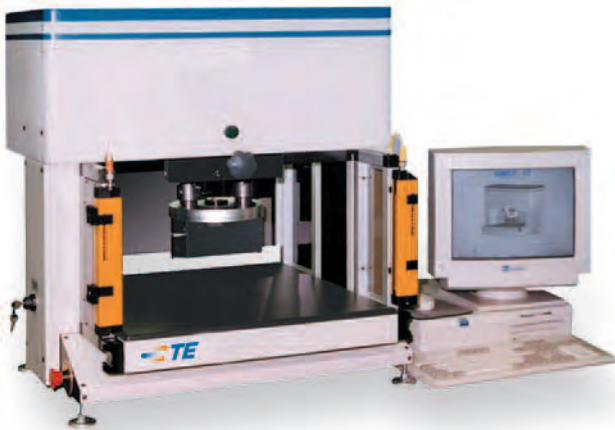
Force, distance and speed are the core parameters of any press cycle. With feed back and PC control, CSP systems can monitor and control each characteristic of every press stroke run on the press in real-time. If any aspect of that press cycle is outside of specified limits, the system can stop the press, mid-stroke, to prevent damage to the product and reduce or eliminate scrap. This gives CSP systems a distinct advantage over pneumatic or hydraulic systems which can not offer the same level of control. Optional pin penetration sensing (PPS) tools also allow the CSP to assure that every pin has properly penetrated the PCB a predetermined minimum distance. Any missing, bent or improperly seated pins will be detected and illustrated to the operator.



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# Board Processing Equipment

## CBP-5T Electric Bench-Top Press



The CBP-5T of servo electric press provides the ability to process most compliant pin connector applications in a compact benchtop system. Board size capacity and press force range allows the system to handle a wide range of applications for low to medium production volume operations.



Each system is supplied with a servo electric drive with force feedback control. The CBP is available in 44 kN [5 ton] force capacity to handle most compliant pin connectors on the market. With PC control, the servo driven CBP provides an easily programmed press system with automatic set up from press cycle to press cycle. The system reaches levels of precision and accuracy not available in a pneumatic or hydraulic press.

Force, distance and speed are the core parameters of any press cycle. With feed back and PC control, the CBP system can monitor and control each characteristic of every press stroke run on the press in real-time. If any aspect of that press cycle is outside of specified limits, the CBP can stop the press, mid-stroke, to prevent damage to the PCB and reduce or eliminate rework and/or scrap. Common problems such as PCB holes out of tolerance, missing connectors, improper connectors used and, in some cases, bent pins can be detected and reported to eliminate quality problems.



## CMP-6T and CMP-12T Manual Electric Servo Presses

The CMP manual electric servo presses are designed with a rigid "H" frame to minimize deflection. The CMP-6T press provides 53 kN [6 tons] of force and the CMP-12T press provides 107 kN [12 tons] of force. The operator is able to manually adjust the press head and/or the PCB between connector press cycles.

An air bearing system provides effortless press head positioning. The PCB capacity of the CMP-6T press is 610 x 915mm [24 x 36"] and the PCB capacity of the CMP-12T press is 760 x 900mm [30 x 36"]. The SPC feature within the CMP's included software provides a press log and in addition, allows press force plotting for every connector.

The product setup for these machines is accomplished without any required hardware adjustments. The use of tool and connector databases, and a press sequence program, provides a fully data driven press cycle.

There is a wide range of insertion heads available for these machines for both TE and non-TE products.

Options for these machines include a Bar Code Scanner, which provides fast PCB serial number entry, an Air Table Option that assists the operator when positioning product under the press head, and a Touch Screen Monitor for enhanced machine operation.



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# Board Processing Equipment

## CAP-6T Automatic Electric Press

The CAP-6T automatic electric press is the newest addition to the successful TE Application Tooling servo press line. It provides the proven force control capabilities and quality assurance of the line in an automatic press. The automatic pressing capabilities of the CAP-6T press provide the end user with greater control and simplified processing to help improve quality, lower rework and prevent rejects. This provides users with lower true applied cost and higher end profits. The In-Line version of the CAP-6T allows the integration of the press into a fully automatic production line.

The CAP-6T press was designed to apply compliant pin connectors to a wide range of PCBs. It is fully capable of handling the most demanding applications today from daughter cards to mid-planes to back-planes. The CAP-6T press is focused at all but the largest board applications. This press can also hold up to 12 insertion tools and uses a lower support fixture.

Compliant pin technology has distinct advantages versus through hole solder products. A key advantage is the ability to monitor and control the press cycle in real-time to provide 100% quality assurance. The CAP-6T Press gives your operation the ability to maximize this advantage with higher quality, higher yield and lower applied cost production line.

The key is the CAP-6T's ability to precisely and accurately apply each connector to the pre-programmed force, height and speed requirements. Each parameter can be individually programmed for each connector. Connectors can be pressed to height or force based upon their individual specifications. If an error is encountered during the press stroke, the cycle is stopped immediately to help prevent damage to the PCB and allow for the minimum amount of re-work.

