

AMPOWER* Terminals and Splices
NOTE


All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of ± 0.13 [$\pm .005$] and angles have a tolerance of $\pm 2^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of AMPOWER Terminals and Splices designed to terminate large stranded copper cables and leads. The terminals will accept a wire size range of 6 AWG to 1000 MCM and the splices will accept a wire size range of 6 AWG to 1500 MCM. All are designed to be crimped with precision dies and various power assist units.

AMPOWER Terminals and Splices are especially suited for power generation and distribution and for interconnections of power supplies to computers and peripheral equipment. These terminals and splices are available in a variety of styles and are made of high-quality seamless tubular copper for maximum conductivity.

When corresponding with Tyco Electronics Personnel, use the terminology provided on this specification to help facilitate your inquiry for information. Basic terms and features of connectors are provided in Figure 1.

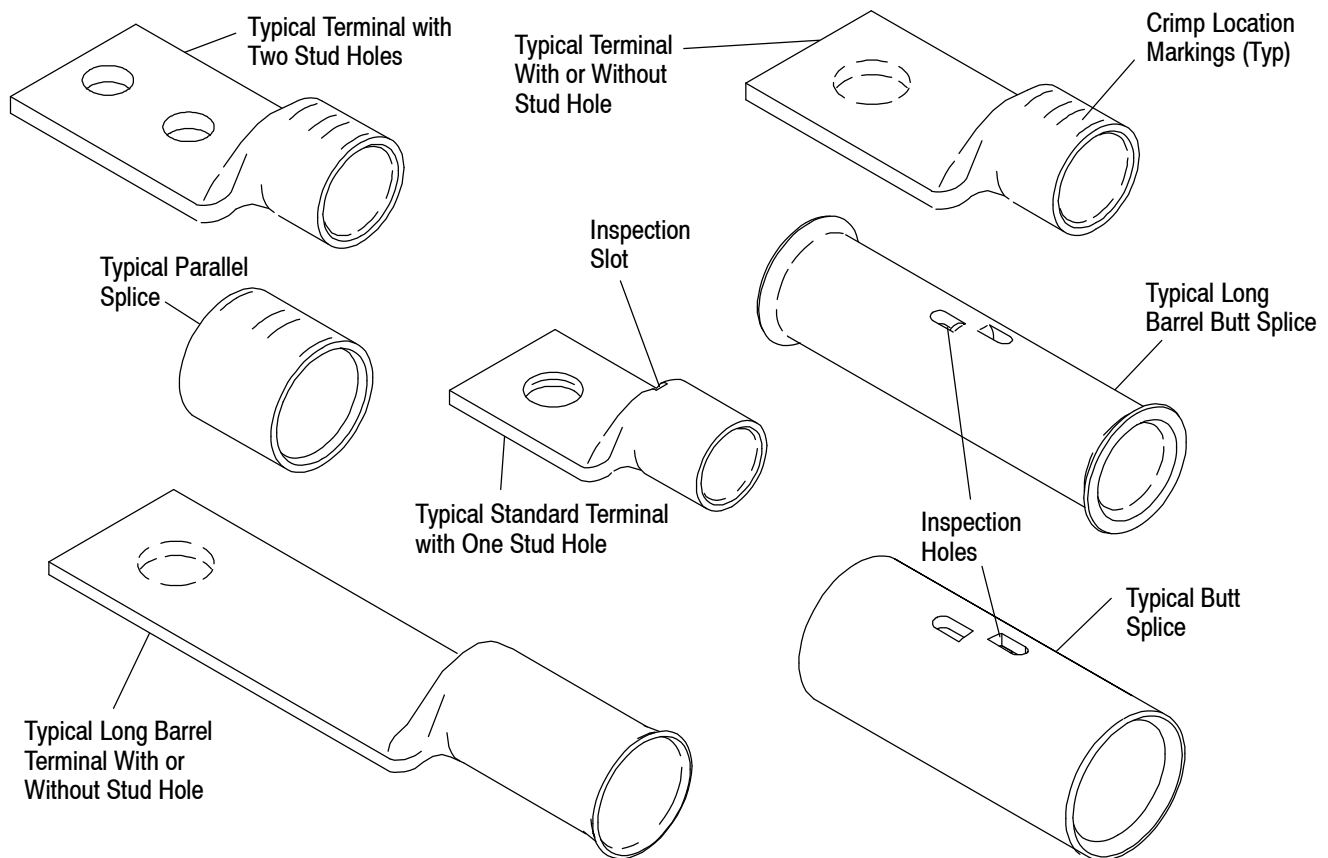


Figure 1

2. REFERENCE MATERIAL
2.1. Revision Summary

- Updated specification to corporate requirements, new logo and format
- Deleted obsolete tooling and related documents

