



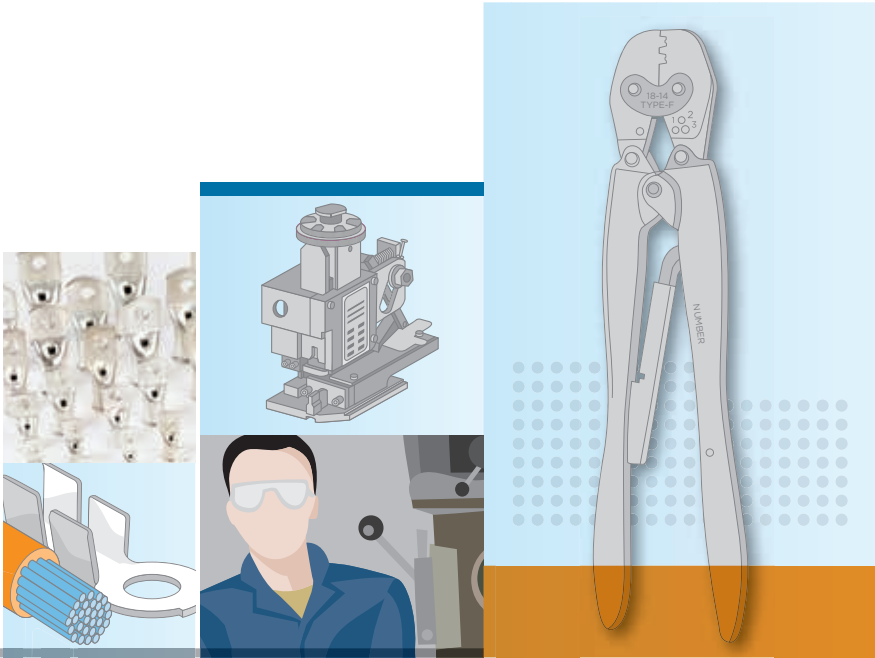
THE GOOD CRIMPING GUIDE

SOLDERLESS TERMINATION TRAINING MANUAL



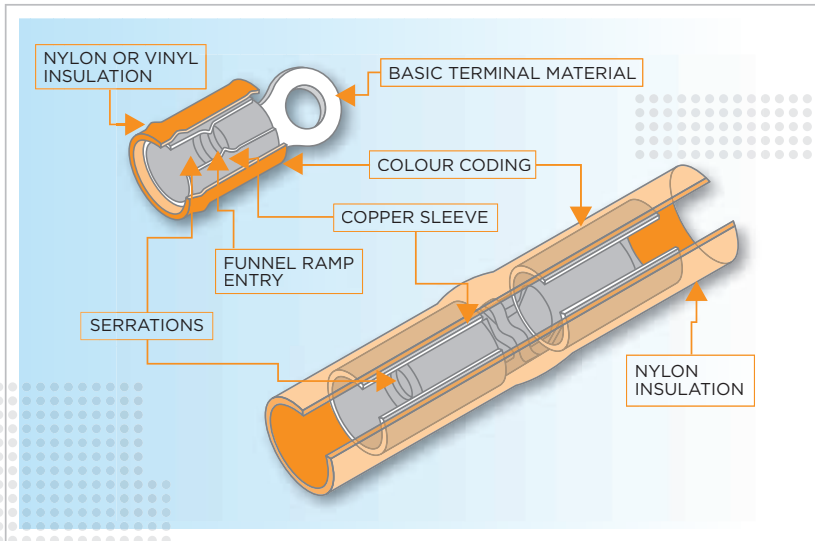
This guide has been produced to help you achieve a perfectly crimped terminal or splice every time. The following pages illustrate the DOs and DON'Ts of crimping, and highlight the advantages of using matched cable, terminal and tooling from the extensive AMP product range

Basic Crimp Techniques and the Components of a Good Connection	2
PIDG™ Terminals and Splices	3
Insulation Restricting PIDG™ Terminal	4
SOLISTRAND Terminals	5
Wire Barrel Functions (Closed and Open)	6 & 7
Wire Insulation Variations	8
Wire Preparation	9
Proper Strip Length and Wire Placement	10
Insulation Crimp Adjustment	11
Dot Coding	12
Crimp Inspection	13, 14 & 15
Double Action Hand Tool	16
• Locating Procedure	17
Heavy Head Tool	18
• Locating Procedure	19
Hand Tool Locating Procedure	20
Locating and Crimping	21
Inspection of Crimping	22 & 23
Crimp Height	24
Metric Cross Reference for Electrical Conductors	25
Ampower Metric Product Installation	26, 27, 28 & 29

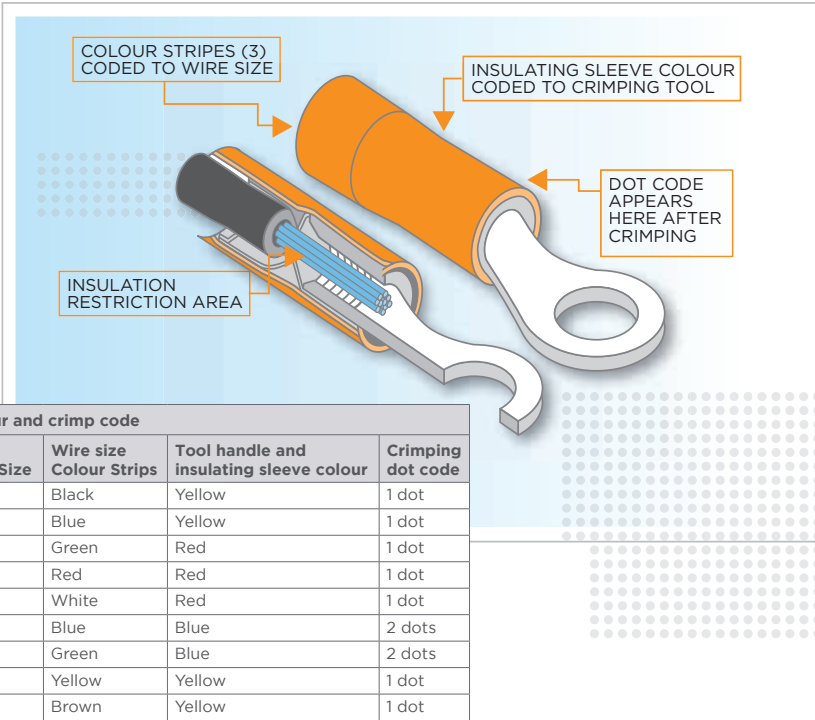


The following is a guide to basic crimp techniques - designed to ensure quality terminations and to prevent poor connections and/or tooling. The components of a good connection include:

