

# 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.

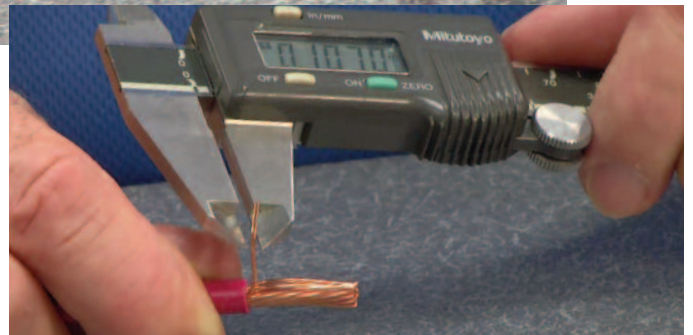
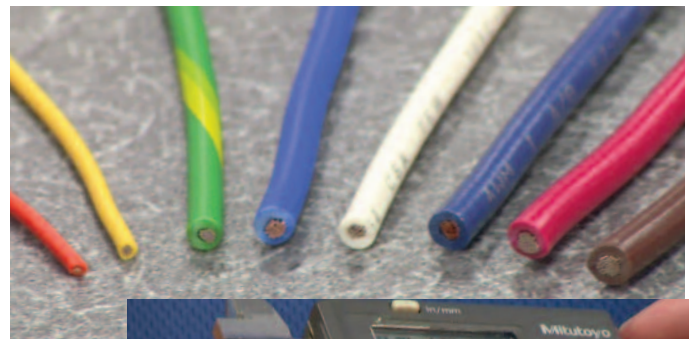
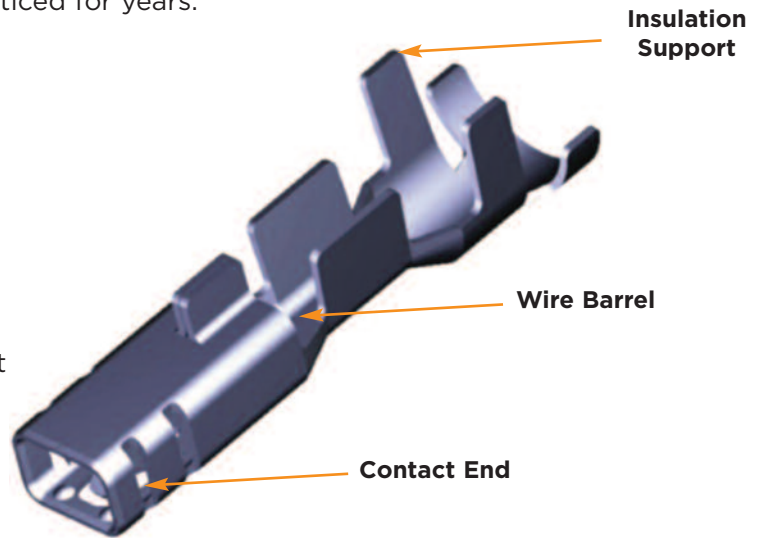
**Why is this experience important to you?** As the pioneer in crimping technology our highly trained engineers have studied how the forces of crimping can affect how a tool works, whether it meets specifications, and even whether it reaches its expected service life. As a result we have led the way, 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 too large or small for the wire strand.

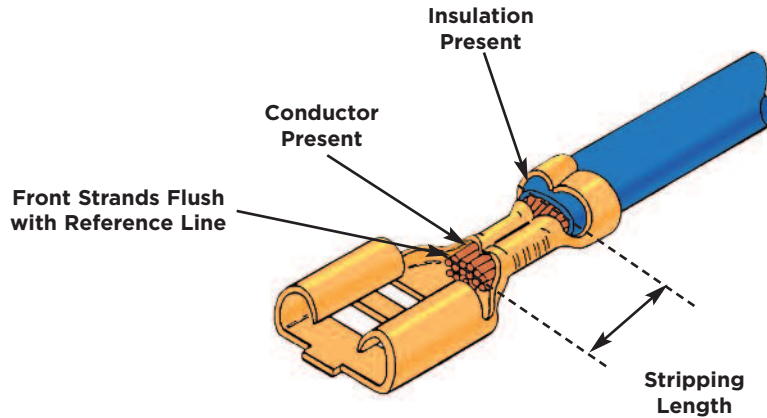


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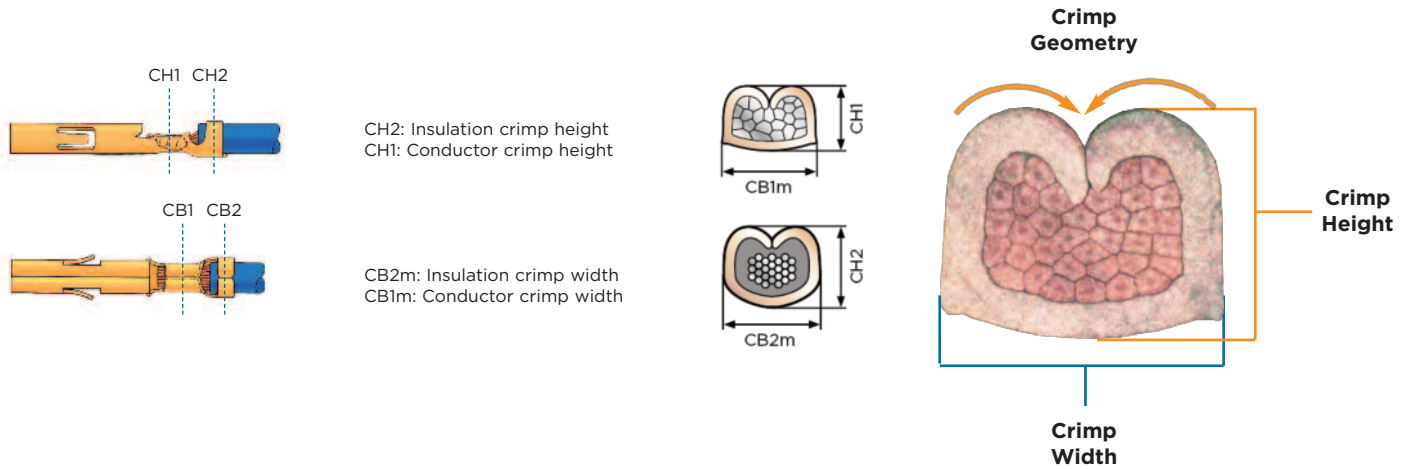
# INTRODUCTION TO TOOLING SOLUTIONS

