INTRODUCTION TO TOOLING SOLUTIONS

TE Connectivity. The Leader in Crimp Quality.

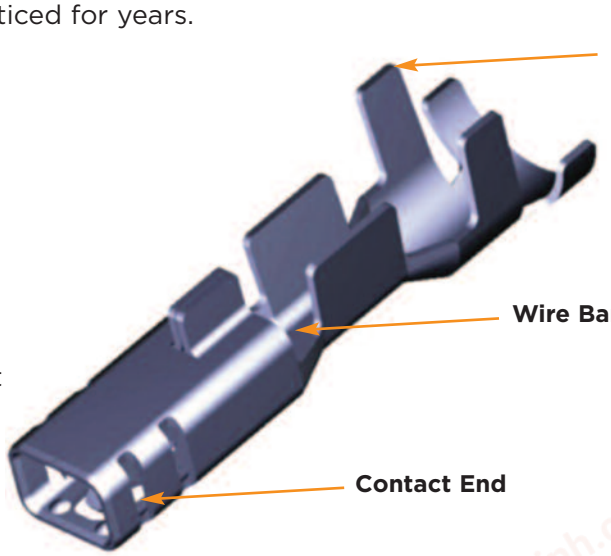
Anyone can make a tool to crimp terminals onto a wire. But not everyone can manufacture a tool to crimp the terminals properly. Crimp termination of wires isn't easy. At least, doing it right isn't easy. We know. We started it. TE Connectivity developed the technology of hand crimping over 70 years ago.

Why is this experience important to you? As the pioneer in crimping technology our highly trained engineers have studied how the forces of crimping can affect how a tool works, whether it meets specifications, and even whether it reaches its expected service life. As a result we have led the way, with tool frames and die sets that maintain their geometry and produce consistent crimps time after time after time. There are differences that aren't readily apparent: the materials, the manufacturing processes, the designs to diverse requirements for different applications.

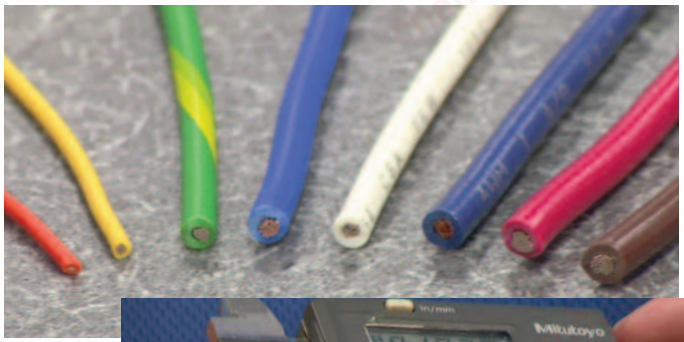
These are all part of what we've known and practiced for years.

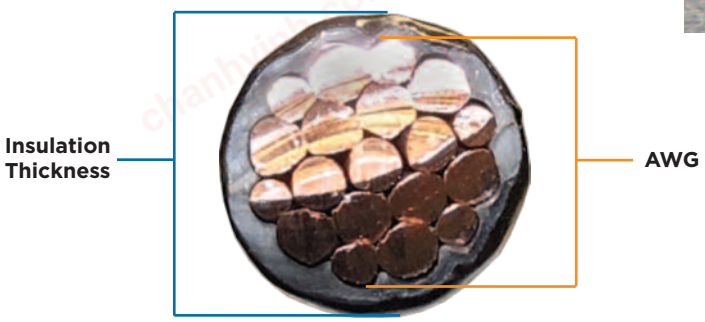
The Secret to a Successful Crimp

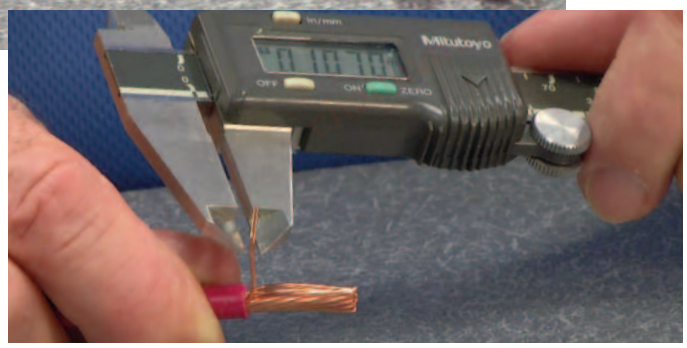
Matching the Terminal to the Tooling - Among the many factors that are critical in producing a quality crimp, matching the terminal to the tooling is crucial. Unlike inferior tooling options, TE offers engineered solutions that are designed to match the exact crimp geometry of the terminal to be applied on the wire. To ensure a proper crimp you need to follow these important steps:



1. **Wire Selection** – AWG and wire insulation thickness varies from wire to wire. Just because two wires are listed at the same AWG, it doesn't mean their insulation thickness is the same. If you don't take into account both factors the copper or aluminum strands may not fit in the wire barrel correctly, or the terminal's insulation support may be to large or small for the wire strand.



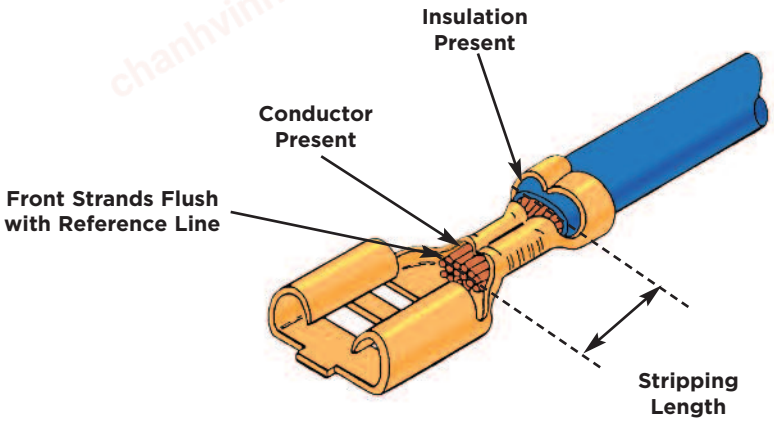




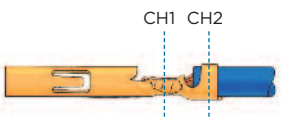
INTRODUCTION TO TOOLING SOLUTIONS

The Secret to a Successful Crimp

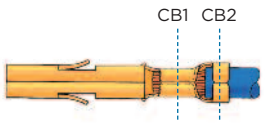
2. **Wire Prep** – In order to properly place a wire in a terminal, the wire insulation must first be stripped to the proper length based on the terminal specifications. If the insulation is cut too short or too long, the wire will not be seated properly into the wire barrel, causing terminal separations or shorting.