2.2. Customer Assistance

Reference Part Number 325403 and Product Code 3050 are representative of AMPOWER Terminals and Splices. These numbers are used in the network of customer service to access tooling and product application information. This service is provided by your local Tyco Electronics Representative or, after purchase, by calling the Tooling Assistance Center or the Product Information number at the bottom of page 1.

2.3. Drawings

Customer Drawings for specific products are available from the responsible Engineering Department via the service network. The information contained in the Customer Drawing takes priority if there is a conflict with this specification or any other technical documentation supplied by Tyco Electronics.

2.4. Specifications

Product Specification 108-30200 provides product performance requirements and test information for small (6, 4, and 2 AWG); medium (1/0 to 4/0 AWG and 250 to 500 MCM); and large (600 to 1500 MCM) AMPOWER Terminals and Splices.

2.5. Instructional Material

The following list includes available instruction sheets (408-series) that provide assembly procedures for product, operation, maintenance and repair of tooling, and customer manuals (409-series) that provide setup, operation, and maintenance of machines.

<u>Document Number</u>	<u>Document Title</u>
408-1206	Multi-Directional Valves
408-1565	AMPOWER Crimping Die Assemblies
408-1602	AMPOWER Crimping Die Assemblies 46754-2, 46755-2, 46756-2, 46757-2, 46758-2, 46759-2, 46760-2, 59870-1, and 69653
408-1606	AMPOWER Crimping Dies
408-1965	Crimping Die Cross Reference for Hydraulic Tooling
408-2449	DYNA-CRIMP* Crimping Heads No. 68073-1 and 68073-2
408-2452	Hydraulic Crimping Head 69065
408-2454	Hydraulic Crimping Head 69067
408-2456	DYNA-CRIMP Crimping Head No. 69082
408-2458	DYNA-CRIMP Crimping Head No. 69099
408-2614	Tool and Die Selection Chart for Terminals and Splices
408-6803	Hydraulic Hand Crimping Tool 59973-1
408-7424	Checking Terminal Crimp Height or Gaging Die Closure
408-9598	Hydraulic Crimping Head 58445-1
408-9684	Inspection and Servicing of Hydraulic Crimping Heads 58422-1, 58445-1, 69051, 69065, 69066, 69067, and 69069
408-9809	Retrofit Kit for Hydraulic Handle Control Assemblies 59907-7, 1-59907-5, 2-59907-1, 2-59907-8
409-1950	Hydraulic Power Units 69120-1 and 69120-2
409-5860	Hydraulic Hand Pump 314979-1

3. REQUIREMENTS

3.1. Safety Limitations



DO NOT use larger or smaller cable sizes than those designated. The use of smaller cable sizes may increase resistance resulting in a higher risk of fire in some applications. The use of larger cable sizes may cause damage to the wire conductors, resulting in increased resistance.

3.2. Feature Characteristics

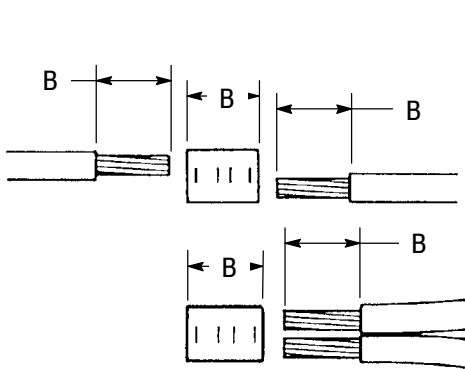
Standard AMPOWER Terminals and Splices are supplied with inspection slots in the barrel, allowing inspection to see if the conductors have been fully and properly inserted into the barrel. Cable stops prevent overinsertion of conductors, and bellmouth construction allows ease of insertion of cable into the barrel.