## 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.



- 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.)**

# 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



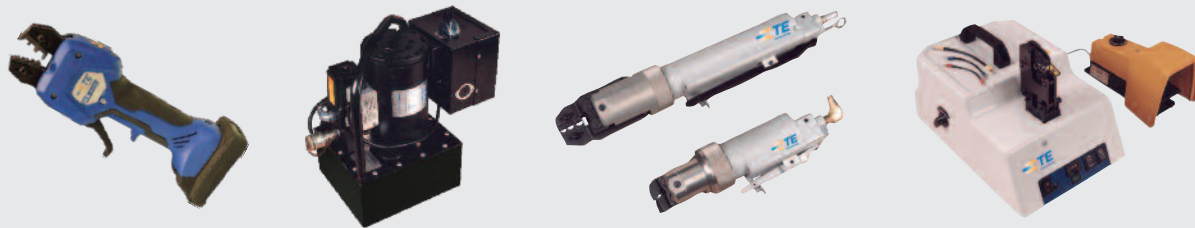
### LOW VOLUME: Small Production Quantities

#### Manual Hand Tools



### INTERMEDIATE: Small to Mid-Level Volumes

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



### INTERMEDIATE: Semi-Automatic Volumes

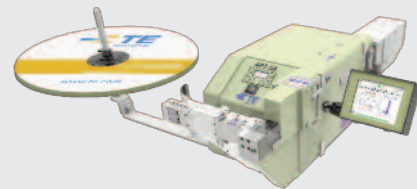
#### Applicators & Spare Tooling



#### Bench Terminators

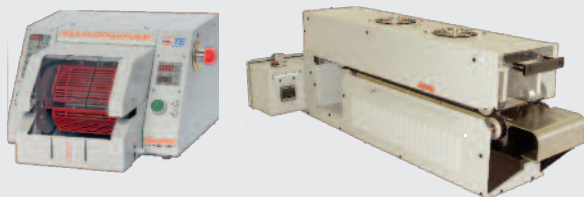


#### AMPLIVAR Product Termination — Magnet Wire



### INTERMEDIATE: Semi-Automatic Volumes

#### Heat Shrink Tubing Equipment



### INTERMEDIATE: Fully-Automatic Volumes

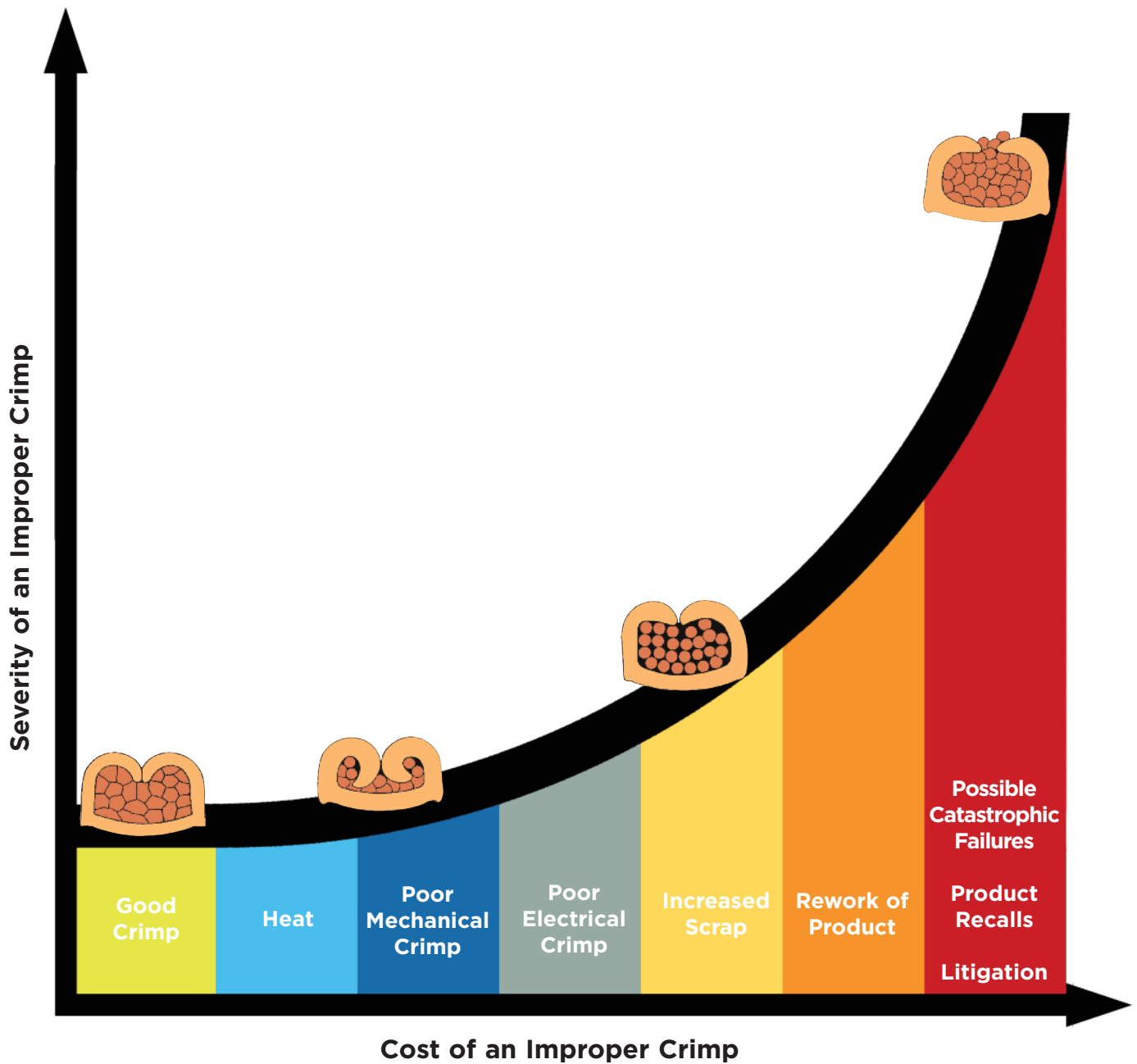
#### Single Crimp Wire Processor



# 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.



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# 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.

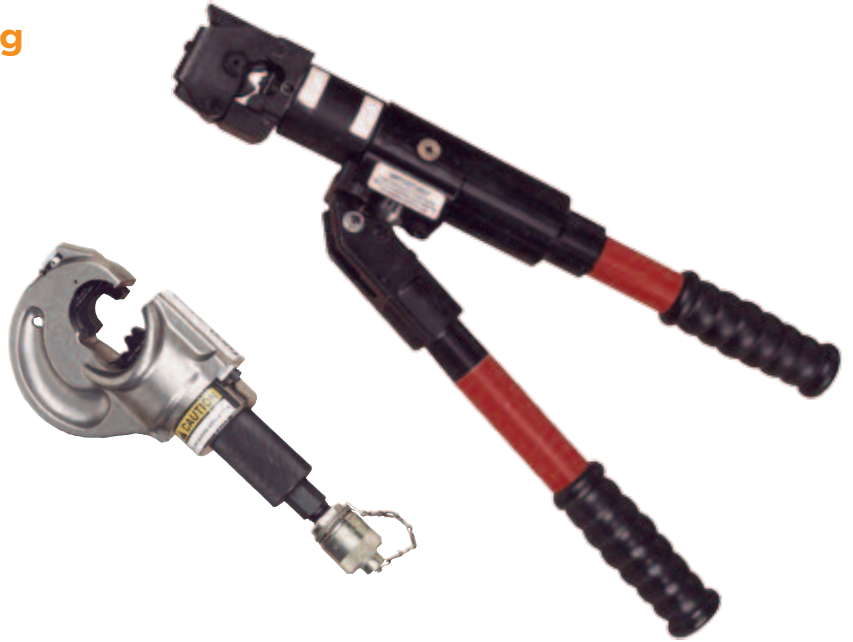
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# POWER HAND TOOLING