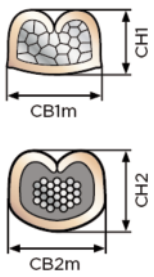
3. **Crimp Specifications** – To ensure a proper crimp for a TE connector or terminal you should be using a TE Connectivity tooling solution that is specifically engineered to the proper Crimp Height, Width and Crimp Geometry of the selected terminal or contact.

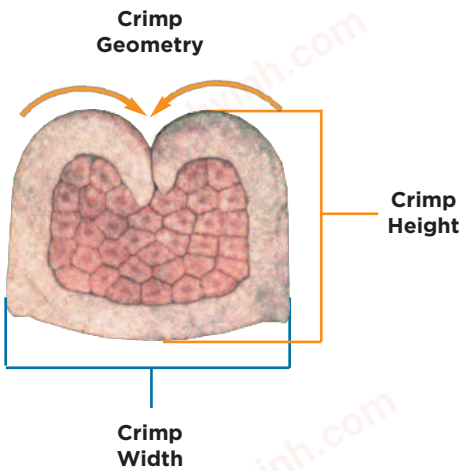


CH2: Insulation crimp height
CH1: Conductor crimp height



CB2m: Insulation crimp width
CB1m: Conductor crimp width





4. **Selecting the Right Tool Based on Production Level** – Are you in the prototype phase of your project? Will you soon be ramping up production? Do your tools need to be mobile, or is a bench top unit more applicable? Are you producing 100's – 1,000's of crimps per day?

   Once you know the answers to these questions, selecting the right TE Connectivity tool to meet your needs is simple. (**Please refer to page 7 for tooling options.**)

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INTRODUCTION TO TOOLING SOLUTIONS

Choices at Any Production Level

We can offer performance continuity in tools, so customers have the same crimp functionality and quality whether they are developing, building, or servicing a product. In many cases they can use the same die set in tooling that spans the range from hand operation through battery, pneumatic, and even electrically powered tools.