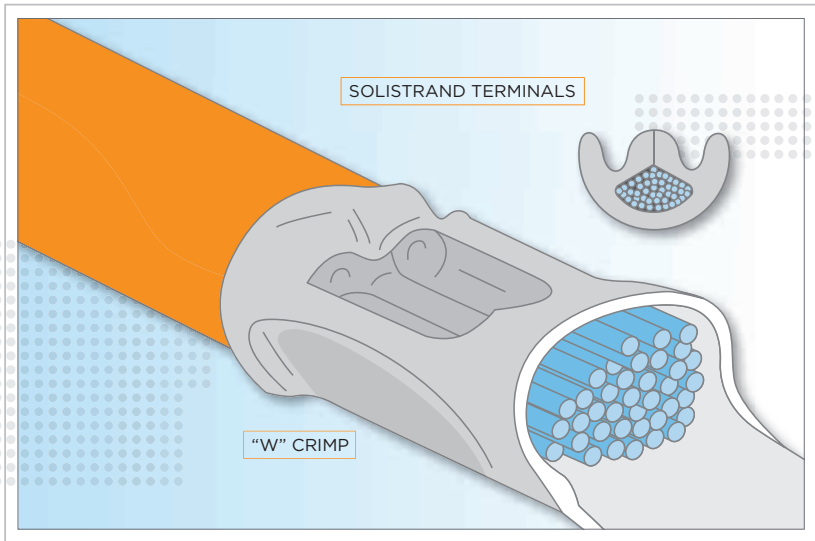
- A. Correct tooling for terminal and wire
- B. Correct terminals for application
- C. Properly prepared wire
- D. A properly trained operator



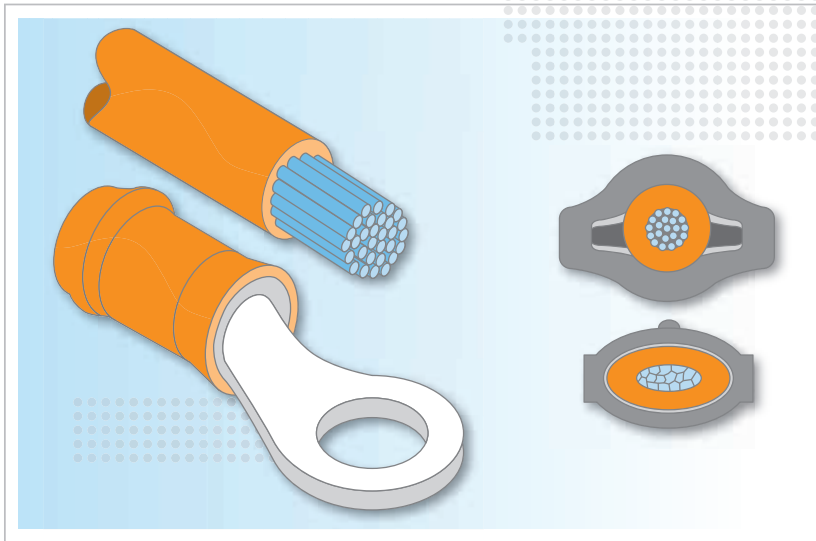
1. Available in terminals and splices for a broad range of wire sizes
2. Main features include:
 - A. Body – high grade copper, tin plated
 - B. 1. Insulation support
 2. Funnel entry
 - C. Insulation sleeve:
 - i. Colour-coded to wire range
 - ii. Colour code matched to tool handle colours



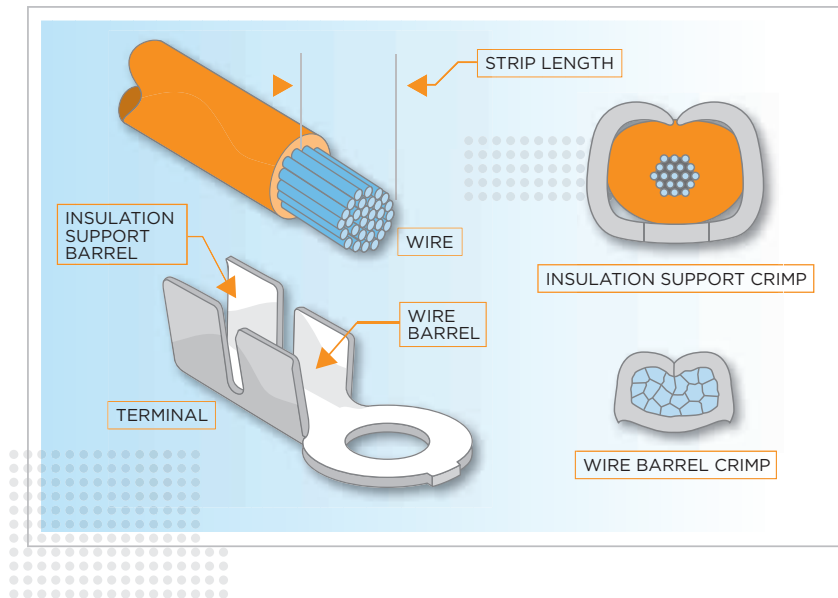
1. PIDG™ terminals for thin-wall wire insulation
2. Main features include:
 - A. Body - high grade copper, tin plated
 - B.
 1. Insulation support
 2. Insulation restricting portion - provides lead-in entry for wire and prevents thin wire insulation from entering wire barrel.
Note: Only one wire size for each terminal
 - C. Insulation sleeve:
 - i. Colour stripes (3) coded to wire size
 - ii. Sleeve colour-coded to tool handles
3. Uses standard PIDG tooling



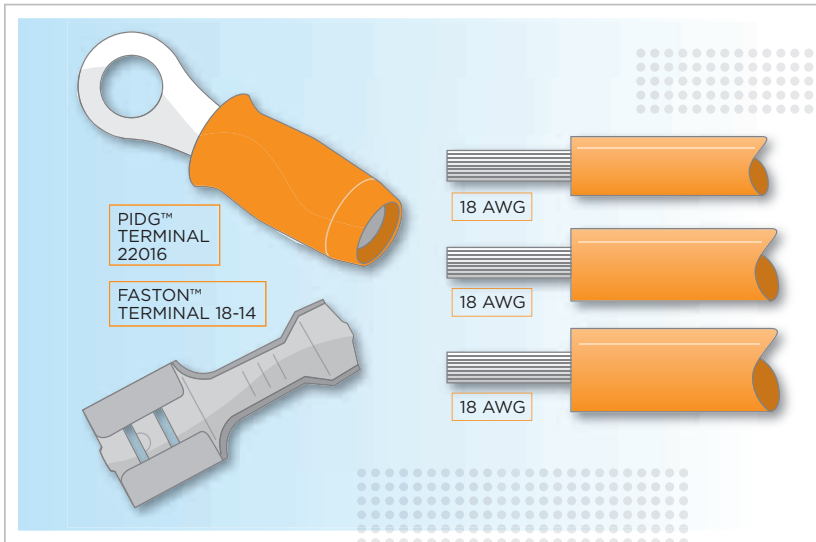
1. W crimp on SOLISTRAND Terminals - uninsulated
2. Always ensure the W crimp is each side of the seam on ring tongue terminals