## Hydraulic Powered Crimp Tooling

### FAST FACTS

- Industry standard 10,000 psi and TE legacy 8,200 psi hydraulic system pumps and crimp heads
- Electric & manual hydraulic pumps for crimping at fixed locations
- 10,000 psi and 8200 psi crimp heads compatible with shank dies available for wire sizes requiring a crimp force up to 33 tons
- 10,000 psi crimp heads compatible with U-dies for wire sizes requiring a crimp force up to 14 tons
- U-die crimp head stroke options of 1 in and 1.5 in
- Hand-held pistol grip tools with rechargeable battery for U dies
- Portable battery operated hydraulic pump for 10,000 psi crimp heads
- Integrated crimp head/die combinations for crimping #8-2 AWG SOLISTRAND terminals



TE Connectivity's line of quality tooling includes industry-standard 10,000 psi [68,950 kPa] and TE legacy 8,200 psi [56,540 kPa] hydraulic tool systems. The basic hydraulic tool system requires a pump, hose (multiple lengths are available with all configurations), crimp head, and crimp die. There is a TE hydraulic pump to meet the demands of any crimping application. For fixed crimping locations, you can choose between a 110 V or 220 V Electric Hydraulic Pump (with optional remote hand control), or manual foot and hand hydraulic pumps. For maximum portability, 10,000 psi hand-held pistol grip crimp tools with rechargeable battery are an effective solution. Or, to power a 10,000 psi crimp head at any location, order a portable battery hydraulic unit.

U-dies for a 10,000 psi hydraulic system are well suited for applications requiring a crimp force of up to 14 tons [125 kN]. For wire sizes requiring up to 33 tons [294 kN], TE offers crimp heads for 10,000 psi and 8,200 psi pumps that are compatible with shank dies.

For a 10,000 psi hydraulic system, there are three light duty and one heavy duty U die crimp heads available. U-die crimp heads are available in two types, with 1 in [25 mm] and 1.5 in [38 mm] strokes, respectively. Two 12 ton [101 kN] crimp heads have a 1 in [25 mm] stroke. Two 14 ton [125 kN] crimp heads are for larger products that require a 1.5 in [38 mm] stroke. Four heavy duty crimp heads for shank dies are available for wire sizes requiring between 14 and 33 tons of crimp force.

For an 8,200 psi hydraulic system, there are eight crimp heads available. These crimp heads accept shank dies. The crimp heads are available for wire sizes requiring up to 33 tons of crimp force.

For both hydraulic systems, an integrated head/die for crimping #8 to #2 SOLISTRAND terminals is available. There are also manual hand held hydraulic tools available for both U and shank die sets.

**Note: 10,000 psi hydraulic pumps are not compatible with 8,200 psi crimp heads. 8,200 psi hydraulic pumps are not compatible with 10,000 crimp heads.**

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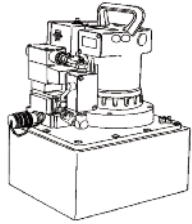


# POWER HAND TOOLING

## HYDRAULIC TOOLING SELECTION GUIDE for 10,000 psi

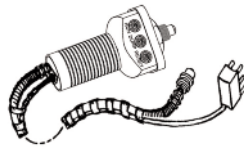
### Hydraulic Pumps, Controls and Hoses

The Heavy-duty Pump is designed for higher crimp cycle frequency.



Heavy Duty Electric Hydraulic Pump (110V)<sup>1,2</sup> P/N **1804700-1**  
OR  
Heavy Duty Electric Hydraulic Pump (220V)<sup>1,2</sup> P/N **1804700-2**  
CM 409-10081

WITH



Remote Hand Control<sup>3</sup>  
**(for Heavy-Duty pump)**  
w/hose attached  
P/N **1901775-1** (7 ft hose)  
P/N **1901776-1** (15 ft hose)  
P/N **1901777-1** (21 ft hose)

OR



Remote Foot Control<sup>3</sup>  
**(for Heavy-Duty pump)**  
P/N **68284-1**

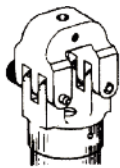
AND



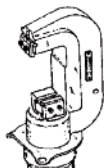
Hydraulic Hoses<sup>4</sup>  
**(not required for hand control)**  
P/N **1583662-1** (6 ft)  
P/N **1583662-2** (10 ft)  
P/N **1583662-3** (20 ft)

### Heavy-Duty Crimp Heads (Shank Dies)

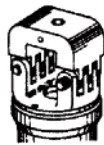
( > 25,000 cycles )



8 - 4/0 AWG  
22 ton output force  
16 lbs  
P/N **1752877-1**  
IS 408-8956



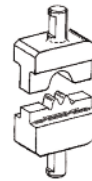
4/0 AWG - 1000 MCM  
26 ton output force  
29 lbs  
P/N **1752786-1**  
IS 408-8958



8 - 4/0 AWG  
33 ton output force  
28 lbs  
P/N **1752787-1**  
IS 408-8914



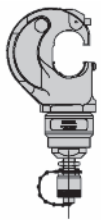
12-10 AWG - 350 MCM  
18 ton output force  
13 lbs  
P/N **1752868-1**  
IS 408-8959



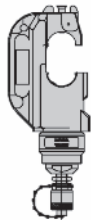
PLASTI-GRIP	8 AWG - 4/0 AWG
AMPOWER	6 AWG - 1500 MCM
AMPOWER Quick Disconnect	1/0 AWG - 600 MCM
Insulation Piercing COPALUM	10 AWG (Cu) - 3/0 AWG
Sealed COPALUM	10 AWG - 3/0 AWG
Bar COPALUM	10 AWG (Cu) - 400 MCM
SOLISTRAND	8 AWG - 600 MCM
STRATO-THERM	8 AWG - 2/0 AWG
TERMINYL	1/0 AWG thru 4/0 AWG

### Medium-Duty Crimp Heads & Hand Tools (U-Dies)

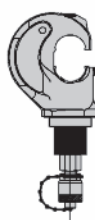
### U-Dies



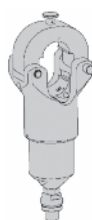
12 ton output force  
1 stroke;  
20,000 cycle  
Light Duty  
Compression Head<sup>2</sup>  
U-Die Compatible  
P/N **1490745-1**  
IS 408-10111