LOW VOLUME: Prototype, Repair

Manual Hand Tools



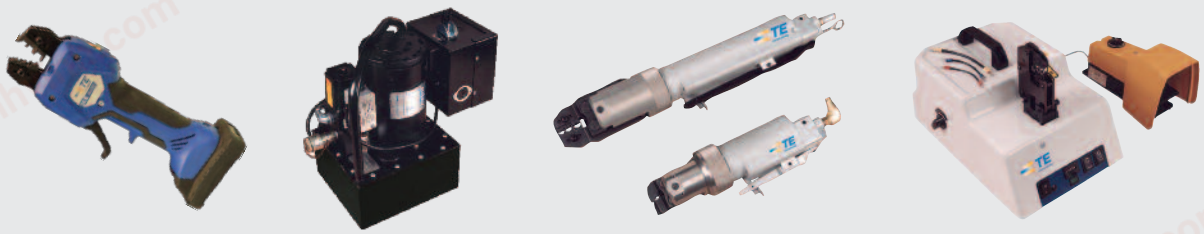
LOW VOLUME: Small Production Quantities

Manual Hand Tools



INTERMEDIATE: Small to Mid-Level Volumes

Power Hand Tools and Benchtop Tooling — Battery, Hydraulic, Pneumatic Electric



INTERMEDIATE: Semi-Automatic Volumes

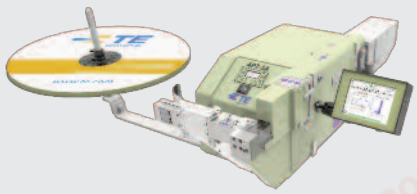
Applicators & Spare Tooling



Bench Terminators

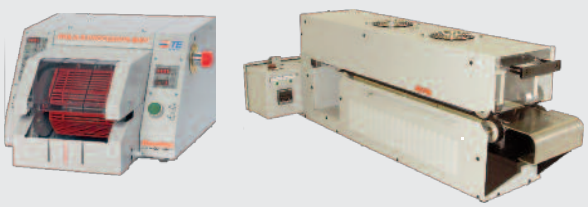


AMPLIVAR Product Termination — Magnet Wire



INTERMEDIATE: Semi-Automatic Volumes

Heat Shrink Tubing Equipment



INTERMEDIATE: Fully-Automatic Volumes

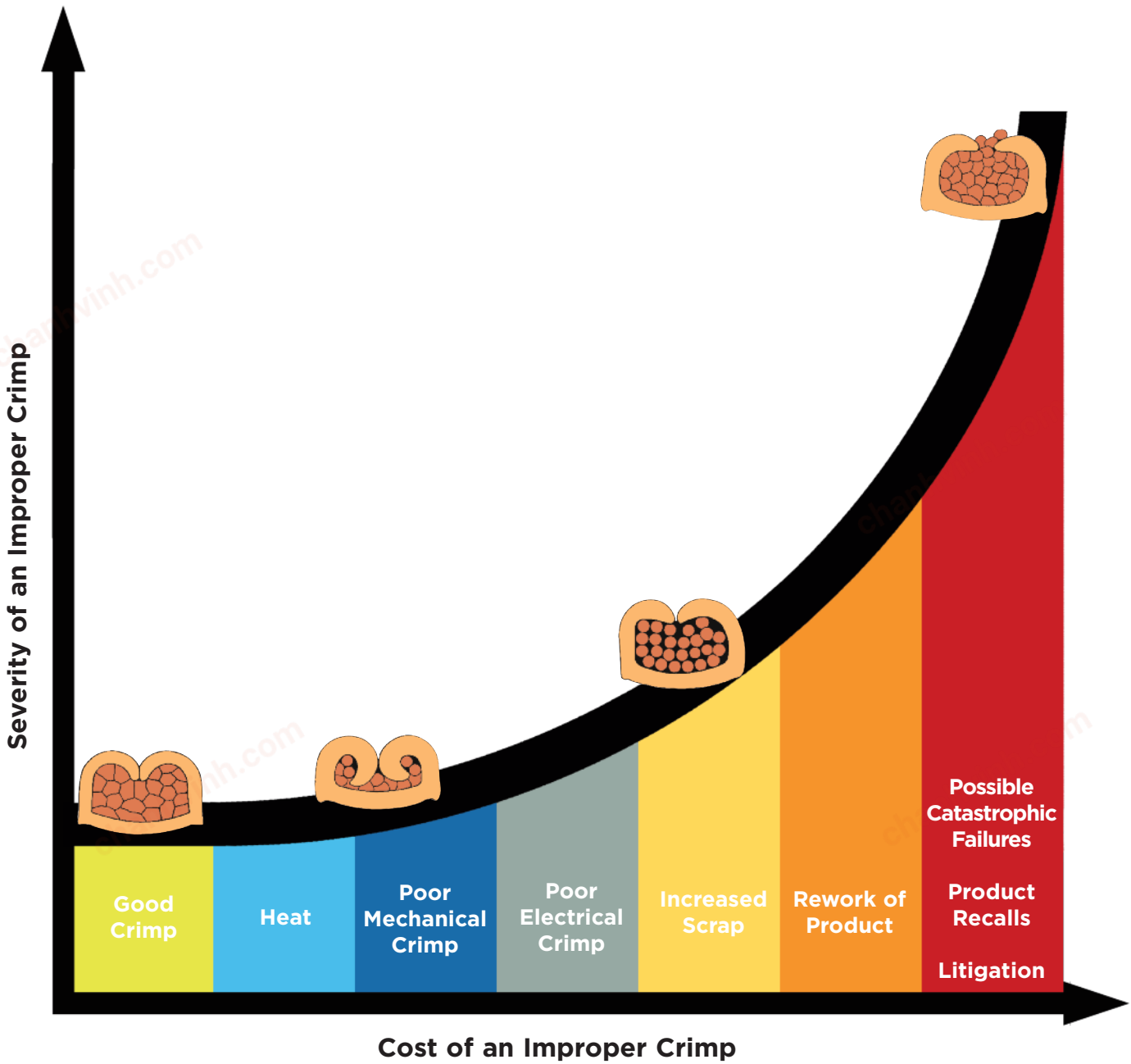
Single Crimp Wire Processor



INTRODUCTION TO TOOLING SOLUTIONS

Dangers of Improperly Crimped Terminals

From wasted time & scrap all the way up to product recalls and possible litigation, the cost of poor crimp quality can be expensive. If customers are not using the proper crimp tooling, ie. incorrectly matching the terminal to the crimp tooling, the end results can be dramatic.



INTRODUCTION TO TOOLING SOLUTIONS

What You Need to Know About TE Hand Tools

Tool Grade

A prime consideration when choosing the appropriate tool for an application. Our hand tools are categorized into three levels; Service, Commercial and Premium. The higher the grade of the tool, less operator skill is needed in order to repeatedly meet the specified parameters of the crimp.

Premium (CERTI-CRIMP Tool)

Premium tools include the appropriate crimp die configuration, integral locating, and integral straightening features that permit terminals or contacts crimped in these tools, to meet all feature requirements in applicable TEC application (114-) specifications. Most premium tools include an adjustable insulation crimp height feature and the CERTI-CRIMP ratcheting feature, set at the factory, which ensures the ratchet will not release until the wire crimp jaws bottom within .001. This guarantees consistent repeatability of the crimp. Premium hand tools require the least amount of user dexterity.

Commercial (PRO-CRIMPER III Tool)

Commercial die assemblies are designed to meet the wire crimp height requirements per the applicable TEC application (114-) specifications. Other feature requirements may or may not be met. Commercial handle assemblies permit the interchange of die assemblies and an adjustable ratcheting feature. Users are responsible for adjusting the ratchet to obtain the correct crimp height. Commercial tools require a greater amount of user dexterity than Premium crimp tools.

Service

Service tools are generally single thickness, stamped tools. They are not intended to meet any specifications and require exceptional user dexterity to obtain acceptable results.



Tool Type

Choosing a tool type may be driven by several factors; simply by type preference, or by the application needs itself, ie. heavy duty crimp, industry specification requirements, etc. The overall wire range is also a prime consideration when choosing the appropriate tool for an application. Often there will be several tools referenced to the same product but having different wire ranges.

www.tooling.te.com

COMMERCIAL: MANUAL HAND TOOLING

Standard Die Envelope (SDE)

FAST FACTS

- Dies meet wire crimp requirements per specification
- Over 100 interchangeable SDE die sets for crimping over 4,000 different connectors
- Ability to handle multiple wire and terminal sizes in one die set



Standard Die Envelope (SDE)

SDE technology is a new, flexible approach to crimp tooling, that allows use of the same dies on tooling across a range of application platforms. Dies are interchangeable in tools from portable hand tools — manual 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 dies fitted to each kind of tool. They're suited for R & D, networking applications and on-site maintenance work.

Customers can be sure their dies will fit their long-term needs, because they are completely compatible with all tools in the SDE system. They move with a customer as their needs grow.



If you know the terminal — this tool will help you find the die set.

Go to **www.tooling.te.com** and look for the magnifying glass.



www.tooling.te.com

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Standard Die Envelope (SDE)

By removing just 2 screws you can easily swap dies between your SDE compatible manual, battery, pneumatic and electric TE tools.



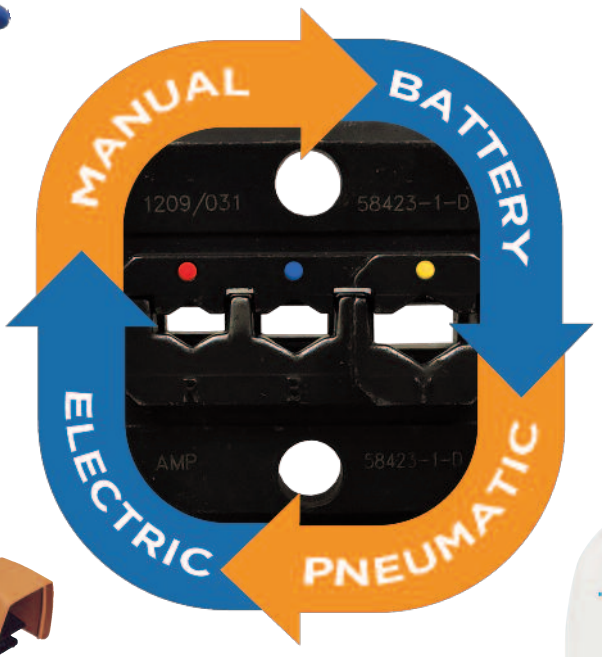




See pages 18-23

The SDE* Advantage!

*Standard Die Envelope







See pages 24-27



See pages 60-63



See pages 61-63



See pages 32-35

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COMMERCIAL: MANUAL HAND TOOLING

Commercial Standard Die Envelope (SDE) Manual Hand Tools

FAST FACTS

- Ratchet control provides complete crimping cycle
- Emergency ratchet release
- Angled head provides a comfortable hand and wrist position
- One tool with over 75 interchangeable die sets can crimp many different types of connectors
- Accommodates multiple terminal sizes in one die set
- Precision construction of durable high-carbon steel
- Extra strength pivot pins provide greater durability
- Produced under a quality management system certified to ISO 9001.



A Flexible Tooling Approach

Our Commercial Hand Tools provide the versatility of general-purpose service tools along with the reliability and ease of use of many premium-grade tools. For versatility, all 75 die sets are interchangeable, including those for open-barrel contacts and terminals. Additionally, many of these die sets have multiple cavities for crimping a variety of contact or terminal sizes.

PRO-CRIMPER III — Made to Last

For reliability, the tool is constructed of durable high carbon steel with extra strength pivot pins. And, for user convenience, the PRO-CRIMPER III Hand Tool particularly excels.