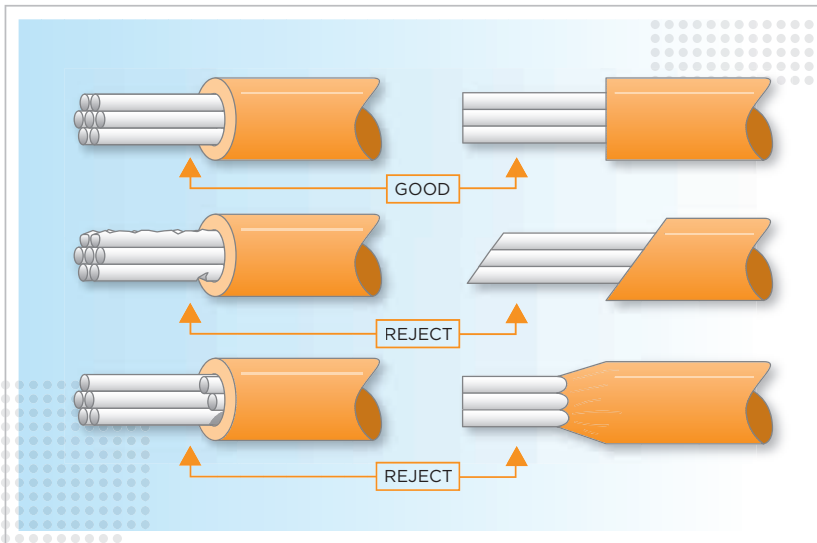
1. Wire barrel:
 - A. Provides electrical and mechanical connection to wire conductor(s)
2. Insulation barrel:
 - A. Provides strain relief for wire insulation
 - B. Requires a more relaxed crimp than wire barrel crimp
 - C. Provides no electrical connection or appreciable mechanical strength



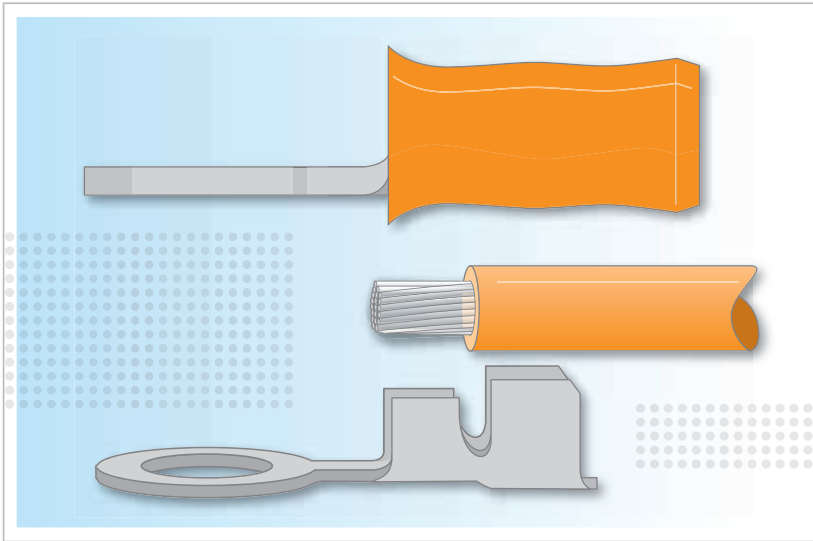
1. Wire barrel:
 - A. Provides electrical and mechanical connection to wire conductor(s)
2. Insulation barrel:
 - A. Provides strain relief for wire insulation
 - B. Requires a more relaxed crimp than wire barrel crimp
 - C. Provides no electrical connection or appreciable mechanical strength



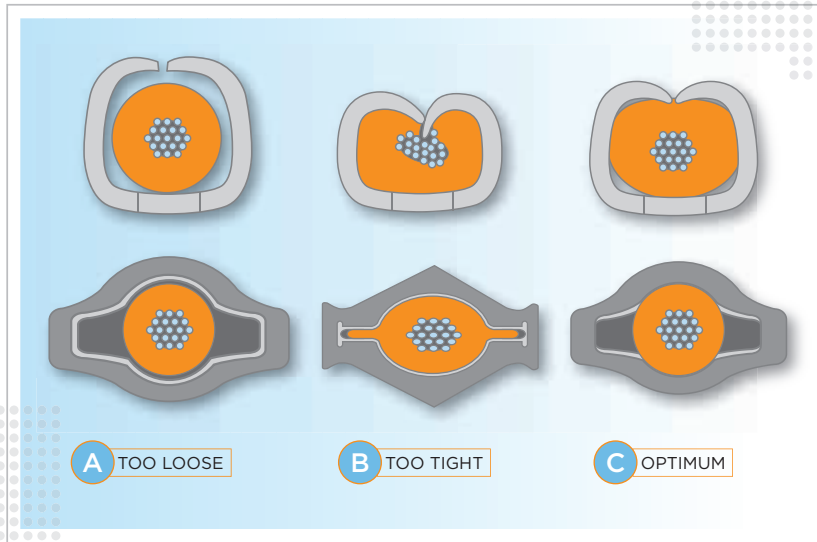
1. Wire insulation diameters vary among wire of the same AWG wire size
2. Terminal insulation barrel must be designed to accommodate insulation O.D. of wire being used
3. Tooling with correct insulation crimp range must be used to ensure good insulation support crimp



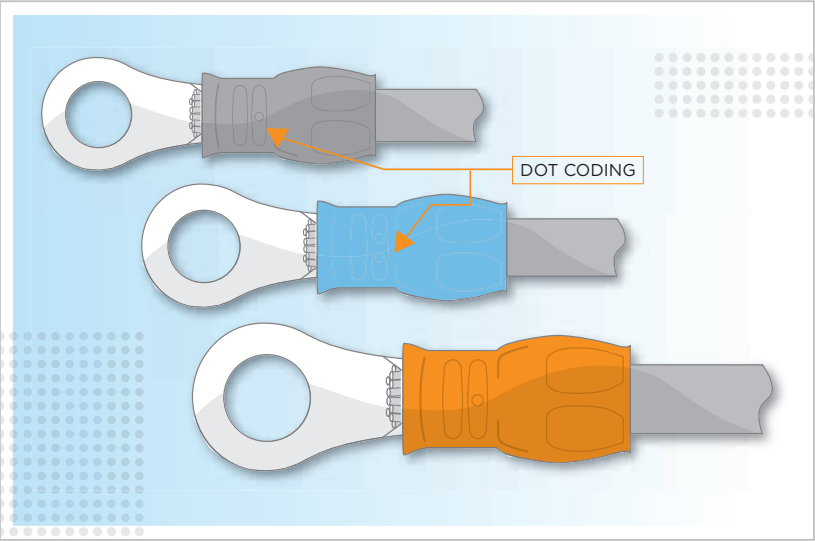
1. Remove proper length of insulation cleanly - no nicking or breaking of wire strands
2. Shown - good strips vs. poor (reject) strips