12 ton output force  
1.5 stroke;  
20,000 cycle  
Light Duty  
Compression Head  
U-Die Compatible  
P/N **1490746-1**  
IS 408-10112



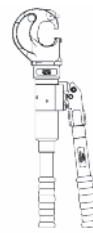
12 ton output force  
1 stroke Titanium  
Compression Head  
U-Die Compatible  
P/N **1490747-1**  
IS 408-8715



14 ton output force  
1.5 stroke;  
Heavy-Duty  
Compression Head  
U-Die Compatible  
P/N **1976230-1**  
IS 408-10145



14 ton output force  
1.5 stroke  
Compression Tool  
U-Die Compatible  
P/N **1490749-1**  
IS 408-8717



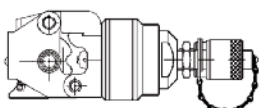
1 stroke Hand  
Compression Tool  
U-Die Compatible  
P/N **1490748-1**  
IS 408-8716



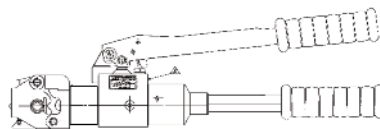
PLASTI-GRIP	8 AWG - 2 AWG
AMPOWER	6 AWG - 4/0 AWG
SOLISTRAND	8 AWG - 4/0 AWG
TERMINYL	8 AWG - 1/0 AWG

- Powered systems require a pump, hand or foot control, hose, crimp head and die except with **1673672-1**.
- The portable battery pump, **180411-1**, includes a hand control.
- Manual systems require hand tools and the battery hand tool requires only dies.

### SOLISTRAND (Integrated Crimp Dies)



#8-#2 AWG SOLISTRAND  
Compression Head  
(No crimp dies required)  
P/N **1673672-1**  
IS 408-8910



#8-#2 AWG SOLISTRAND  
Compression Tool  
(No crimp dies required)  
P/N **59975-1**  
IS 408-6758

<sup>1</sup> Portable Battery Pump **1804111-1**, Foot Pump **1583659-1** OR Hand Pump **1583661-1** can be substituted as manual options for Electro-Hydraulic Pumps.

<sup>2</sup> Includes male screw-to-connect, 3/8 NPT quick couplers

<sup>3</sup> Not required with manual pump options.

<sup>4</sup> Includes female screw-to-connect, 3/8 NPT quick couplers

# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 10,000 psi

The TE Connectivity hydraulic crimping tool line offers a wide array of die, hand tool, and hydraulic head configurations. Use the following tables to determine the configuration that best matches your requirements.

### SOLISTRAND Terminals



Hydraulic Crimp Tooling 10,000 psi Operating Pressure						
Wire Size in AWG [mm <sup>2</sup> ]	Hand Tools (U-Die)	Hydraulic Heads (U-Die)	Hydraulic Heads (Shank Die)			
		1490748-1 1490749-1	1490745-1 1490746-1 1490747-1 1976230-1	1673672-1▲	1752868-1	1752788-1
8 [7-8.5]	1490413-1** 1490414-1⊙	1490413-1** 1490414-1⊙	▲	69216		
6 [13-15]	1490413-2** 1490414-2⊙	1490413-2** 1490414-2⊙	▲	69217		
4 [21]	1490413-3** 1490414-2⊙	1490413-3** 1490414-2⊙	▲	69218		
2 [34-35]	1490413-4** 1490414-2⊙	1490413-4** 1490414-2⊙	▲	45433		
1/0 [50-60]	1490413-5** 1490414-3⊙	1490413-5** 1490414-3⊙		45436		
2/0 [67-70]	1490413-6** 1490414-3⊙	1490413-6** 1490414-3⊙		45439		
3/0 [80-95]	1490413-7** 1490414-3⊙	1490413-7** 1490414-3⊙		45442		
4/0 [100-125]	1490413-8** 1490414-3⊙	1490413-8** 1490414-3⊙		45445		
250-300 MCM [127-152]					48816	69911
300-350 MCM [152-177]					48817	69912
400 MCM [203]					48818	69913
500-600 MCM [253-304]					48819	69914

**	Stationary die
⊙	Moving die
▲	Self-Contained die



# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 10,000 psi

### Heavy Duty SOLISTRAND Terminals



Wire Size in AWG [mm <sup>2</sup> ]	Hydraulic Crimp Tooling 10,000 psi Operating Pressure	
	Hand Tools (U-Die)	Hydraulic Heads (U-Die)
		1490748-1 1490749-1
8 [7-8.5]	1490413-9 ✱ 1490413-2 ⊙	1490413-9 ✱ 1490414-2 ⊙
6 [13-15]	1-1490413-0 ✱ 1490414-2 ⊙	1-1490413-0 ✱ 1490414-2 ⊙
4 [21]	1-1490413-1 ✱ 1490414-2 ⊙	1-1490413-1 ✱ 1490414-2 ⊙
2 [34-35]	1-1490413-2 ✱ 1490414-3 ⊙	1-1490413-2 ✱ 1490414-3 ⊙
1/0 [50-60]	1-1490413-3 ✱ 1490414-3 ⊙	1-1490413-3 ✱ 1490414-3 ⊙



### SOLISTRAND Flag Terminals

Wire Size in AWG [mm <sup>2</sup> ]	Hydraulic Crimp Tooling 10,000 psi Operating Pressure	
	Hand Tools (U-Die)	Hydraulic Heads (U-Die)
		1490749-1
8 [7-8.5]	1752680-8 ✱ 1752681-2 ⊙	1752680-8 ✱ 1752681-2 ⊙
6 [13-15]	1752680-7 ✱ 1752681-3 ⊙	1752680-7 ✱ 1752681-3 ⊙
4 [21]	1752680-6 ✱ 1752681-3 ⊙	1752680-6 ✱ 1752681-3 ⊙
2 [34-35]	1752680-5 ✱ 1752681-3 ⊙	1752680-5 ✱ 1752681-3 ⊙
1/0 [50-60]	1752680-4 ✱ 1752681-1 ⊙	1752680-4 ✱ 1752681-1 ⊙
2/0 [67-70]	1752680-3 ✱ 1752681-1 ⊙	1752680-3 ✱ 1752681-1 ⊙
3/0 [80-95]	1752680-2 ✱ 1752681-1 ⊙	1752680-2 ✱ 1752681-1 ⊙
4/0 [100-125]	1752680-1 ✱ 1752681-1 ⊙	1752680-1 ✱ 1752681-1 ⊙