COMMERCIAL: MANUAL HAND TOOLING

Characteristics of a Commercial Crimping Tool

Every Commercial grade hand tool incorporates features for long lasting performance and ease-of-use. They include ergonomic handle designs and a ratchet control system designed to ensure proper crimping.

Ratchet System for Improved Repeatability

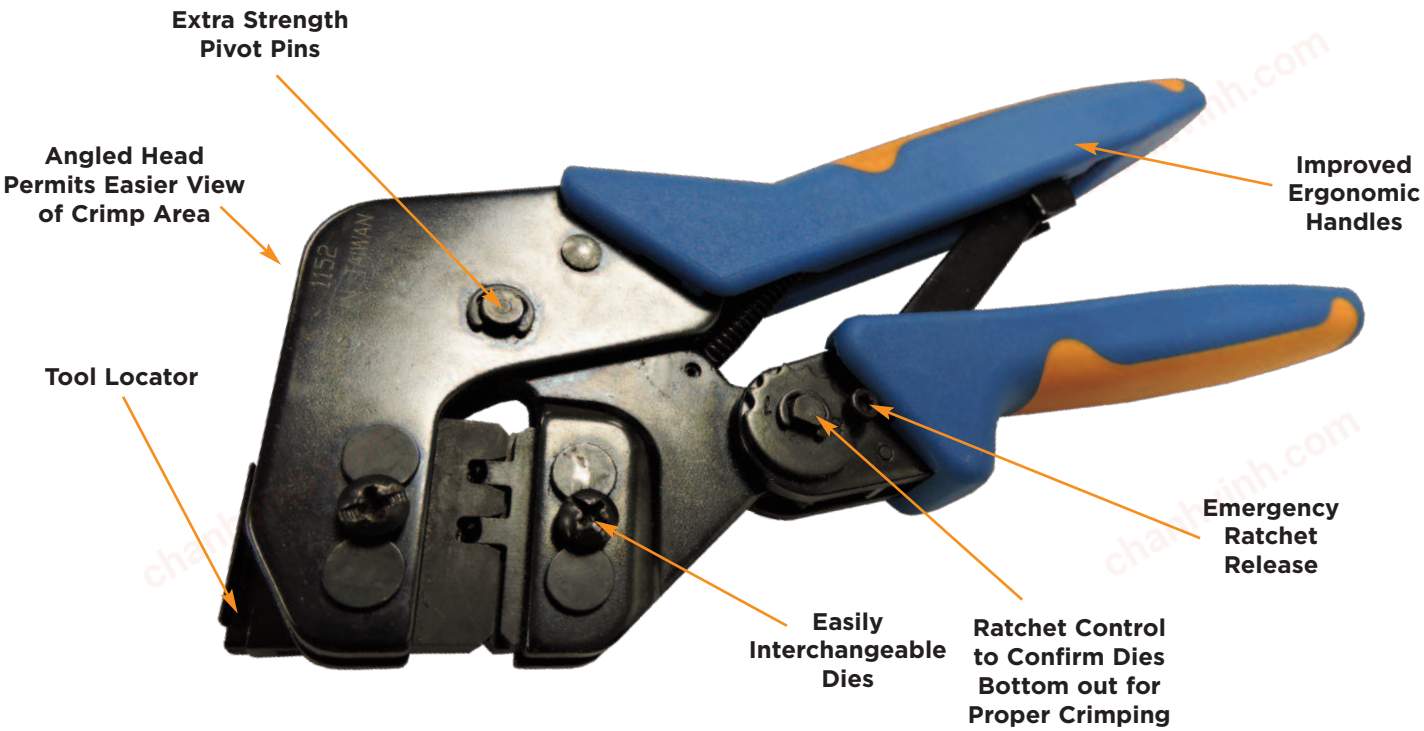
Ratchet control is provided for complete crimp cycling; this helps eliminate partial crimps. Also, an emergency ratchet release allows the user to open the tool jaws at any time during the crimp cycle.

Applying the Crimp Force

To reduce handle force, the linkage was designed to match the forces required to crimp our largest insulated terminal. The result is dramatically less handle force than comparable tools. Also, the angled head and specially designed handles reduce hand stretch and provide comfortable operation.

Ensuring a Proper Crimp

Locators are mounted on pin-and-socket style tools. They help properly locate the contact in the die set, provide a wire stop, and help minimize contact rotation and bending during crimping.



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Commercial SDE Tooling Options

PRO-CRIMPER III Hand Tool
Part No. 354940-1 (frame only)



The PRO-CRIMPER III hand tool is ideally suited for R&D prototyping, networking applications, and commercial, industrial, and institutional maintenance work.

- Enhanced ergonomics, with a thin, comfortable handle profile
- Manufactured with precision stamping that permits close tolerance controls on critical parts, for better performance and repeatability
- Improved tool geometry for a longer life, stronger tool frame
- Fits industry's largest selection of crimp die options



SDE SA Hand Tool
Part No. 9-1478240-0 (frame only)



The unique geometry of this tool results in a comfortable, easy-to-use handle design that is unmatched in the market.

- Large crimp jaw arc, minimizing roll in open barrel applications
- Easy accessibility for space-constrained applications
- User-adjustable ratchet control and emergency ratchet release



ERGOCRIMP Hand Tool
Part No. 539635-1 (frame only)



- Interchangeable dies
- Virtually a straight action jaw closure
- Ratchet mechanism ensures complete crimp cycle
- Easy access ratchet release
- Handle pressure adjustment with locking device
- Ergonomic non-slip handles

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Customized Hand Tool Kits

FAST FACTS

- Portability
- Customization
- Cost effectiveness
- OEM personalization
- Flexibility in the factory as well as in service and repair garages
- Consist of well-proven hand tools and dies as well as accessories matched to special applications
- A selection of sample terminals enables the technician to start work immediately

In addition to providing standard kits, TE Connectivity is also able to provide custom kits for volume requirements containing only tools, or a combination of tools, dies and terminals tailored to your specific requirements.

The kit shown is an example designed specifically for the Automotive Industry. However, we can also provide kits for promotion and product support as well as application support and repair.

The flexibility in creation of these individual kits enables the customer to help both control and ensure quality.



PRO-CRIMPER Hand Tool Kits

TE specialty hand tools are available in convenient kits that contain the tooling, terminations, and spare parts you need for your crimping operations.

PRO-CRIMPER III Hand Tool PIDG and PLASTI-GRIP Terminal Kit Part No. 55823-1

Includes hand tool (part no. 58433-3), 225 insulated ring and spade terminals in 12-10, 16-14 and 22-16 AWG [3.0-5.0, 1.3-2.0 and 0.3-1.3 mm^2] wire sizes.

BNC Premises Wiring Kit Part No. 58477-1

Includes hand tool (part no. 58433-1); plugs—5 RG-58, 10 RG-59/62, 5 RG-58 plenum and RG-59/62 plenum sizes; adapters—2 jack-to-jack and 2 T.