1. With properly stripped wire and correct placement in terminal:
 - A. Wire strands are crimped in wire barrel
 - B. Only insulation is crimped in insulation support barrel

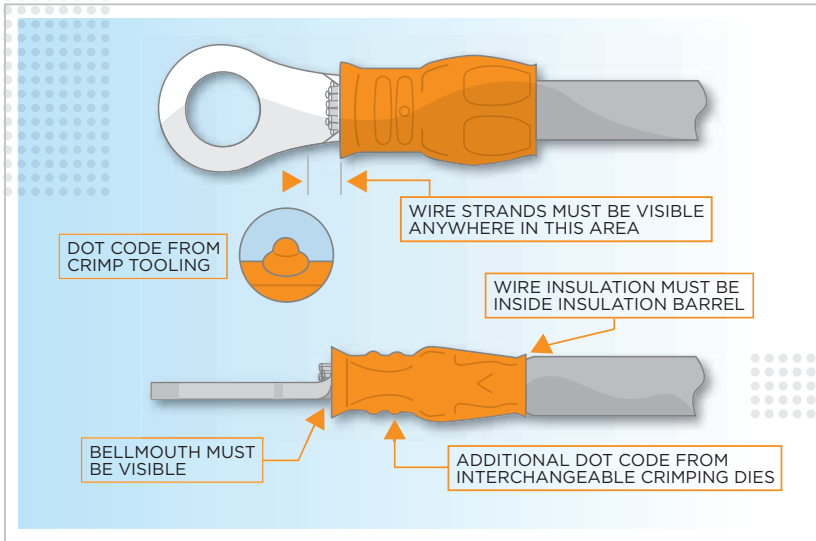


1. Two basic insulation support crimp styles:
 - A. 'F' Crimp - Insulation support barrel forms in same configuration as wire barrel crimp - more relaxed
 - B. 'O' Crimp - Insulation support barrel wraps around wire insulation
2. Examples of insulation support crimp adjustments:
 - A. Too loose - no mechanical support or strain relief for wire
 - B. Too tight - barrel digs into wire strands and can actually break wire strands
 - C. Optimum - wire insulation held firmly, slight indenting of insulation, good mechanical support and strain relief

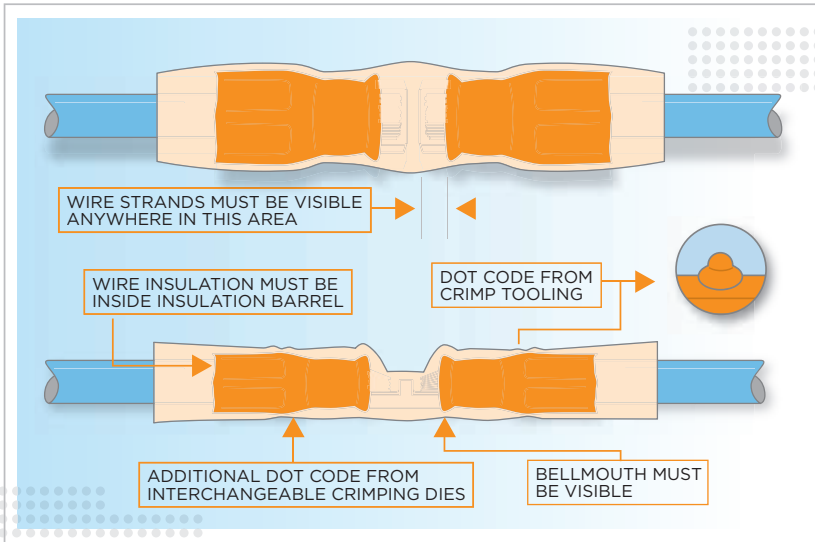


1. The purpose of dot coding is to:
 - A. Identify tool with terminal
 - B. Show wrong combination of tool and terminal

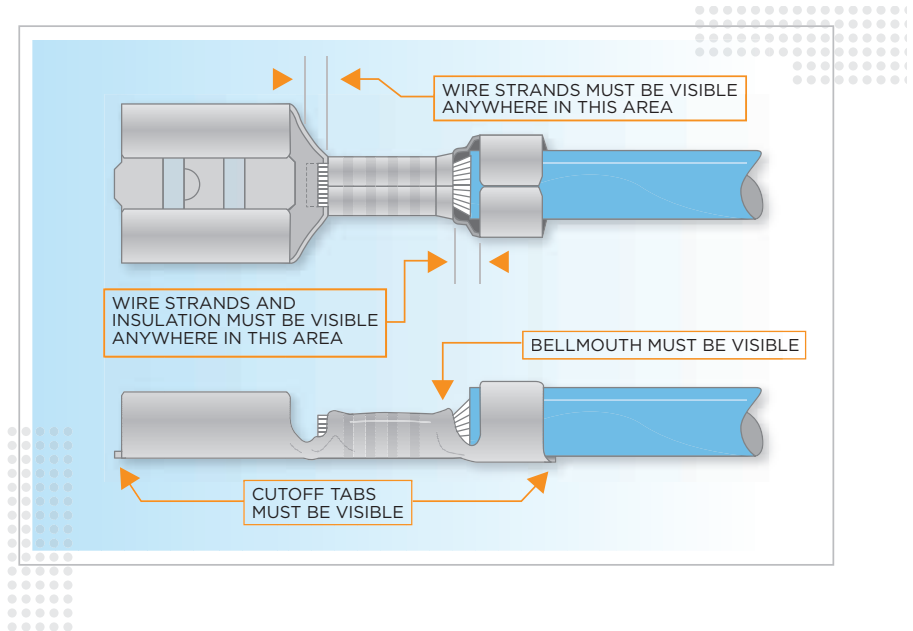
Wire range	Colour	Dot code
26-22	Yellow	1 dot
24-20	White	2 dots
22-18	Red	1 dot
16-14	Blue	2 dots
16-14HD	Black(BR)	1 dot
12-10	Yellow	1 dot