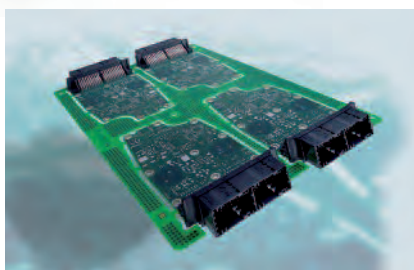


## CSM-200 Connector Seating Machine



PCB and connectors are loaded manually into fixtures. When started, the machine checks the correct loading of the connectors before placing the connectors onto the PCB. The tool then moves under the press ram where the connectors get pressed one after the other onto the PCB. The BMEP 5-T servo-electric press is used to seat the PCB which provides a force-distance check to guarantee quality production.

A special tooling plate allows the sequential pressing of a number of different pre-loaded connectors. An intermediate plate, positioned between the PCB with its pre-positioned connectors and the flat rock press ram contains the connector specific press tools. For each connector a force distance curve is available after completion.



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# Equipment for Heat Shrink Products

TE heat and shrink application equipment is designed and engineered specifically for the installation of TE Raychem heat-shrinkable products.

It provides the optimal heating temperatures, performance, and control features for maximum production efficiency. It is designed for general industry use or developed specifically in close collaboration with customers, using standard heater components.

## Raychem AD-3050 Seal Test Equipment

The AD-3050 seal test equipment is a manually operated pneumatic device, intended for use as a convenient 'inprocess' sampling technique for checking sealed splices. Different combinations of in-line or stub splices can be pressure tested in any of the combination of fixtures (8 in total).

There is also a facility to allow leak testing of various connectors. The tool is also intended for use as a quick and easy sampling technique for the preliminary selection of installation conditions where Raychem products are used for protection of the splice.

TE Connectivity has seen good correlation between results obtained with the AD-3050 seal test and those obtained through water immersion testing.

However testing in accordance with the OEM (Original Equipment Manufacturer) specification is the only guaranteed way of confirming that the OEM specification is being met. The splice products are located in clamps which deliver the test pressure.

The product is immersed in water and pressure is delivered down the wire(s) to the sealed area. The test result is determined visually by looking for bubbles in the area of the sealing products.



## Raychem RBK-ILS Processor Mark II

The RBK-ILS processor MarkII is a semi-automatic unit designed specifically to install splice sealing products onto ultrasonically welded or crimped splice joints used in auto-motive harnesses.

The tool can operate in several modes:

- Stand-alone - operator sets time and temperature.
- Sequenced - preset times and temperatures can be sequenced automatically (and can also be randomly selected from sequence stored.)
- Automatic communication with upstream ultrasonic welder can allow time and temperature to be automatically set without operator intervention.



In this way the operator is able to efficiently load both machines and so minimise 'dead time'. Installing Raychem splice sealing products immediately after welding gives reduced installation time and earliest possible mechanical protection for the welded joint. The operator positions the splice sealing product centrally over the splice joint and then locates the assembly into the gripper mechanism.

Pushing the two start buttons initiates the machine cycle thus bringing the heating chamber into place over the joint area. The heating chamber remains in place for the set period and then returns to the rest position. The wire assembly is automatically ejected, with the splice sealing product installed and the joint area sealed, insulated and strain relieved.

The machine can install sealing product on in-line or stub-type splices.

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TE Connectivity provides global field service support on our application tooling. Field specialists are located across every continent to provide timely response to customer needs. In addition to installation, warranty and repair service, TE Connectivity field specialists can help you with equipment choices, training of maintenance and operation personnel, troubleshooting assistance and spare parts. Service contracts to cover all your application equipment needs are also available. We have implemented a service management tool that provides standardization of reporting that gives us the ability to continuously improve our global service organization. Throughout the year we educate our field service engineers on the latest industry technologies and equipment. See for yourselves the advantages of our professional consultation and individual services. Our qualified service teams are ready to assist you.

## Service Offerings:

### Standard Service

Includes troubleshooting problems, making repairs, and/or installing parts.

### Equipment Installations

Providing installation, set-up and training of application equipment at the time of delivery.

### Training

Providing customers with practical training programs addressing machine operation, set-up, maintenance, inspection, and connector application. Training programs can be scheduled at the customer's site or a TE Connectivity training center. A training certificate will be issued upon the completion of each formal training course.

**We are proud to be able to offer a comprehensive range of customer training programs. The following are some of the standard training programs we offer:**

- The Fundamentals of Crimp Technology, 4901
- The Proper Handling of Crimping Applicators, 4902
- Crimping Training Program, 4903 (combination of 4901 and 4902)
- The Proper Handling of Crimping Hand Tools, 4904
- FFC Crimp Technology, 4906
- Fundamentals of Crimping Technology for Machine Operators, 4907
- Magnet Wire Connection Technology, 4910
- Advanced Seminar on Crimping Quality, 4911
- Advanced Seminar on Crimp Force Monitoring, 4912
- Advanced Cross Sectioning - Photos, 4913
- MAG-MATE Module, Pneumatic, 4914
- Insulation Displacement Technology, 4930

## Service Contracts

### Preventive Maintenance and/or Inspection Calibration

Provides service for periodic visits to perform preventive maintenance and/or inspection calibration service on hand tools, applicators, bench and automatic equipment.