PRO-CRIMPER III Hand Tool Repair Kit Part No. 679221-1

Includes retaining rings, handle return spring, pawl spring, pivot pins, pawl pin, ratchet pawl, die pins, nut and die set screws.

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COMMERCIAL: MANUAL HAND TOOLING

Tooling-to-Terminal Cross Reference

COMMERCIAL TOOLS



PRO-CRIMPER Hand Tools (PC)



SDE-SA Hand Tools (SDE-SA)



ERGO-CRIMP Hand Tool

UNINSULATED TERMINALS

		Wire Range		Max		Hand Tools	Tool Type
		AWG	mm²	Insul.	Dia.	Commercial	Commercial
SOLISTRAND Terminals and Splices		22-16	0.3-1.25	—	—	58546-1	PC
		16-14	1.25-2	—	—	58546-1	PC
		12-10	3-5	—	—	58546-1	PC
		8	7	—	—	—	—

INSULATED TERMINALS

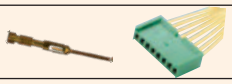
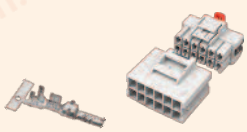
		Wire Range		Max		Hand Tools	Tool Type
		AWG	mm²	Insul.	Dia.	Commercial	Commercial
PIDG FASTON Receptacles (6409☐☐ Series)		22-18	0.3-0.8	.100	2.54	58433-3	PC
		16-14	1.25-2	.170	4.32	58433-3	PC
		12-10	3-5	.250	6.35	—	—
PIDG Terminals and Splices, PLASTI-GRIP Terminals		22-16	0.3-1.25	.125	3.18	58433-3	PC
		16-14	1.25-2	.150	3.81	58433-3	PC
		12-10	3-5	.230	5.84	58433-3	PC

FULLY-INSULATED TERMINALS

		Wire Range		Max		Hand Tools	Tool Type
		AWG	mm²	Insul.	Dia.	Commercial	Commercial
Ultra-Fast FASTON Tabs and Receptacles		22-18	0.3-0.8	.230	5.84	58628-1	PC
		16-14	1.25-2	.260	6.60	58628-1	PC

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Tooling-to-Terminal Cross Reference

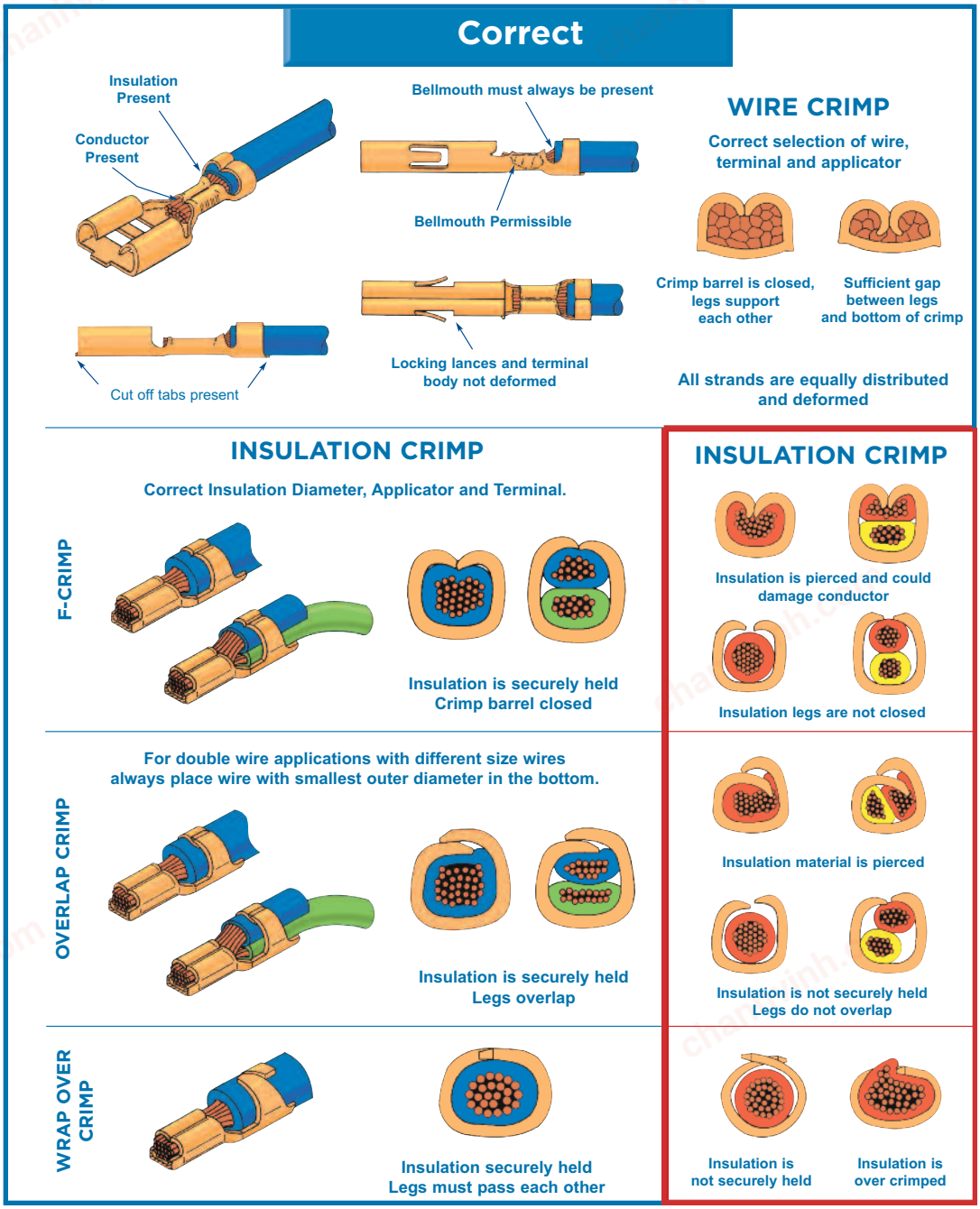
OPEN BARREL TERMINALS		Style	Wire Range AWG	Wire Range mm²	Max Insul.	Max Dia.	Hand Tools Commercial	Tool Type Commercial
AMPLIMITE D-Sub. Connectors		Size 20 DF Contacts	28-24	0.08-0.2	.040	1.02	58448-2	PC
			24-20	0.2-0.5	.060	1.52		
		Size 22 DF Contacts	28-22	0.08-0.3	.040	1.02	90800-1	PC
AMPMODU Connectors		Mod. IV Contacts	26-22	0.12-0.3	.061	1.55	58641-1	PC
			24-20	0.2-0.5	.069	1.75	—	—
CPC Connectors, M Series Connectors		Type II Contacts	28-24	0.08-0.2	.055	1.40	—	—
			24-20	0.2-0.6	.062	1.57	58541-1	PC
			18-16	0.8-1.4	—	—	58541-1	PC
			14	2	—	—	58541-1	PC
		Type III+ Contacts	30-26	0.05-0.15	.060	1.52	—	—
			26-24	0.12-0.2	.055	1.40	58495-1	PC
			24-20	0.2-0.6	.080	2.03	58495-1	PC
			24-20	0.2-0.6	.100	2.54	—	—
			24-20	0.2-0.6	.120	3.05	—	—
			18-16	0.8-1.25	.100	2.54	58495-1	PC
			18-14	0.8-2	.100	2.54	—	—
FASTON Straight Receptacles (Premier Line Only)		250 Series	22-18	0.3-0.8	.130	3.30	—	—
			18-14	0.8-2	.170	4.32	58524-1	PC
			14-10	2-5	.200	5.08	58525-1	PC
MATE-N-LOK Connectors		Commercial Contacts	30-22	0.05-0.3	.075	1.91	—	—
			24-18	0.2-0.8	.100	2.54	90574-1	PC
			20-14	0.5-2	.130	3.30	90575-1	PC
		Universal & Universal II Contacts	24-18	0.2-0.8	.100	2.54	90548-1	PC
			20-14	0.5-2	.130	3.30	90546-1	PC
			20-18	0.5-0.8	.200	5.08	90547-1	PC
			16-14	1.25-2	.200	5.08	90547-1	PC
		Mini-Universal	20-16	0.5-1.25	.126	3.20	90760-1	PC
		Mini-Universal II Contacts	26-22	0.12-0.3	.069	1.75	90758-1	PC
			22-18	0.3-0.8	.094	2.39	90759-1	PC
			20-16	0.5-1.25	.126	3.20	58707-1	PC
Power Triple Lock Connectors		Power Triple Lock	22-20	0.3-0.6	.106	2.70	2217267-1	SDE-SA
			20-16	0.6-1.25	.130	3.30	2217208-1	SDE-SA
			18-14	0.9-2.1	.146	3.70	2217266-1	SDE-SA
			12	3.3	.167	4.25	2217268-1	SDE-SA