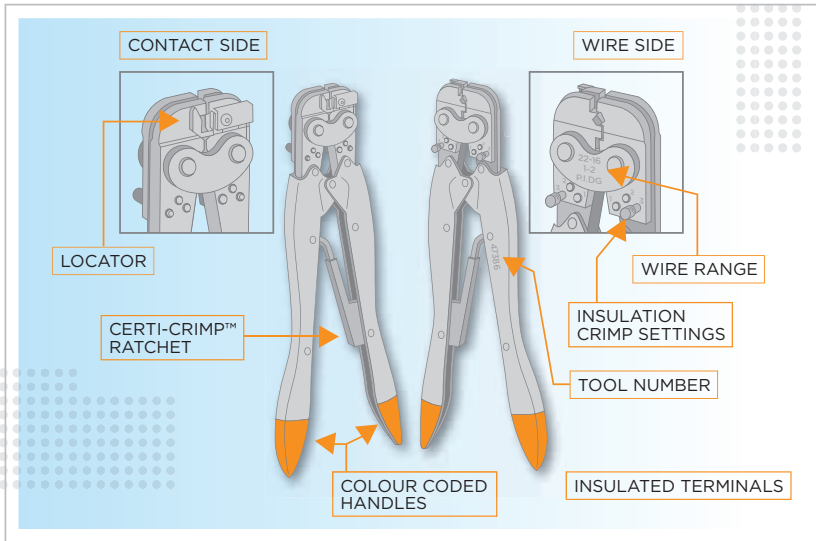
1. Wire strands must be visible at tongue end of wire barrel, but must not extend past area indicated
2. Bellmouth must be visible at tongue end of wire barrel
3. Wire insulation must be inside, and supported by, insulation barrel
4. Dot code should be in accord with instructional material packaged with crimp, tooling or dies - an additional dot code appears on terminals crimped with interchangeable crimping dies



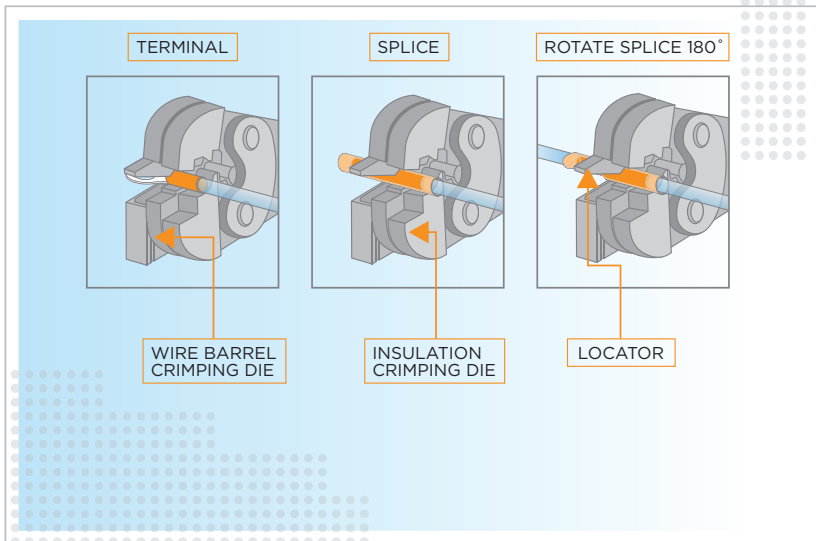
1. Wire strands must be visible between wire stop and end of wire barrel
2. Dot code should be in accordance with instructional material packaged with crimp tools - additional dot code appears on splices crimped in tooling that use interchangeable crimping dies
3. Bellmouth must be visible at window end of wire barrel
4. Wire insulation must be inside insulation support sleeve



1. Cutoff tabs must be visible at insulation barrel and mating end of terminal
2. Wire strands must be visible at contact end of wire barrel, but must not extend past area indicated
3. Wire strands and insulation must both be visible anywhere between wire barrel and insulation barrel
4. Bellmouth must be visible at wire end of wire barrel

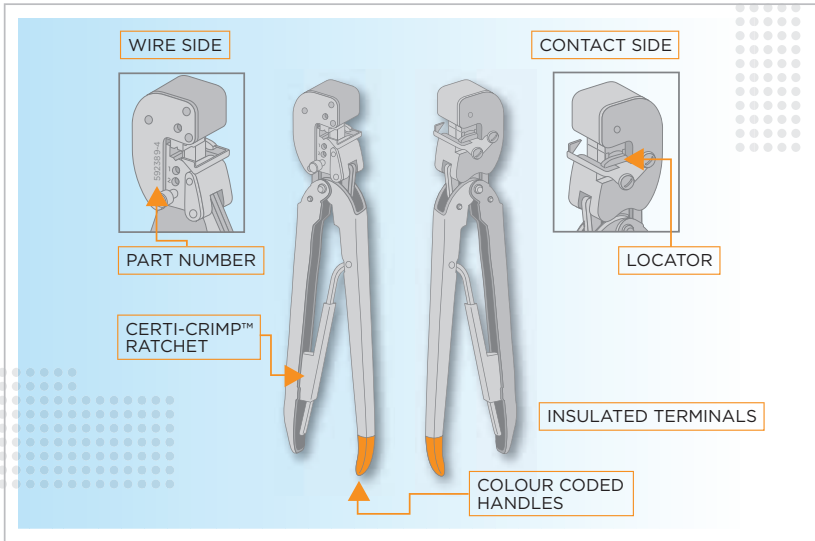


1. One of several similar tools used for crimping a wide variety of wire sizes
2. Illustration shows:
 - A. Locator
 - B. Certi-Crimp™ ratchet
 - C. Colour coded handles
 - D. Insulation crimp adjustment

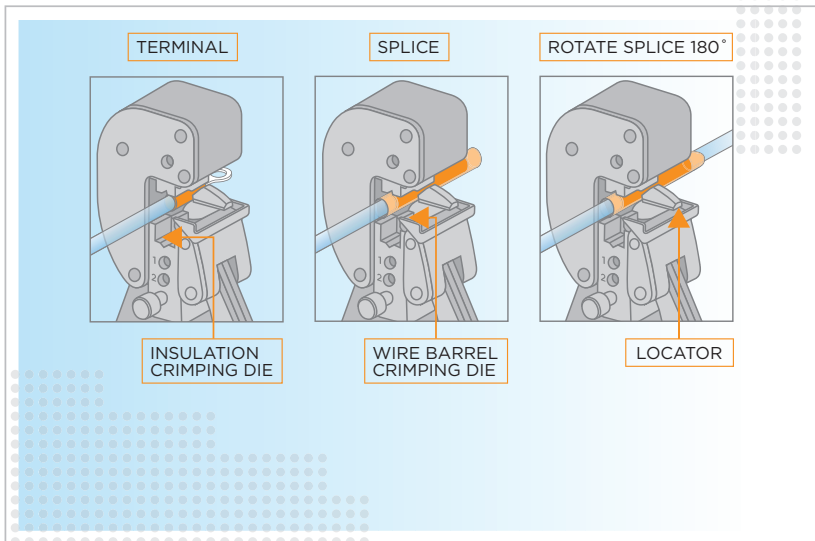


Caution - make certain that the insulation crimping adjustment is correct before making production crimps