3.3. Cable Preparation

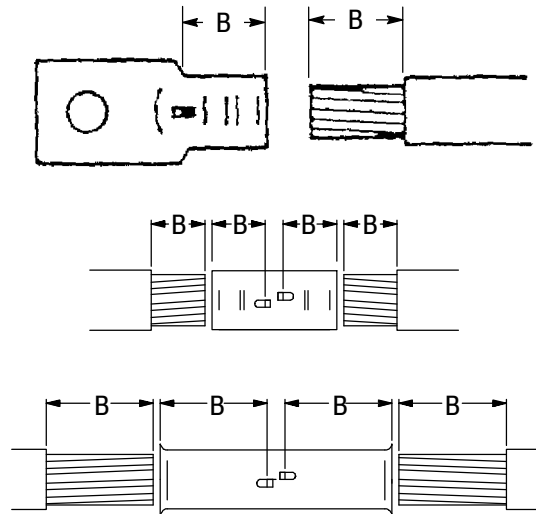
The terminal or splice selected will be determined by the conductor type and size being used. The strip length shall be as shown in Figure 2.



Do not nick, scrape, or cut the wire conductor during the stripping operation.



**PARALLEL SPLICES
LENGTH OF BARREL B**



**TERMINALS AND BUTT SPLICES,
LENGTH OF BARREL B**

PRODUCT TYPE	WIRE SIZE	CIRCULAR MILL RANGE	STRIP LENGTH	
			PARALLEL SPLICES	TERMINALS AND BUTT SPLICES
AMPOWER TERMINALS, BUTT AND PARALLEL SPLICES	6 AWG	20,800 - 33,100 CM	B + 1.59 [.063 (1/16)]	B + 0.79 [.031 (1/32)]
	4 AWG	33,100 - 52,600 CM		
	2 AWG	52,600 - 83,700 CM		
	1/0 AWG	83,700 - 119,500 CM	B + 3.20 [.125 (1/8)]	B + 1.59 [.063 (1/16)]
	2/0 AWG	119,500 - 150,500 CM		
	3/0 AWG	150,500 - 190,000 CM		
	4/0 AWG	190,000 - 231,000 CM		
	250 MCM	231 - 275 MCM	B + 6.35 [.250 (1/4)]	B + 3.20 [.125 (1/8)]
	300 MCM	275 - 325 MCM		
	350 MCM	325 - 375 MCM		
	400 MCM	375 - 450 MCM		
	500 MCM	450 - 550 MCM		
	600 MCM	550 - 650 MCM		
	700 MCM	650 - 750 MCM		
	800 MCM	750 - 850 MCM		
	900 MCM	850 - 950 MCM		
	1000 MCM	950 - 1,125 MCM		
	1250 MCM	1,125 - 1,300 MCM	---	B + 6.35 [.250 (1/4)]†
1500 MCM	1,300 - 1,600 MCM	B + 6.35 [.250 (1/4)]†		

†Butt Splice Only.

Figure 2

3.4. Crimp Requirements

Locate the terminal or splice to be crimped in the appropriate tooling according to the instructions packaged with that tooling. Detailed instructions covering the placement of products in the tooling and the use of such tooling is packaged with each tool. Terminate the product according to the directions shipped with the appropriate tooling. See Section 5, TOOLING. Figure 3 shows a typical terminal as it should appear after crimping.



Wire insulation shall NOT be cut or broken during the crimping operation, nor shall the insulation be crimped into the wire barrel. Reasonable care should be taken by tooling operators to provide undamaged wire terminations.

A. Crimp Height

There is a specific crimp height for each conductor size that will ensure optimum bonding between the terminal/splice and the conductor. The crimp can be measured with a micrometer over the most compressed area of the crimped conductor barrel. See Figure 3.

B. Crimp Location

For optimum crimp effectiveness, the crimp must be within the area shown and must meet the crimp dimensions provided in Figure 3. Effective crimp length shall be defined as that portion of the wire barrel, excluding the rear bellmouth, fully formed by the crimping tool. Instructions for adjusting, repairing, and inspecting tools are packaged with the tools. See Figure 6.