CRIMP QUALITY GUIDELINES



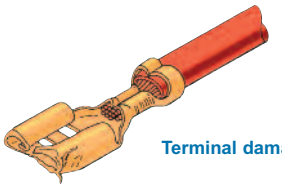
Want to know more about proper crimp techniques? View our Crimp Theory Fundamentals videos on our website at tooling.te.com or find them on our YouTube channel.

Crimp Theory Fundamentals Video.
https://www.youtube.com/watch?v=foFgl8c17so

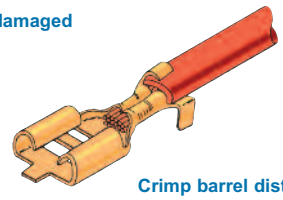


CRIMP QUALITY GUIDELINES

Incorrect

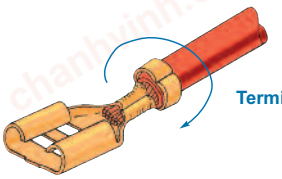


Terminal damaged

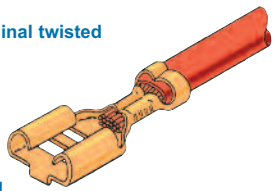


Cut off tab too long

Crimp barrel distorted

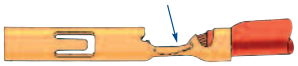


Terminal twisted

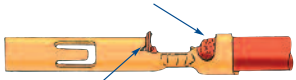


Cut off tab deformed

Crimp height too tight

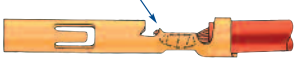


Insulation inside the wire crimp



Conductor Brush protruding into terminal body

Bellmouth on wrong end



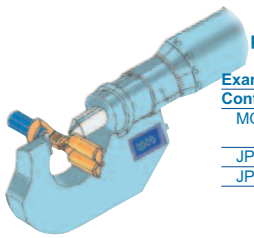


Terminal bend

Test

WIRE CRIMP

Crimp height measurement



Crimp heights and tolerances

For crimp height tolerances for any given contact, please refer to the relevant application specification.

Examples:

Contact	P/N	Wire Range	Tolerance	Application Spec.
MQS	962885 962886	0,20 - 0,50 mm²	± 0,03 mm	114-18025
JPT	927775	0,50 - 1,00 mm²	± 0,05 mm	114-18050
JPT	927773	1,50 - 2,50 mm²	± 0,05 mm	114-18050

Digital crimp height micrometer (0.001mm increments) according to DIN ISO 9001
Part Number 547203-1



WIRE CRIMP

Incorrect applicator adjustment

Asymmetric crimp



Terminal feed incorrectly adjusted

Unacceptable formation excessive flash and/or cracks



Anvil and crimper not aligned or worn

Incorrect terminal / wire selection

Wire size too large



Crimp barrel does not close

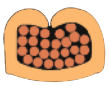
Wire size too small



Legs too close to bottom of crimp. Insufficient deformation of strands, showing voids.

Incorrect crimp height adjustment

Crimp height too loose



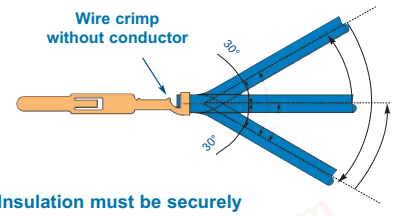
Insufficient deformation, showing voids

Crimp height too tight



Flash at under side of crimp, due to over crimping

INSULATION CRIMP



Insulation must be securely held after bend test

Training & Services

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Glossary of Terms

ACTION PIN Contact (connector): Manufactured exclusively by TE Connectivity, having a split pin to provide gas tight retention in a printed circuit board plated-thru hole without solder.

Anvil (tooling): Most commonly used to identify that part of the crimping die — normally stationary — which positions and supports the terminal during crimping. Sometimes referred to as nest.

Arc Voltage: Voltage that continues to pass through a surge protector during activation of GDT (approx. 20 volts).

ASTM (American Society for Testing and Materials): A nonprofit industry-wide organization that formulates test methods and material specifications, and publishes standards, testing methods, recommended practices, definitions and other materials.

AWG (American Wire Gauge): The recognized method (in the United States) of specifying conductor size. The higher the gauge number, the smaller the conductor size.

Bare Conductor: A conductor not covered with insulating material.

Barrel: **1.) Connector Barrel:** The section of the terminal, splice, or contact that accommodates the stripped conductor. **2.) Insulation Barrel:** The section of the terminal, splice, or contact that accommodates the conductor insulation. **3.) Open Barrel:** The section of a cap that accommodates the conductor.