1. With tool handles in the open position:
 - A. For terminal – place in tool so tongue goes under locator (the sloped side)
 - B. For splice – centre the window indent under locator
- the splice cannot be oriented incorrectly in locator
2. Close handles until terminal or splice is held in place without deforming wire barrel
3. Insert stripped wire until it bottoms and close handles until Certi-Crimp™ ratchet releases
4. To crimp other half of splice, remove splice from tool, rotate splice 180°, reposition splice in tool and complete crimp as instructed in steps 2 and 3

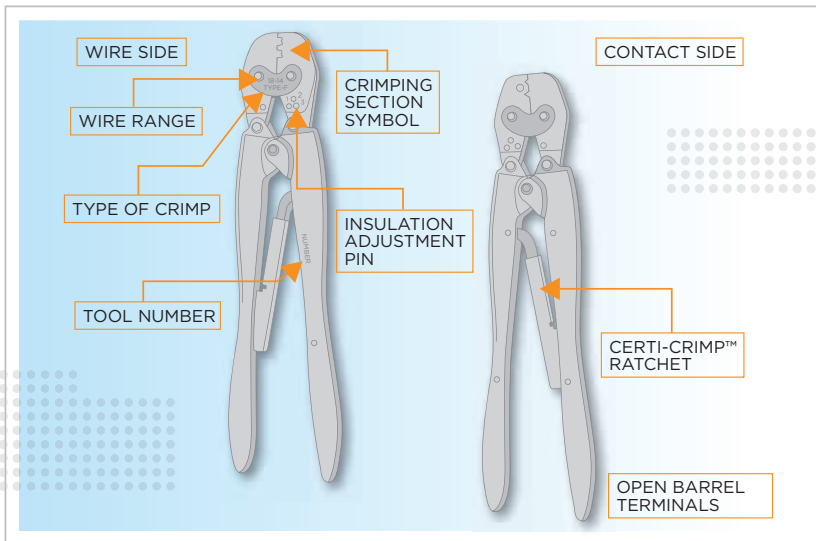


1. This heavy-head tool is used to crimp terminals and splices onto larger wires
2. Upper dies are fixed – lower dies move up and down
3. Illustration shows:
 - A. Locator
 - B. Certi-Crimp™ ratchet
 - C. Colour coded handle
 - D. Insulation crimp adjustment

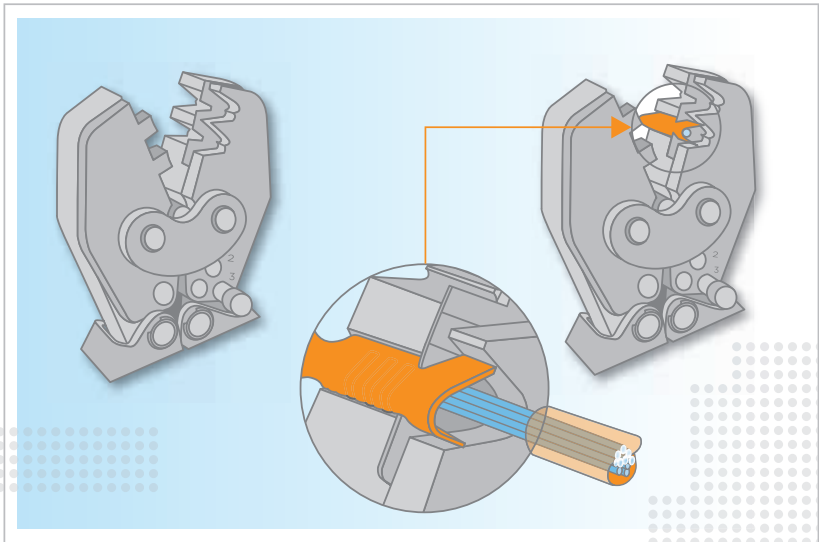


Caution - make certain that the insulation crimping adjustment is correct before making production crimps.

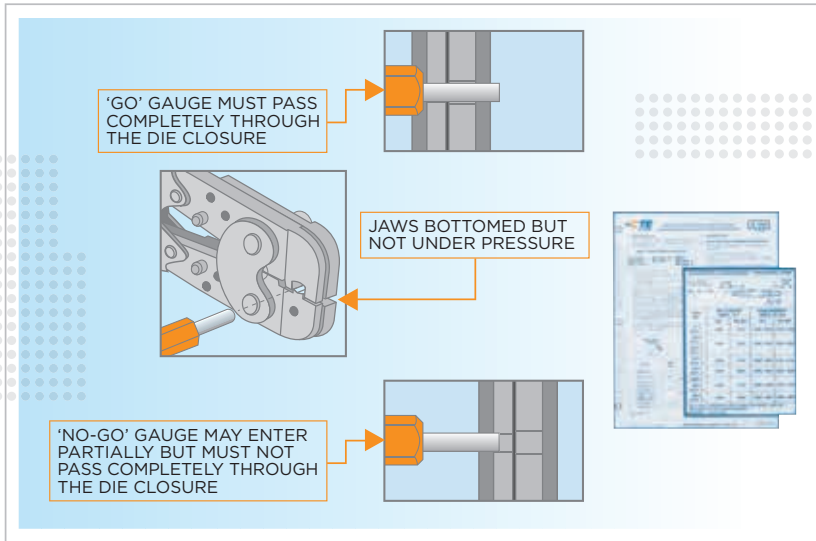
1. With tool handles in the open position:
 - A. For terminal – place in tool so tongue goes over locator
 - B. For splice – centre the window indent over locator
2. Close handles until terminal or splice is held in place without deforming wire barrel
3. Insert stripped wire until it bottoms and close handles until Certi-Crimp™ ratchet releases
4. To crimp other half of splice, remove splice from tool, rotate splice 180°, reposition splice in tool and complete crimp as instructed in steps 2 and 3



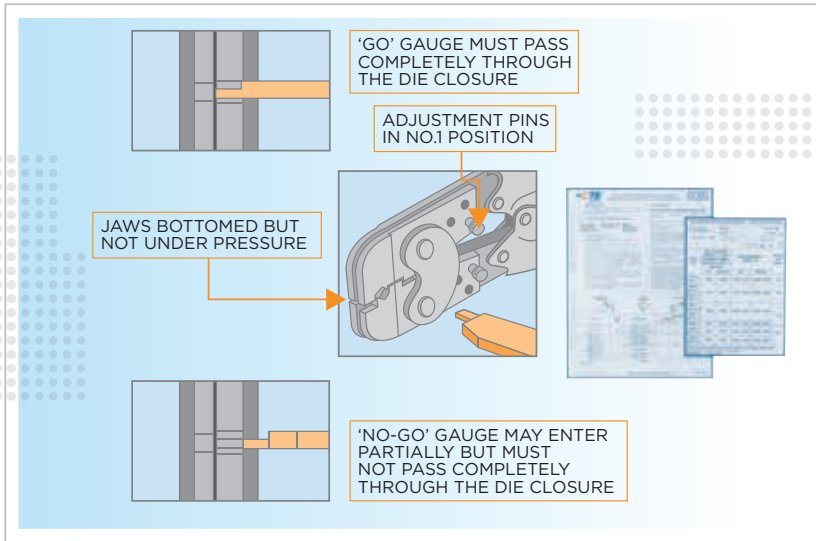
1. Wire side (back of tool) features:
 - A. Crimp section symbols
 - B. Type of crimp
 - C. Insulation adjustment pin
 - D. Wire range
 - E. Tool number
2. Contact side – side of tool from which receptacle end of terminal extends, when positioned for crimping
3. Certi-Crimp™ ratchet – prevents tool from opening until crimp is completed
4. Insulation adjustment pin – controls insulation crimp height