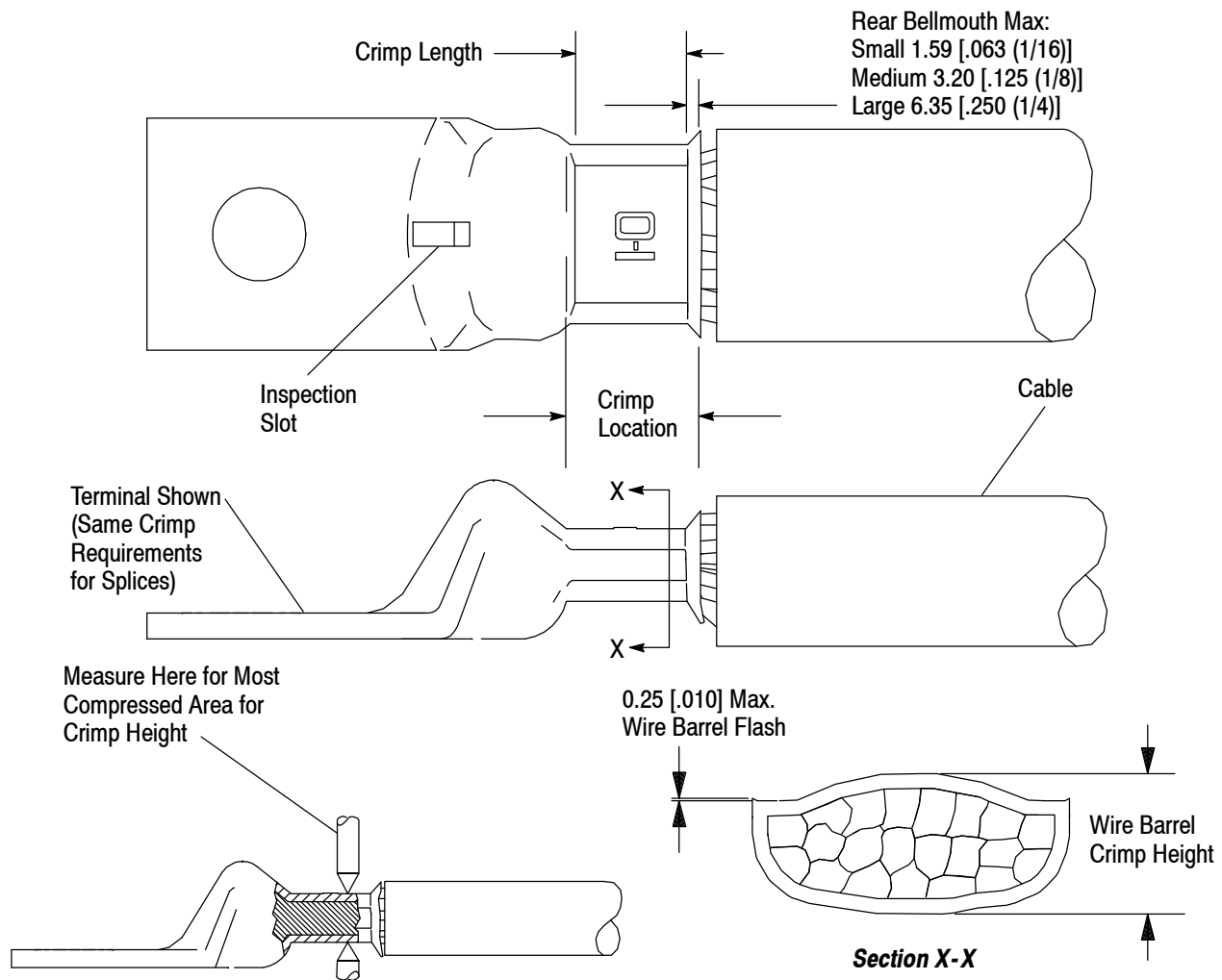


Figure 3 (cont'd)

WIRE SIZE	CRIMPING DIES	CRIMP HEIGHT [Ⓜ]
6 AWG	69133-1	3.734-3.984 [.1470-.1568]
4 AWG	69134-2	4.496-4.747 [.1770-.1868]
2 AWG	46765-3	5.384-5.635 [.2120-.2218]
	46321-3	
1/0 AWG	46766-2	6.655-6.905 [.2620-.2718]
	46322-2	
2/0 AWG	46767-2	7.544-7.794 [.2970-.3068]
	46323-2	
3/0 AWG	46749-2	8.509-8.759 [.3350-.3448]
	46324-2	
4/0 AWG	46750-2	9.576-9.826 [.3770-.3868]
	46325-2	
250 MCM	46751-2	10.490-10.741 [.4130-.4228]
	46326-2	
300 MCM	46752-2	11.506-11.757 [.4530-.4628]
350 MCM	46753-2	12.421-12.671 [.4890-.4988]
	69653	
400 MCM	46754-2	13.564-13.814 [.5340-.5438]
500 MCM	46755-2	15.037-15.287 [.5920-.6018]
500 MCM HD	46756-2	16.612-16.862 [.6540-.6638]
600 MCM [■]	46756-2	16.612-16.862 [.6540-.6638]
700 MCM [■]	46757-2	17.831-18.081 [.7020-.7118]
800 MCM [■]	46758-2	19.406-19.656 [.7640-.7738]
900 MCM [■]	46759-2	20.422-20.672 [.8040-.8138]
1000 MCM [■]	46760-2	21.539-21.790 [.8480-.8578]