Bellmouth: Flared at the mouth. The rear of a properly crimped wire barrel will have a slight flare (bellmouth) to relieve the strain on the wire strands as they leave the area of high compression and take their natural lay. A bellmouth may also be present in front of the wire barrel.

Breakdown Voltage: The voltage at which an insulator or dielectric fails to maintain the applied voltage.

Breakout: A region in a harness assembly where a wire or a group of wires is detached to form a separate, terminated branch. Also known as a transition.

Bunch Stranding: A method of twisting individual strands to form a finished stranded conductor. Specifically, a number of strands twisted together in a common direction and with a uniform pitch (or twist) per inch.

Butt Splice (electrical): A splice wherein two wires from opposite ends butt against each other, or against a stop, in the center of the splice.

Cable: Two or more wires in a twisted or parallel configuration. Also, a shielded wire.

Cabler: A machine that mechanically assembles a group of insulated wires.

Cabling: The act of twisting together two or more insulated components to form a cable.

Capacitance: The property of an electrical conductor (dielectric in a capacitor) that permits the storage of energy as a result of electrical displacement. The basic unit of capacitance is the farad, however, measurement is more commonly in microfarads or picofarads.

Carrier: A group of strands or ends used to form a finished braid.

Circular Mil Area (CMA): A unit of area equal to the area of a circle whose diameter is 1 mil (0.001 inch). Used chiefly in specifying cross-sectional areas of conductors.

Closed Entry Contact: Female contact designed to prevent entry of a pin or probing device having a cross-sectional dimension (diameter) greater than the mating pin.

Component: A wire or cable that is combined with other wires or cables to make a multi-component cable.

Concentric Stranding: A method of stranding conductor. Specifically, the final conductor is built up in layers so that the inner diameter of a succeeding layer is always equal to the outer diameter of the underlying layer.

Conductivity: The capability of a material to carry electrical current, usually expressed as a percentage of copper conductivity (copper being 100%). Specifically, the ratio of the current flow to the potential difference causing the flow. The reciprocal of resistance.

Conductor: The metallic strand or strands used to carry an electric current.

Conductor Resistance: The resistance to flow of the electrical current along a conductor. Expressed in ohms/1,000 feet (usually referenced to 20°C).

Conduit: A tubular raceway for holding wires or cables.

Connector: A device used to physically and electrically connect two or more conductors.

Contact: The element in a connector that makes the actual electrical connection. Also the parts of a connector that actually carry the electrical current, and are touched together or separated to control the flow.

Contact Crimp: A contact whose rear portion is a hollow cylinder that accepts the conductor. A crimping tool is applied to swage or form the contact metal firmly against the conductor. Sometimes referred to as a solderless contact.

Contact Engaging and Separating Force: Force required to either engage or separate contacts. Values are generally established for maximum and minimum forces.

Contact Resistance: Measurement of electrical resistance of mated contacts when assembled in a connector under typical service use. Electrical resistance is determined by measuring from the rear of the electrical area of one contact to the rear of the contact area of the mating contact (excluding both crimps) while carrying a specified test current.

Contact Size: The diameter of the engagement end of a pin contact; also related to the current carrying capacity of a contact.

Continuity: A continuous path for the flow of current in an electrical circuit.

Core: 1.) In cables, a component or assembly of components over which additional components, such as a shield or a sheath, are applied.
2.) Inner wall of dual-wall heat-shrinkable tubing.

Crimp: The final configuration of a terminal barrel after the necessary compression forces have been applied to cause a functional union between the terminal barrel and the wire.

Crimper (tooling): Often used to identify that part of the crimping die — usually the moving part — which indents or compresses the terminal barrel. Also called indenter.

Crimp Height: A top to bottom measurement of the crimped barrel, using a crimp height comparator in the prescribed manner.

Crimping Chamber: Area of a crimping tool in which a contact or terminal is crimped; the crimping enclosure formed by the mating of the anvil (nest) and crimper (indenter). When the dies or jaws are fully closed or bottomed, it is the crimping chamber that is checked with a go no-go plug gauge to confirm that the crimp produced by the tooling satisfies the crimp height specification.

Crimping Dies: A term used to identify the shaping tools that, when moved toward each other, produce a certain desirable shape to the barrel of the terminal or contact that has been placed between them. Crimping dies are often referred to as die sets or as die inserts.

Crimping Head: Tooling containing jaws and linkage for use in pneumatic or hydraulic powered units to crimp loose-piece contacts/terminals that may be too large for hand tool applications.

Crimping Tool: A term commonly used to identify a hand held mechanical device that is used to crimp a contact, terminal or splice.

Cross Crimp: A crimp that deforms the terminal by exerting on the top and bottom of the terminal barrel without confining the sides. Usually identified by a raised crescent (moon) shaped form on the surface of the crimp.

Current: A movement or flow of electrons. Also, the measure of this flow, expressed in amperes.

Current-carrying Capacity: The maximum current an insulated conductor is capable of carrying without exceeding its insulation- and/or jacket temperature limitations under specified ambient conditions.

Current Rating: The maximum continuous electrical flow of current recommended for a given situation. It is expressed in amperes.

Die: See crimping dies.

Die Closure: Term used to designate a crimping area (crimping chamber) when the dies are fully closed or bottomed. Die closure is checked with go/no go plug gauge to confirm that the crimp produced by the tooling satisfies the crimp height specification.

Dielectric: A material that serves as an insulator. The amount of resistance to voltage in a given insulation.

Dielectric Isolation (IC): Most silicon integrated circuits depend on back biased semiconductor junctions to provide isolation between components on the chip. Dielectric isolation involves a number of additional process steps, which result in silicon dioxide rather than a junction surrounding each component to be isolated. The silicon dioxide, a dielectric, provides the necessary isolation.

Dielectric Strength: Maximum voltage a dielectric can withstand without rupture. Expressed as volts per mil.

Discontinuity: Rated interconnection: broken connection (open circuit) or loss of a specified connection characteristic. Transient phenomena: Short-term interruption or unacceptable variation in current or voltage.

Drain Wire: In a cable, an un-insulated conductor laid over the component, or components, in a foil-shield cable. Used as a ground connection.

Electromagnetic Compatibility (EMC): The ability of an electronic device to operate in its intended environment without its performance being affected by EMI and without generating EMI that will affect other tooling.

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Glossary of Terms

Electromagnetic Interference (EMI): Unwanted electrical or electromagnetic energy that causes undesirable responses, degrading performance or complete malfunctions in electronic tooling.

Electromotive Force (emf): See voltage.

EMI: Abbreviation for electro magnetic interference.

Extraction Tool: A tool used for removing contacts from a connector body.

F Crimp: A crimp that brings the center of the barrel along an open seam downward into a V.

Ferrule: A short tube used to make solderless connections to shielded or coaxial cable. Also molded into the plastic inserts of multiple contact connectors to provide strong, wear-resistant shoulders on which contact retaining springs can bear.