✱	Stationary Die
⊙	Moving Die

# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 10,000 psi

### TERMINYL Terminals and Splices



Wire Size in AWG [mm <sup>2</sup> ]	Hydraulic Crimp Tooling 10,000 psi Operating Pressure					
	Hand Tools (U-Die)		Hydraulic Heads (U-Die)		Hydraulic Heads (Shank-Die)	
	1490748-1	1490749-1	1490745-1 1490747-1	1490746-1 1976230-1	1752877-1	1752787-1
8 [7-8.5]	1490597-1	1490597-1	1490597-1	1490597-1		
6 [13-15]	1490598-1	1490598-1	1490598-1	1490598-1		
4 [21]	1490599-1	1490599-1	1490599-1	1490599-1		
4HD					69463	69463
2 [34-35]		1490406-1		1490406-1		
1/0 [50-60]		1490700-1		1490700-1	47824	47824
2/0 [67-70]					47825	47825
3/0 [80-95]					47915	47915
4/0 [100-125]					47918	47918

### PLASTI-GRIP Terminals and Splices



Wire Size in AWG [mm <sup>2</sup> ]	Hydraulic Crimp Tooling 10,000 psi Operating Pressure			
	Hand Tool (U-Die)	Hydraulic Head (U-Die)	Hydraulic Heads (Shank Die)	
	1490749-1	1490746-1 1976230-1	1752877-1	1752787-1
8 [7-8.5]	1490534-1	1490534-1	48858-1	48858-1
6 [13-15]	1490535-1	1490535-1	48859-1	48859-1
4 [21]	1490536-1	1490536-1	48860-1	48860-1
2 [34-35]	1490410-1	1490410-1	48861-1	48861-1
1/0 [50-60]			48756-1	48756-1
2/0 [67-70]			48757-1	48757-1
3/0 [80-95]			48758-1	48758-1
4/0 [100-125]			48759-1	48759-1

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 10,000 psi

### STRATO-THERM Terminals and Splices



Wire Size in AWG [mm <sup>2</sup> ]	Hydraulic Crimp Tooling 10,000 psi Operating Pressure	
	Hydraulic Head (Shank Die)	
	1752868-1	
8 [7-8.5]	69211-1	
6 [13-15]	69212-1	
4 [21]	69213-1	
2 [34-35]	69214-1	
1/0 [50-60]	69215-1	
2/0 [67-70]	69254-1	

### AMPOWER Quick Disconnect Terminals



Wire Size in AWG [mm <sup>2</sup> ]	Hydraulic Crimp Tooling 10,000 psi Operating Pressure	
	Hydraulic Heads (Shank Die)	
	1752868-1	1752786-1
1/0 [50-60]	68361-1 ○ / 68200-1	
2/0 [67-70]	68253-1 ○ / 68201-1	
3/0 [80-95]	59867-1 ○	
4/0 [100-125]	68304-1 ○	
250 MCM [127]	68203-1	
350 MCM [177]	68204-1	
400 MCM [203]	68332-1 ●	
500 MCM [253]	68206-1 ●	
600 MCM [304]	46757-3	

○	With Locator
●	Dual Crimp

# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads — Configuration Options for 10,000 psi

### AMPOWER Terminals and Splices



Wire Size in AWG [mm²]	Hydraulic Crimp Tooling 10,000 psi Operating Pressure						
	Hand Tools (U-Die)		Hydraulic Heads (U-Die)		Hydraulic Heads (Shank Die)		
	1490748-1	1490749-1	1490745-1 1490747-1	1490746-1 1976230-1	1752868-1	1752788-1	1752786-1
6 [13-15]	1583092-1	1583092-1	1583092-1	1583092-1	69133-1		
4 [21]	1583093-1	1583093-1	1583093-1	1583093-1	69134-2		
2 [34-35]	1583094-1	1583094-1	1583094-1	1583094-1	46765-3		
1/0 [50-60]	1583095-1	1583095-1	1583095-1	1583095-1	46766-2		
2/0 [67-70]	1583096-1	1583096-1	1583096-1	1583096-1	46767-2		
3/0 [80-95]				1583097-1⊕	46749-2		
4/0 [100-125]				1583098-1⊕	46750-2		
250 MCM [127]					46751-2	46326-2	
300 MCM [152]					46752-2		
350 MCM [177]					46753-2		69653
400 MCM [203]							46754-2
500 MCM [253]							46755-2
600 MCM [304]							46756-2
600 HD							59870-1
700 MCM [355]							46757-2
800 MCM [405]							46758-2
900 MCM [456]							46759-2
1000 MCM [507]							46760-2

⊕	1976230-1 only
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# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 10,000 psi

### Sealed Crimp COPALUM Terminals and Splices



Wire Size in AWG [mm²]		Hydraulic Crimp Tooling 10,000 psi Operating Pressure			
		Hand Tool (U-Die)	Hydraulic Head (U-Die)	Hydraulic Heads (Shank Die)	
Al	Cu	1490749-1	1490746-1 1976230-1	1752877-1	1752787-1
8 [7-8.5]	10 [5-6]	1490555-1	1490555-1	68006	68006
6 [13-15]	8 [7-8.5]	1490556-1	1490556-1	68007	68007
4 [21]	6 [13-15]	1490557-1	1490557-1	68008	68008
2 [34-35]	4 [21]			68009	68009
1/0 [50-60]	2 [34-35]			68010	68010
2/0 [67-70]	1/0 [50-60]			314964-1	68011-1
3/0 [80-95]	2/0 [67-70]				59877-1
4/0 [100-125]	3/0 [80-95]				314948-1



### Bar Crimp COPALUM Terminals and Splices

Wire Size in AWG [mm²]		Hydraulic Crimp Tooling 10,000 psi Operating Pressure			
		Hand Tool (U-Die)	Hydraulic Head (U-Die)	Hydraulic Heads (Shank Die)	
Al	Cu	1490749-1	1490746-1 1976230-1	1752868-1	1752786-1
8 [7-8.5]	10 [5-6]	1490572-1	1490572-1	68043	
6 [13-15]	8 [7-8.5]	1490573-1	1490573-1	68044	
4 [21]	6 [13-15]	1490574-1	1490574-1	68045	
2 [34-35]	4 [21]	1490575-1	1490575-1	68046	
1/0 [50-60]	2 [34-35]			68047	
2/0 [67-70]	1/0 [50-60]			68048	
3/0 [80-95]	2/0 [67-70]			68049	
4/0 [100-125]	3/0 [80-95]				68050
250 MCM [127]	4/0 [100-125]				68034
300 MCM [152]	250 MCM [127]				68035
400 MCM [203]	300 MCM [152]				68036
500 MCM [253]	400 MCM [203]				68037

# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 10,000 psi

### Insulation Piercing Crimp COPALUM Terminals and Splices



Wire Size in AWG [mm <sup>2</sup> ]		Hydraulic Crimp Tooling 10,000 psi Operating Pressure			
		Hand Tool (U-Die)	Hydraulic Head (U-Die)	Hydraulic Heads (Shank Die)	
Al	Cu				
		1490749-1	1490746-1 1976230-1	1752868-1	1752786-1
8 [7-8.5]	10 [5-6]	1490714-1	1490714-1	68084	
6 [13-15]	8 [7-8.5]	1490715-1	1490715-1	68085	
4 [21]	6 [13-15]	1490716-1	1490716-1	68086	
2 [34-35]	4 [21]	1490717-1	1490717-1	68130	
1/0 [50-60]	2 [34-35]	1490718-1	1490718-1	68131	
2/0 [67-70]	1/0 [50-60]			68132	
3/0 [80-95]	2/0 [67-70]			68133	
4/0 [100-125]	3/0 [80-95]			318106-1	68129

## Hydraulic Equipment Options for 68,950 kPa / 10,000 psi

### Pistol Grip Battery Tool Kit

PN **1213875-1** (12 ton 1 stroke, 110V)  
PN **1213875-2** (12 ton 1 stroke, 220V)

PN **1976505-1** (14 ton 1 1/2 stroke, 110V)  
PN **1976505-2** (14 ton 1 1/2 stroke, 220V)

- Complete kit with batteries and battery charger
- Accepts U-Dies
- Rotating head 320°
- Excellent power to weight ratio
- Cycle life: 10,000 cycles



### Hydraulic Foot Pump, manual

PN **1583659-1**



### Hydraulic Hand Pump, manual

PN **1583661-1**



### Portability Options for 10,000 psi

#### Portable Battery Hydraulic Unit

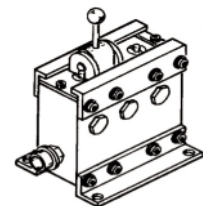
Portable tools and pump units allow you to perform crimping where its needed - in the factory or in the field.

PN **1804111-1** - Portable Battery Unit (10,000 psi (68,950 kPa))



#### 3-Way Multidirectional Valve

PN **1901782-1** (manual)

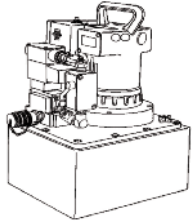


[www.tooling.te.com](http://www.tooling.te.com)

## HYDRAULIC TOOLING SELECTION GUIDE for 8,200 psi

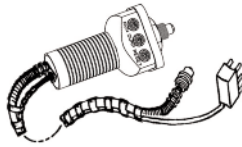
### Hydraulic Pumps, Controls and Hoses

The Heavy-duty Pump is designed for higher crimp cycle frequency.



Heavy Duty Electric Hydraulic Pump (110V)<sup>1,2</sup> P/N **69120-1**  
OR  
Heavy Duty Electric Hydraulic Pump (220V)<sup>1,2</sup> P/N **69120-2**  
CM 409-1950

WITH



Remote Hand Control<sup>3</sup>  
**(for Heavy-Duty pump)**  
w/hose attached  
P/N **59907-7** (7 ft hose)  
P/N **1-59907-5** (15 ft hose)  
P/N **2-59907-1** (21 ft hose)

OR



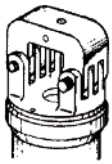
Remote Foot Control<sup>3</sup>  
**(for Heavy-Duty pump)**  
P/N **68284-1**

AND

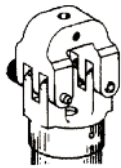


Hydraulic Hoses<sup>4</sup>  
**(not required for hand control)**  
P/N **59909-3** (3 ft)  
P/N **59909-7** (7 ft)  
P/N **1-59909-5** (15 ft)  
P/N **2-59909-1** (21 ft)

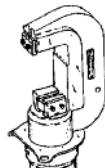
### Heavy-Duty Crimp Heads (Shank Dies) (> 25,000 cycles)



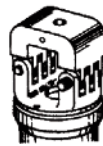
250 MCM - 600 MCM  
33 ton output force  
28 lbs  
P/N **58445-1**  
IS 408-9598



8 - 4/0 AWG  
22 ton output force  
16 lbs  
P/N **69066**  
IS 408-2453



4/0 AWG - 1000 MCM  
26 ton output force  
29 lbs  
P/N **69082**  
IS 408-2456



8 - 4/0 AWG  
33 ton output force  
28 lbs  
P/N **58422-1**  
IS 408-9535



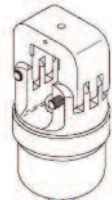
12-10 AWG - 350 MCM  
18 ton output force  
13 lbs  
P/N **69099**  
IS 408-2458



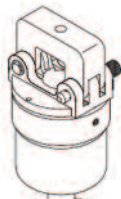
PLASTI-GRIP	8 AWG - 4/0 AWG
AMPOWER	6 AWG - 1500 MCM
AMPOWER Quick Disconnect	1/0 AWG - 600 MCM
Insulation Piercing COPALUM	10 AWG (Cu) - 3/0 AWG
Sealed COPALUM	10 AWG - 3/0 AWG
Bar COPALUM	10 AWG (Cu) - 400 MCM
SOLISTRAND	8 AWG - 600 MCM
STRATO-THERM	8 AWG - 2/0 AWG
TERMINYL	1/0 AWG thru 4/0 AWG

### Shank Dies

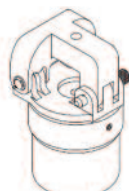
### Hydraulic Hand Tools



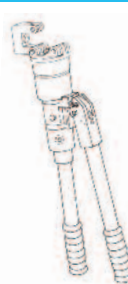
8 - 2 AWG  
8 ton output force  
5 lbs  
P/N **69051**  
IS 408-2450



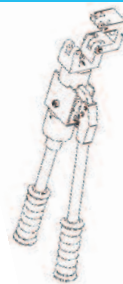
8 - 4/0 AWG  
12 ton output force  
10 lbs  
P/N **69065**  
IS 408-2452



8 - 4/0 AWG  
12 ton output force  
10 lbs  
P/N **69067**  
IS 408-2454



8-4/0 AWG  
12.5 lbs  
P/N **59973-1**  
IS 408-6803

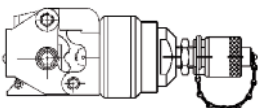


8-2 AWG  
8 lbs  
P/N **59974-1**  
IS 408-6757

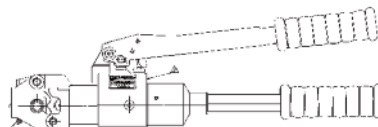
- Powered systems require a pump, hand or foot control, hose, crimp head and die except with **69069**
- Manual systems require hand tools and the battery hand tool requires only dies.