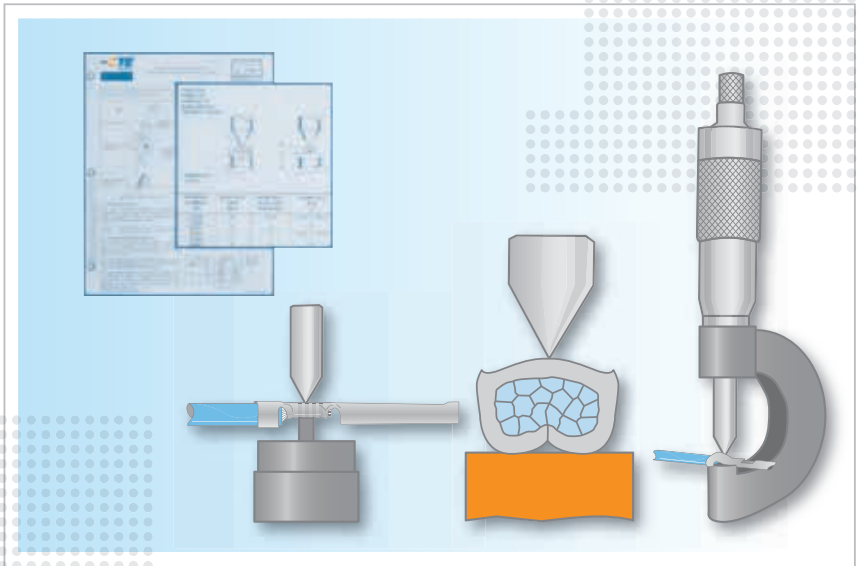
1. Before locating, check instruction sheet for wire strip length, insulation diameter range and correct crimping section
2. Hold tool near ends of handles with wire side of tool facing you, then close handles until ratchet closes and permits tool dies to open
3. Hold terminal by receptacle end, insert terminal into contact side of tool and hook terminal local slot onto tool locator
4. Hold terminal and close tool handles partway until crimping dies hold terminal in place
5. Insert stripped wire through slot in locator into terminal wire barrel, until insulation butts against locator
6. Hold wire in place and close handles until ratchet releases



1. Die closure inspection accomplished using Go/No-Go plug gauges

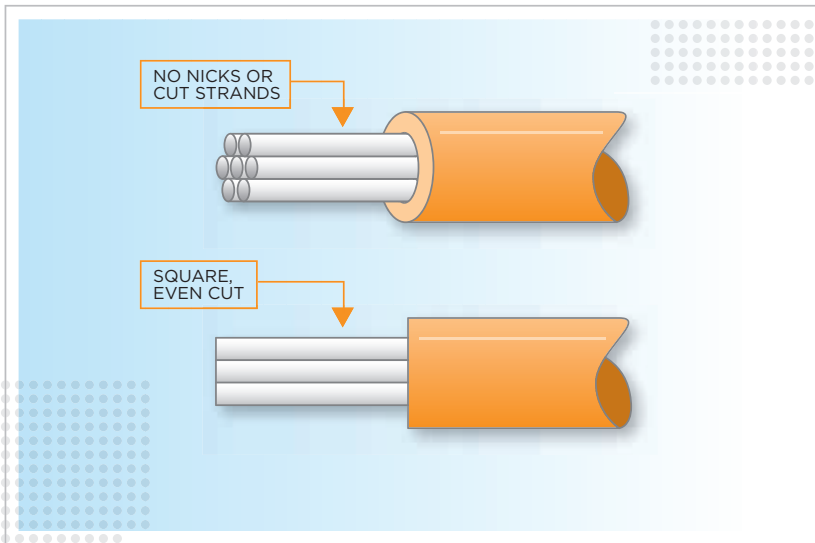


1. Die closure inspection accomplished using Go/No-Go plug gauges



1. Check crimp height of finished termination using crimp height comparator
2. Crimp height data is found in instruction sheet (hand tools) or on data plate (applicators)

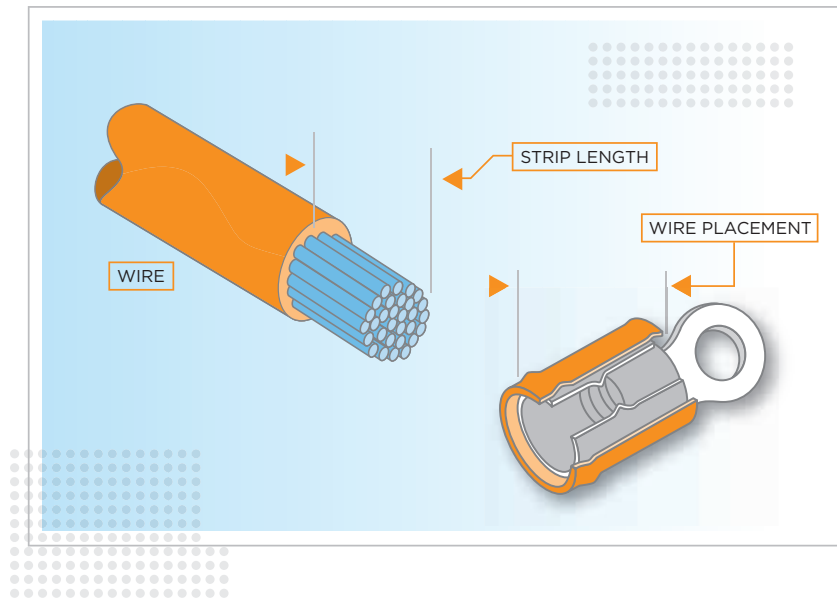
Cross Reference TE Connectivity Closed Barrel Sizes/Metric Cable		
Wire Size mm ²	Typical Cables Metric	TE Connectivity Code
0.5	16/0.20	22 - 16
0.75	24/0.20	22 - 16
1.0	32/0.20 1/1.13	22 - 16
1.5	30/0.25 1/1.38	22 - 16 16 - 14
2.5	50/0.25 1/1.78	16 - 14
4	46/0.30 7/0.85	12 - 10
6	84/0.30 7/1.04	12 - 10
10	80/0.40 7/1.35	8
16	126/0.40 7/1.70	6
25	196/0.40 7/2.14	4
35	276/0.40 19/1.53	2
50	396/0.40 19/1.78	1/0
70	360/0.50 19/2.14	2/0
95	475/0.50 19.2.52	3/0
120	608/0.50 37/2.93	231 - 300 MCM
150	756/0.50 37/2.25	231 - 300 MCM
185	925/0.50 37/2.52	300 - 380 MCM
240	1221/0.50 61/2.25	380 - 478 MCM



Safety limitations - DO NOT use larger or smaller cable sizes than those designated as this may result in increased resistance, leading to higher fire risk in some applications.