FFC: Flexible flat cable; flat flexible cable; or flexible flat conductor. A form of multiple conductor cable consisting of parallel flat metal strips imbedded in a flat flexible insulating material.

Flat Braid: A braided shield composed of flatstrands.

Flat Cable: A cable with each component in a single, flat plane.

Flat Conductor: A conductor having a rectangular cross section, as opposed to a round or square cross section.

Fretting Corrosion: A form of accelerated oxidation that appears at the interface of contacting materials undergoing slight cyclic relative motion. All non-nobel metals (tin) are susceptible to some degree of fretting corrosion and will suffer contact resistance increases.

Gauge: A term used to denote the physical size of a wire. See also AWG.

Ground: A connection, intentional or accidental, between an electrical circuit and the earth or some conducting body (e.g. chassis) serving in place of earth.

Grounding Conductor: A conductor that provides a current return path from an electrical device to ground.

Hardness: A general term that correlates with strength, rigidity, and resistance to abrasion or penetration. Measured on Shore or Rockwell scales.

Harness: A system providing electrical connection between two or more points.

Hertz (Hz): International standard term for cycles per second. Named after the German physicist Heinrich R. Hertz (e.g., 60 cycles per second is equal to 60 hertz or 60 Hz).

Inductance: One cause of reactance. An electromagnetic phenomenon in which the expanding and collapsing of a magnetic field surrounding a conductor or device tends to impede changes in current. The effects of inductance become greater as frequencies increase. The basic unit for inductance is the henry.

Insertion Tool: A tool used to insert removable contacts into a connector.

Insulation Barrel: See barrel.

Insulation Crimp: The area of a terminal splice or contact that has been formed around the insulation of a wire.

Insulation Displacement: A terminating technique whereby an insulated wire is forced into a restrictive slot in a terminal, during which time the wire insulation is displaced, and the bare wire engages the sides of the slot.

Insulation Grip: The ability of certain crimped terminals to hold firmly in place both the conductor and a small portion of insulation. This prevents the conductor from being exposed due to insulation receding away from the terminal.

Insulation Resistance: The electrical resistance between two conductors separated by an insulating material.

Interference: Electrical or electromagnetic disturbance causing undesirable response in electronic tooling.

Jack: A connecting device into which a plug can be inserted to make circuit connections. The jack may also have contacts which open or close to perform switching functions when the plug is inserted or removed. See also: receptacle.

Jacket: 1.) A material covering over a wire or cable assembly. 2.) Outer covering of a dual-wall heat-shrinkable tubing.

Jackscrew: A screw attached to one half of a two-piece, multiple-contact connector and used to draw both halves together and to separate them.

kV (kilovolt): A unit equal to 1,000 volts.

Mega (M): A prefix meaning one million (106).

Multiconductor: More than one component within a single-cable complex.

Nominal: A descriptor applied to a dimension representing the center of the range of tolerance or a value if no tolerance is applied.

O Crimp: An insulation support crimp for open barrel terminals and contacts. In its crimped form it resembles an O and conforms to the shape of the round wire insulation. O crimp is also used to describe the circumferential crimps used on COAXICON ferrules.

Open Barrel: See barrel.

Peripheral Seal: A seal provided around the periphery of connector inserts to prevent the ingress of fluids or contaminants at the perimeter of mated connectors.

Pigtail: A short conductor or wire extending from an electrical or electronic device to serve as a jumper or ground connection.

Pin Contact: Electrical terminal, usually in a connector. Normally smaller termination than a lug.

Pretinned: Description of an electrical component to which solder has been applied prior to soldering.

Primary Insulation: The inner member of a dual wall wire insulation. The insulation applied directly on the conductor.

Printed Circuit Board (PCB): An insulating board serving as a base for a printed circuit. When the printing process is completed, the board may include printed components and printed wiring.

Rated Voltage: The maximum voltage at which an electric component can operate for extended periods without undue degradation.

Receptacle: Usually the fixed or stationary half of a two-piece multiple contact connector. Also the connector half usually mounted on a panel and containing socket contacts.

Removable Contact: A contact that can be mechanically joined to or removed from an insert. Usually special tools are required to lock the contact in place or remove it for repair or replacement.

Resistance: A measure of the difficulty in moving electrical current through a conductor or insulation when voltage is applied. Measured in ohms.

Resonance: A frequency at which captive reactance and inductive reactance

Ribbon Cable: Flat cable with conductors that have been individually insulated together. Its structure is usually characterized by individual colors of insulation for each conductor, although a single color may be used for all conductors.

Serrations: Small grooves or indentations within a terminal wire barrel. The serrations increase the tensile strength and improve the electrical conductivity of the crimped termination.

Sleeve: The insulated or metallic covering over the barrel of a terminal.

Solid Conductor: A conductor composed of one single strand.

Splice: A joint connecting conductors with good mechanical strength and conductivity; a terminal that permanently joins two or more wires.

Strand: A single unit of a conductor.

Strip: To remove insulation from a wire or cable.

Surface Resistance: The ratio of the direct current applied to an insulation system to the current that passes across the surface of the system.

Surface Resistance: Ratio of the direct current applied to an insulation system to the current that passes across the surface of the system.

Tab: Used to scribe the flat blade portion of certain terminals (e.g. FASTON tab, taper tab, solder tab).

Tab-lok Crimp: A type of crimp used on FASTON flag terminals whereby a tab on the wire barrel is inserted through a slot in the terminal. The crimping action flattens the tab between two lances, which in turn are locked over the tab.

Terminal: An electrically conductive item designed to be attached to a circuit or device for convenience in making electrical connections.

Terminal Area: The portion of a printed circuit – usually along the edge – used for making the input-output connections. Sometimes this term is used synonymously with pad.

Terminal Barrel: See barrel.

Trimming: The adjustment of resistor or capacitor values in thick or thin film circuits by pattern changes, irreversible thermally induced changes, or removal of portions of material by laser or abrasive techniques. Dynamic trim is unique to these technologies, and of great value to circuit design and manufacture.

Volt (V): The unit of measurement for electromotive force (emf). It is equivalent to the force required to produce 1 ampere through a resistance of 1 ohm.

Voltage (E): The term most often used to designate electrical pressure that exists between two points and is capable of producing a flow of current when a closed circuit is connected between the two points. Voltage is measured in volts, millivolts, microvolts and kilovolts. The terms electromotive force (emf), potential, potential difference and voltage drop are often referred to as voltage.

Voltage Drop: The voltage developed across a component or conductor by the flow of current through the resistance or impedance of that component or conductor.

Voltage Rating: The voltage that may be continuously applied to wire.

W Crimp: A confined type of crimp that makes two longitudinal indentations which form a W cross section. Used on SOLISTRAND terminals.

Wall Thickness: The thickness of the applied insulation or jacket.

Wire: A single conductor covered with insulation.

Wire Barrel: See barrel.

Wire Crimp: See crimp.