[■]Requires two crimps for optimum mechanical and electrical performance. [Ⓜ]Crimp Height for closed dies, product will have greater dimensions based on conductor type due to spring-back. Contact the Tooling Assistance Center or the Product Information number at the bottom of page 1 for specific dimensions.

Figure 3 (end)

C. Bellmouth

Rear bellmouths shall be evident and conform to the dimensions given in Figure 3.

D. Wire Barrel Flash

The wire barrel flash shall not exceed the dimensions shown in Figure 3 in Section X-X.

E. Wire Location

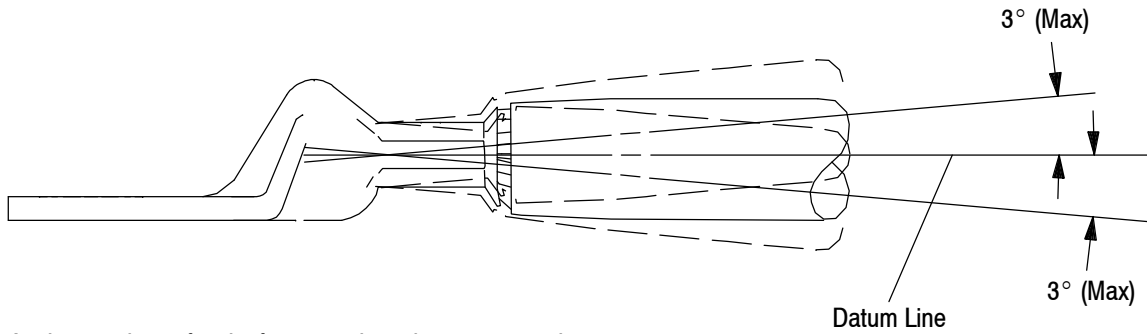
After crimping, the wire conductor must be visible in the inspection slot if applicable or fully seated within the wire barrel. See Figure 3.

F. Straightness

The force applied during crimping may cause some bending between the crimped wire barrel and the mating portion of the product. Such deformation is acceptable within the following limits.

1. Up and Down

The crimped terminal and burr, shall not be bent above or below the datum line more than the amount shown in Figure 4.



NOTE: Angles are drawn for clarification only and are not to scale.

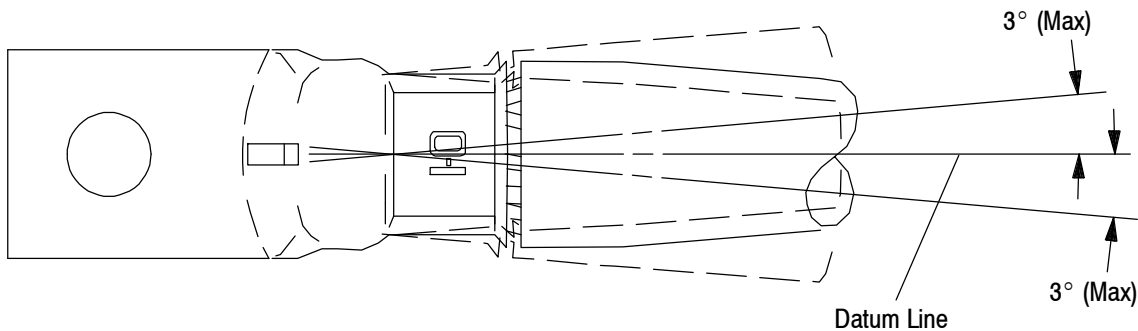
Figure 4

2. Side to Side

The side-to-side bending of the terminal may not exceed the limits provided in Figure 5.

NOTE

Periodic inspections must be made to ensure crimped product formation is consistent as shown.