### Comprehensive Service

Provides for a specified number of field specialist visits. A visit can be used for services such as standard service, installation, set-up and training for all application equipment, preventive maintenance and/or inspection calibration, spare parts management, equipment process evaluation and technical assistance on application tooling and/or product related problems or concerns.

**“A customized service / training contract ensures equipment optimization”**

### Short Term Rental of Crimping Applicators

Applicators are being increasingly required at short notice for a limited period. This may include preproduction runs, prototype series, and the subsequent production of single part requirement or simply small series production. It is often uneconomical to purchase a crimp tool or to rent it on a long-term basis, when it is only required for a few weeks in the year. Our short-term rental service has applicators readily available for you, which you can return when complete with your rental period. Your local TE Connectivity representative will gladly inform you about the availability of an appropriate applicator for your specific need.

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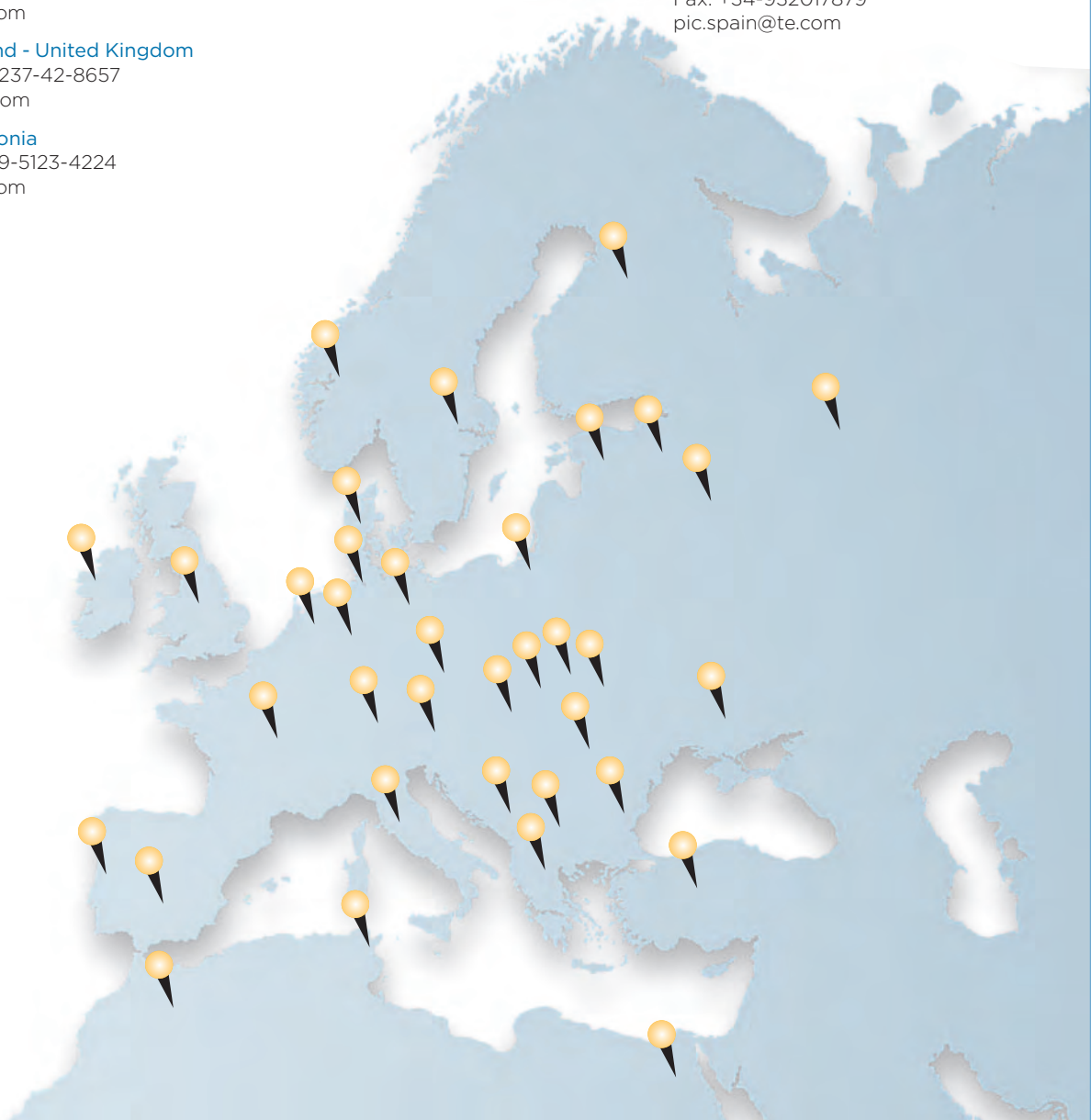
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