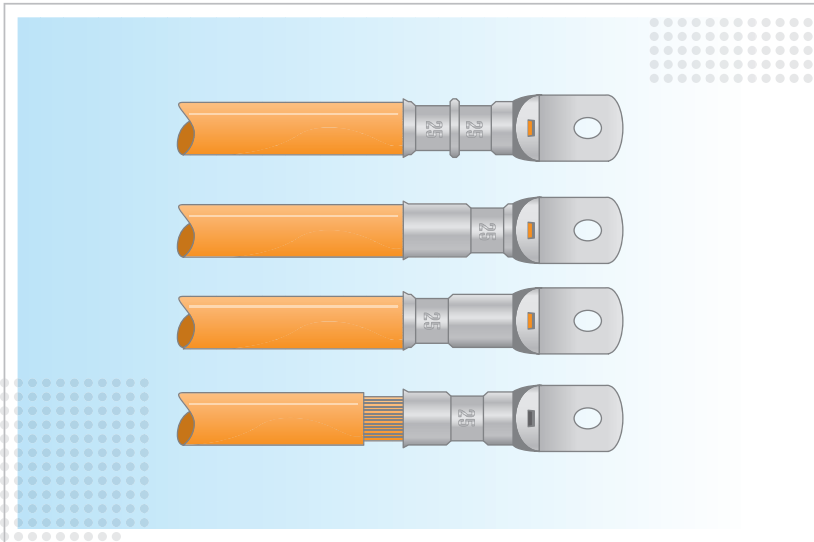
1. Feature characteristics - AMPOWER Metrics terminals and splices are supplied with inspection slots in the barrel, allowing visibility of whether the conductors have been fully and properly inserted into the barrel.
2. Cable preparation - the terminal or splice selected will be determined by the conductor type and size being used.

The strip length as it shown in the diagram.



Strip Length:

This is key to correct wire placement in the terminal. It is important that the strip length matches the terminal, and enables the correct wire placement in the terminal prior to crimping.



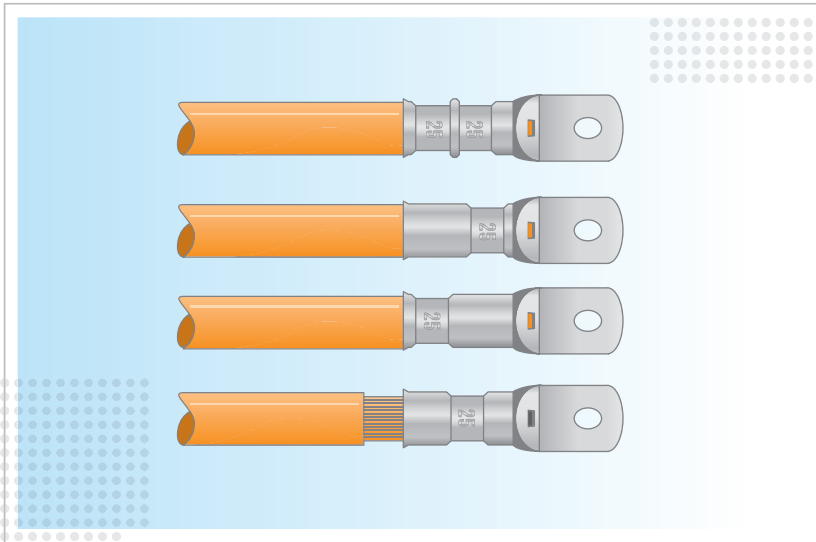
1. Crimp requirements:

- A. Locate the terminal or splice to be crimped in the appropriate tooling, according to the instructions packaged with that tooling*
- B. Terminate the product according to the directions shipped with the appropriate tooling
- C. Wire insulation should NOT be cut or broken during the crimping operation, nor should the insulation be crimped into the wire barrel
- D. Reasonable care must be taken by tooling operators to provide undamaged wire terminations

2. Crimp location:

- A. For optimum crimp effectiveness, the crimp must be within the area shown above
- B. Effective crimp length should be defined as that portion of the wire barrel, excluding the rear chamfer, fully formed by the crimping tool
- C. Instructions for adjusting, repairing, and inspecting tools are packaged with the tools

*Detailed instructions covering the placement of products in the tooling, and the use of such tooling, are packaged with each tool.



1. Good crimp location:

- A. Wire seen in correct position through site hole
- B. Correct die reference embossed upon crimp area, relates to terminal reference and wire size

2. Bad crimp location

- A. Crimped too near the palm
- B. Crimped too far from the palm
- C. Conductor not fully inserted

About TE Connectivity

TE Connectivity (NYSE: TEL) is a \$14 billion global technology leader. Our connectivity and sensor solutions are essential in today's increasingly connected world. We collaborate with engineers to transform their concepts into creations – redefining what's possible using intelligent, efficient and high-performing TE products and solutions proven in harsh environments. Our 80,000 people, including 7,500 design engineers, partner with customers in over 150 countries across a wide range of industries. We believe EVERY CONNECTION COUNTS - **te.com**.

About TTI, Inc.

TTI, Inc., a Berkshire Hathaway company, is the world's leading specialist distributor of passive, connector, electromechanical and discrete components. TTI's philosophy is "Lead by Design", and the company differentiates itself by focusing on people, parts and process. TTI in Europe strives to be the distributor of choice for customers and suppliers alike by introducing new product technologies and by stocking broad and deep inventory across its franchise base. TTI's sophisticated inventory management system ensures the ability to service changes in demand due to fluctuating markets and supply chains. For more information about TTI, please visit: **tti europe.com**.

CORPORATE HEADQUARTERS

TTI, Inc.
2441 Northeast Parkway
Fort Worth, Texas 76106
U.S.A.
T: +1 817 740 9000
F: +1 817 740 9898
E: information@ttiinc.com

EUROPEAN HEADQUARTERS

TTI, Inc.
Ganghoferstr. 34
82216 Maisach-Gernlinden
Germany
T: +49 (0) 81 42 66 80 0
F: +49 (0) 81 42 66 80 490
E: sales@de.ttiinc.com