NOTE: Angles are drawn for clarification only and are not to scale.

Figure 5

3.5. Mounting Hardware

The fasteners used to secure the terminals are to be in accordance with the user's specification. These terminals must not be secured using incompatible, dissimilar metals without appropriate interface treatment.

3.6. Repair/Replacement

AMPOWER Terminals and Splices are not repairable once a termination has been made. Any defective or damaged terminal or splice must be removed and replaced with a new one.

4. QUALIFICATIONS

AMPOWER Terminals and Splices are Recognized by Underwriters Laboratories Inc. (UL) in File E12388, and Certified by CSA International in File LR7189.

5. TOOLING

AMPOWER Terminals and Splices can be terminated to the cable using hand or hydraulic power units. Available recommended tooling and instructional material is provided in Figure 6.

- **Hand Crimping Tool**

Hand crimping tools that accommodate the full wire size range are designed for prototype and low-volume applications such as field repair of damaged products.

- **Power Units**

A power unit is an automatic or semi-automatic device used to assist in the application of a product. The power unit is the power source used to supply the force or power to terminate a product.

- **Crimping Die Assemblies**

Crimping die assemblies for crimping the products are available for the full wire size range. They are designed for easy installation and removal in hand crimping tool frame assemblies or crimping heads.

- **Crimping Head**

A crimping head is used to hold the die assembly while applying power from a power unit or hand tool.

WIRE SIZE	CRIMPING DIES (DOCUMENT)	CRIMPING HEAD (DOCUMENT)	HAND TOOL (DOCUMENT)	POWER UNIT (DOCUMENT)
6 AWG	69133-1 (408-1606)	69099 (408-2458)	---	69120-1 (409-1950) 69120-2 (409-1950) 122271-1 (409-5869) 314979-1 (409-5860)
4 AWG	69134-2 (408-1606)			
2 AWG	46765-3 (408-1606)	69065 (408-2452) 69067 (408-2454)	59973-1 (408-6803)	
	46321-3 (408-1565)			
1/0 AWG	46766-2 (408-1606)	69099 (408-2458)	---	
	46322-2 (408-1565)	69065 (408-2452) 69067 (408-2454)	59973-1 (408-6803)	
2/0 AWG	46767-2 (408-1606)	69099 (408-2458)	---	
	46323-2 (408-1565)	69065 (408-2452) 69067 (408-2454)	59973-1 (408-6803)	
3/0 AWG	46749-2 (408-1606)	69099 (408-2458)	---	
	46324-2 (408-1565)	69065 (408-2452) 69067 (408-2454)	59973-1 (408-6803)	
4/0 AWG	46750-2 (408-1606)	69099 (408-2458)	---	
	46325-2 (408-1565)	69065 (408-2452) 69067 (408-2454)	59973-1 (408-6803)	
250 MCM	46751-2 (408-1606)	69099 (408-2458)	---	
	46326-2 (408-1565)	58445-1 (408-9598)		
300 MCM	46752-2 (408-1606)	69099 (408-2458)		
350 MCM	46753-2 (408-1606)			
		69653 (408-1602)		69082 (408-2456)
400 MCM	46754-2 (408-1602)			
500 MCM	46755-2 (408-1602)			
500 MCM HD	46756-2 (408-1602)			
600 MCM [■]	46756-2 (408-1602)			
700 MCM [■]	46757-2 (408-1602)	69082 (408-2456)		69120-1 (409-1950) 69120-2 (409-1950) 122271-1 (409-5869) 314979-1 (409-5860)
800 MCM [■]	46758-2 (408-1602)			
900 MCM [■]	46759-2 (408-1602)			
1000 MCM [■]	46760-2 (408-1602)			

[■]Requires two crimps for optimum mechanical and electrical performance.