- Hand Pump **314979-1** can be substituted as manual options for Electro-Hydraulic Pumps.
- Includes female screw-to-connect, <sup>3</sup>/<sub>8</sub> NPT quick couplers
- Not required with manual pump options.
- Includes male screw-to-connect, <sup>3</sup>/<sub>8</sub> NPT quick couplers

### SOLISTRAND (Integrated Crimp Dies)



#8-#2 AWG SOLISTRAND  
Compression Head  
(No crimp dies required)  
P/N **69069**  
IS 408-1745



#8-#2 AWG SOLISTRAND  
Compression Tool  
(No crimp dies required)  
P/N **59975-1**  
IS 408-6758

# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 8,200 psi

The TE Connectivity hydraulic crimping tool line offers a wide array of die, hand tool, and hydraulic head configurations. Use the following tables to determine the configuration that best matches your requirements.

### SOLISTRAND Terminals



DYNA-CRIMP System 8,200 psi Operating Pressure						
Wire Size in AWG [mm <sup>2</sup> ]	Hand Tool	Hydraulic Heads	Hydraulic Heads (Shank Dies)			
		59973-1	69065 69067	69069▲	69099	58445-1
8 [7-8.5]	48126** 48355○	48126** 48355○	▲	69216		
6 [13-15]	48128** 48127○	48128** 48127○	▲	69217		
4 [21]	48129** 48127○	48129** 48127○	▲	69218		
2 [34-35]	48130** 48127○	48130** 48127○	▲	45433		
1/0 [50-60]	48132** 48131○	48132** 48131○		45436		
2/0 [67-70]	48133** 48131○	48133** 48131○		45439		
3/0 [80-95]	48134** 48131○	48134** 48131○		45442		
4/0 [100-125]	300430** 48131○	300430** 48131○		45445		
250-300 MCM [127-152]					48816	69911
300-350 MCM [152-177]					48817	69912
400 MCM [203]					48818	69913
500-600 MCM [253-304]					48819	69914

**	Stationary Die
○	Moving Die
▲	Self-Contained Die



# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 8,200 psi

### Heavy Duty SOLISTRAND Terminals



Wire Size in AWG [mm <sup>2</sup> ]	DYNA-CRIMP System 8,200 psi Operating Pressure	
	Hand Tools (U-Die)	Hydraulic Heads (U-Die)
		59973-1
8 [7-8.5]	48128-1 ** 48127-1 ○	48128-1 ** 48127-1 ○
6 [13-15]	48129-1 ** 48127-1 ○	48129-1 ** 48127-1 ○
4 [21]	48130-1 ** 48127-1 ○	48130-1 ** 48127-1 ○
2 [34-35]	48132-1 ** 48131-1 ○	48132-1 ** 48131-1 ○
1/0 [50-60]	48133-1 ** 48131-1 ○	48133-1 ** 48131-1 ○

### SOLISTRAND Flag Terminals



Wire Size in AWG [mm <sup>2</sup> ]	DYNA-CRIMP System 8,200 psi Operating Pressure
	Hydraulic Heads (U-Die)
	69067
8 [7-8.5]	48506 ** 48505 ○
6 [13-15]	48508 ** 48507 ○
4 [21]	48509 ** 48507 ○
2 [34-35]	48510 ** 48507 ○
1/0 [50-60]	48652 ** 48511 ○
2/0 [67-70]	48805 ** 48511 ○
3/0 [80-95]	48806 ** 48511 ○
4/0 [100-125]	48807 ** 48511 ○

**	Stationary Die
○	Moving Die

# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 8,200 psi

### TERMINYL Terminals and Splices



Wire Size in AWG [mm <sup>2</sup> ]	DYNA-CRIMP System 8,200 psi Operating Pressure			
	Hand Tool	Hydraulic Heads (Shank Die)		
	59974-1	69051	69066	58422-1
8 [7-8.5]	47820	47820		
6 [13-15]	47821	47821		
4 [21]	47822	47822		
4HD			69463	69463
2 [34-35]	47823	47823		
1/0 [50-60]			47824	47824
2/0 [67-70]			47825	47825
3/0 [80-95]			47915	47915
4/0 [100-125]			47918	47918

### PLASTI-GRIP Terminals and Splices



Wire Size in AWG [mm <sup>2</sup> ]	DYNA-CRIMP System 8,200 psi Operating Pressure			
	Hand Tool	Hydraulic Heads (Shank Die)		
	59974-1	69051	69066	58422-1
8 [7-8.5]	48752-1	48752-1	48858-1	48858-1
6 [13-15]	48753-1	48753-1	48859-1	48859-1
4 [21]	48754-1	48754-1	48860-1	48860-1
2 [34-35]	48755-1	48755-1	48861-1	48861-1
1/0 [50-60]			48756-1	48756-1
2/0 [67-70]			48757-1	48757-1
3/0 [80-95]			48758-1	48758-1
4/0 [100-125]			48759-1	48759-1

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 8,200 psi

### STRATO-THERM Terminals and Splices



Wire Size in AWG [mm²]	DYNA-CRIMP System 8,200 psi Operating Pressure	
	Hydraulic Head (Shank Die)	
	69099	
8 [7-8.5]	69211-1	
6 [13-15]	69212-1	
4 [21]	69213-1	
2 [34-35]	69214-1	
1/0 [50-60]	69215-1	
2/0 [67-70]	69254-1	

### AMPOWER Quick Disconnect Terminals



Wire Size in AWG [mm²]	DYNA-CRIMP System 8,200 psi Operating Pressure	
	Hydraulic Heads (Shank Die)	
	69099	69082
1/0 [50-60]	68361-1 ○ / 68200-1	
2/0 [67-70]	68253-1 ○ / 68201-1	
3/0 [80-95]	59867-1 ○	
4/0 [100-125]	68304-1 ○	
250 MCM [127]	68203-1	
350 MCM [177]		68204-1
400 MCM [203]		68332-1 ●
500 MCM [253]		68206-1 ●
600 MCM [304]		46757-3

○	With Locator
●	Dual Crimp

# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 8,200 psi

AMPOWER Terminals and Splices



Wire Size in AWG [mm²]	DYNA-CRIMP System 8,200 psi Operating Pressure				
	Hand Tool	Hydraulic Heads (Shank Die)			
	59973-1	69065 69067	69099	58445-1	69082
6 [13-15]			69133-1		
4 [21]			69134-2		
2 [34-35]	46321-3	46321-3	46765-3		
1/0 [50-60]	46322-2	46322-2	46766-2		
2/0 [67-70]	46323-2	46323-2	46767-2		
3/0 [80-95]	46324-2	46324-2	46749-2		
4/0 [100-125]	46325-2	46325-2	46750-2		
250 MCM [127]			46751-2	46326-2	
300 MCM [152]			46752-2		
350 MCM [177]			46753-2		69653
400 MCM [203]					46754-2
500 MCM [253]					46755-2
600 MCM [304]					46756-2
600 HD					59870-1
700 MCM [355]					46757-2
800 MCM [405]					46758-2
900 MCM [456]					46759-2
1000 MCM [507]					46760-2

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 8,200 psi

### Sealed Crimp COPALUM Terminals and Splices



Wire Size in AWG [mm <sup>2</sup> ]		DYNA-CRIMP System 8,200 psi Operating Pressure	
		Hydraulic Heads (Shank Die)	
Al	Cu		
8 [7-8.5]	10 [5-6]	68006	68006
6 [13-15]	8 [7-8.5]	68007	68007
4 [21]	6 [13-15]	68008	68008
2 [34-35]	4 [21]	68009	68009
1/0 [50-60]	2 [34-35]	68010	68010
2/0 [67-70]	1/0 [50-60]	314964-1	68011-1
3/0 [80-95]	2/0 [67-70]		59877-1
4/0 [100-125]	3/0 [80-95]		314948-1

### Bar Crimp COPALUM Terminals and Splices



Wire Size in AWG [mm <sup>2</sup> ]		DYNA-CRIMP System 8,200 psi Operating Pressure	
		Hydraulic Heads (Shank Die)	
Al	Cu		
8 [7-8.5]	10 [5-6]	68043	
6 [13-15]	8 [7-8.5]	68044	
4 [21]	6 [13-15]	68045	
2 [34-35]	4 [21]	68046	
1/0 [50-60]	2 [34-35]	68047	
2/0 [67-70]	1/0 [50-60]	68048	
3/0 [80-95]	2/0 [67-70]	68049	
4/0 [100-125]	3/0 [80-95]		68050
250 MCM [127]	4/0 [100-125]		68034
300 MCM [152]	250 MCM [127]		68035
400 MCM [203]	300 MCM [152]		68036
500 MCM [253]	400 MCM [203]		68037

# POWER HAND TOOLING

## Dies, Hand Tools, and Hydraulic Heads – Configuration Options for 8,200 psi

Insulation Piercing Crimp COPALUM Terminals and Splices



Wire Size in AWG [mm <sup>2</sup> ]		DYNA-CRIMP System 8,200 psi Operating Pressure	
		Hydraulic Heads (Shank Die)	
Al	Cu	69099	69082
8 [7-8.5]	10 [5-6]	68084	
6 [13-15]	8 [7-8.5]	68085	
4 [21]	6 [13-15]	68086	
2 [34-35]	4 [21]	68130	
1/0 [50-60]	2 [34-35]	68131	
2/0 [67-70]	1/0 [50-60]	68132	
3/0 [80-95]	2/0 [67-70]	68133	
4/0 [100-125]	3/0 [80-95]	318106-1	68129

## Hydraulic Equipment Options for 56,540 kPa / 8,200 psi

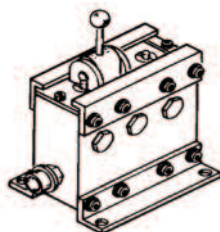
Hydraulic Hand Pump, manual

PN **314979-1**



3-Way Multidirectional Valve

PN **59920** (manual)



# CRIMP QUALITY GUIDELINES



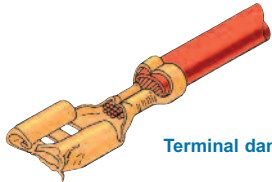
Want to know more about proper crimp techniques? View our Crimp Theory Fundamentals videos on our website at [tooling.te.com](http://tooling.te.com) or find them on our YouTube channel.

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

Correct		WIRE CRIMP	
<p>Insulation Present Conductor Present</p>	<p>Bellmouth must always be present</p>	<p>Crimp barrel is closed, legs support each other</p>	<p>Sufficient gap between legs and bottom of crimp</p>
<p>Cut off tabs present</p>	<p>Bellmouth Permissible</p>	<p>All strands are equally distributed and deformed</p>	
<p><b>INSULATION CRIMP</b> Correct Insulation Diameter, Applicator and Terminal.</p>		<p><b>INSULATION CRIMP</b></p>	
<p><b>F-CRIMP</b></p>	<p>Insulation is securely held Crimp barrel closed</p>	<p>Insulation is pierced and could damage conductor</p>	<p>Insulation legs are not closed</p>
<p>For double wire applications with different size wires always place wire with smallest outer diameter in the bottom.</p>		<p><b>INSULATION CRIMP</b></p>	
<p><b>OVERLAP CRIMP</b></p>	<p>Insulation is securely held Legs overlap</p>	<p>Insulation material is pierced</p>	<p>Insulation is not securely held Legs do not overlap</p>
<p><b>WRAP OVER CRIMP</b></p>	<p>Insulation securely held Legs must pass each other</p>	<p>Insulation is not securely held</p>	<p>Insulation is over crimped</p>

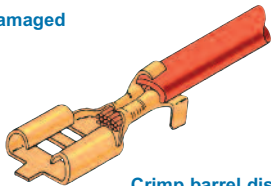
# CRIMP QUALITY GUIDELINES

## Incorrect

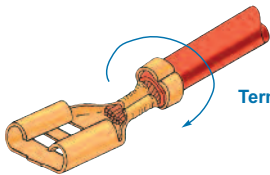


Terminal damaged

Cut off tab too long

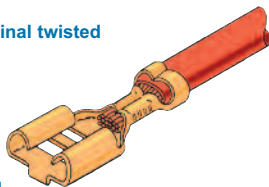


Crimp barrel distorted



Terminal twisted

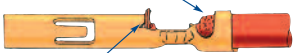
Cut off tab deformed



Crimp height too tight



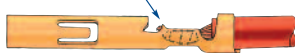
Insulation inside the wire crimp



Conductor Brush protruding into terminal body



Bellmouth on wrong end



Terminal bend

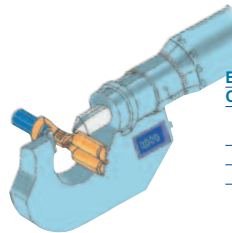
## Test

### WIRE CRIMP

Crimp height measurement

Crimp heights and tolerances

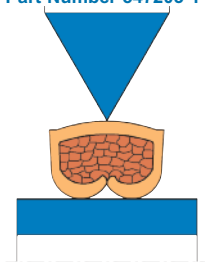
For crimp height tolerances for any given contact, please refer to the relevant application specification.



Examples:

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

Unacceptable formation excessive flash and/or cracks



Terminal feed incorrectly adjusted

Anvil and crimper not aligned or worn

Incorrect terminal / wire selection

Wire size too large

Wire size too small

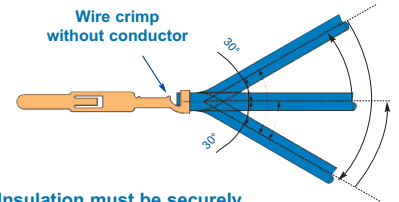


Crimp barrel does not close

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

INSULATION CRIMP

Wire crimp without conductor

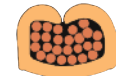


Insulation must be securely held after bend test

Incorrect crimp height adjustment

Crimp height too loose

Crimp height too tight



Insufficient deformation, showing voids

Flash at under side of crimp, due to over crimping

## 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.

**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-noble 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 (10<sup>6</sup>).

**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.