Figure 6 (cont'd)

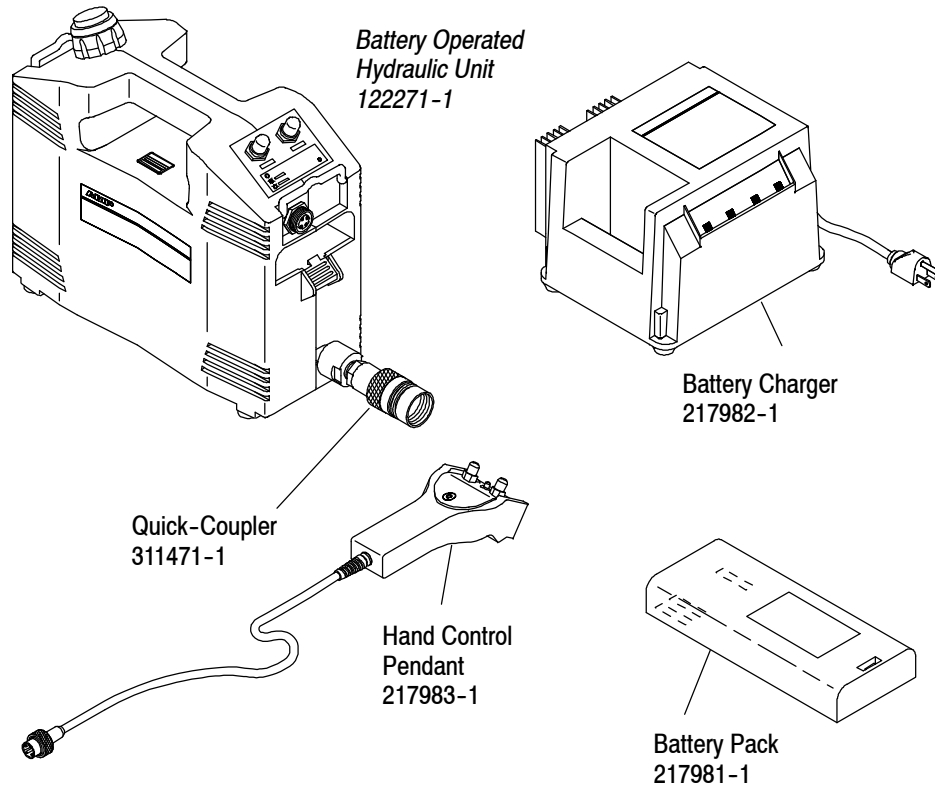
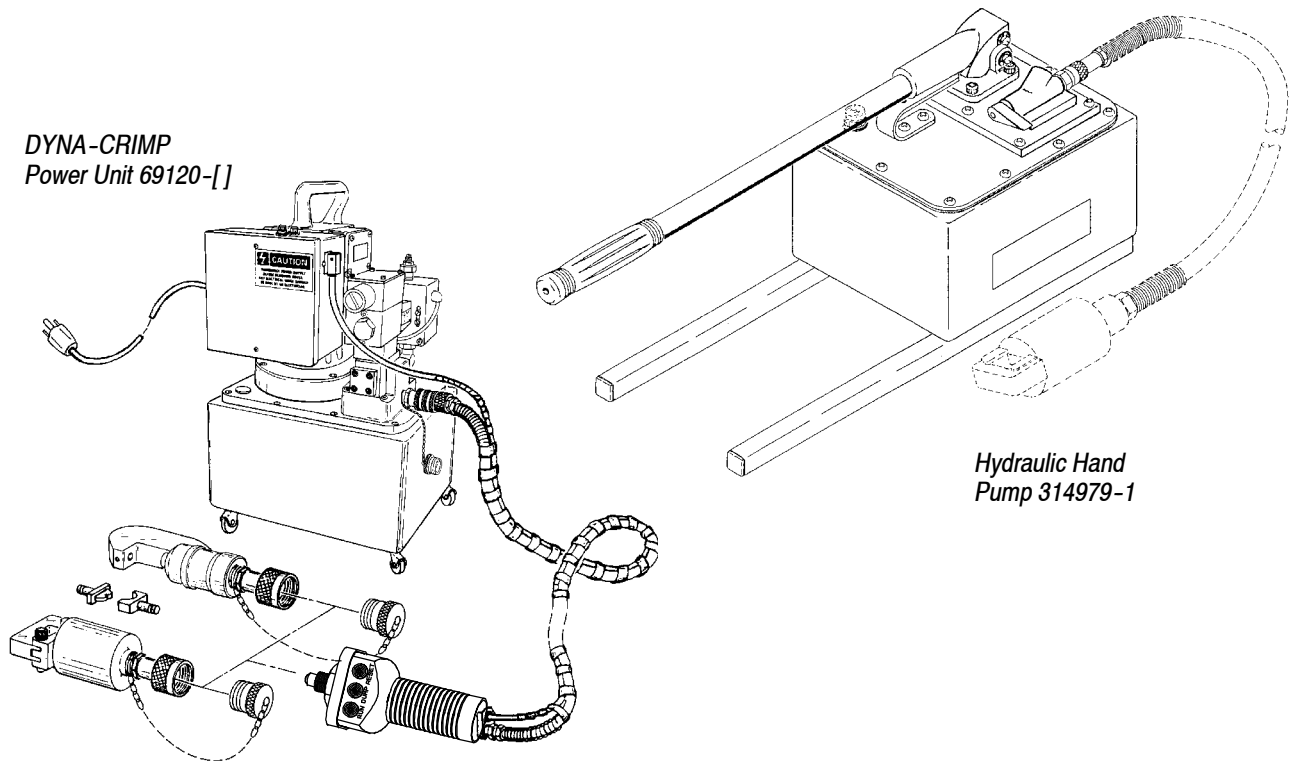
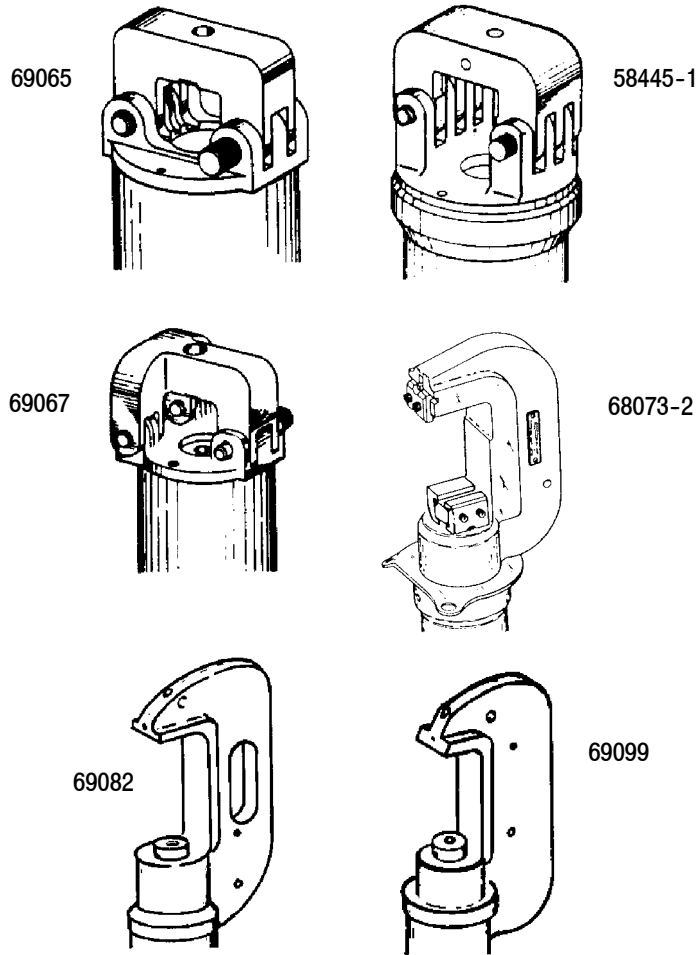
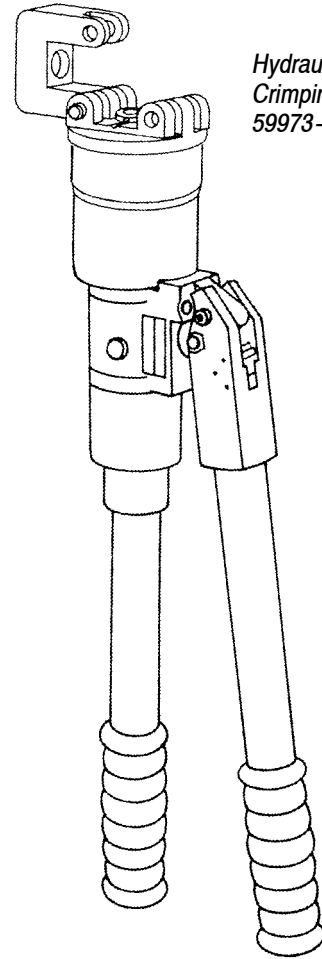


Figure 6 (cont'd)

Crimping Heads



*Hydraulic Hand
Crimping Tool
59973-1*



Typical Crimping Die Assemblies

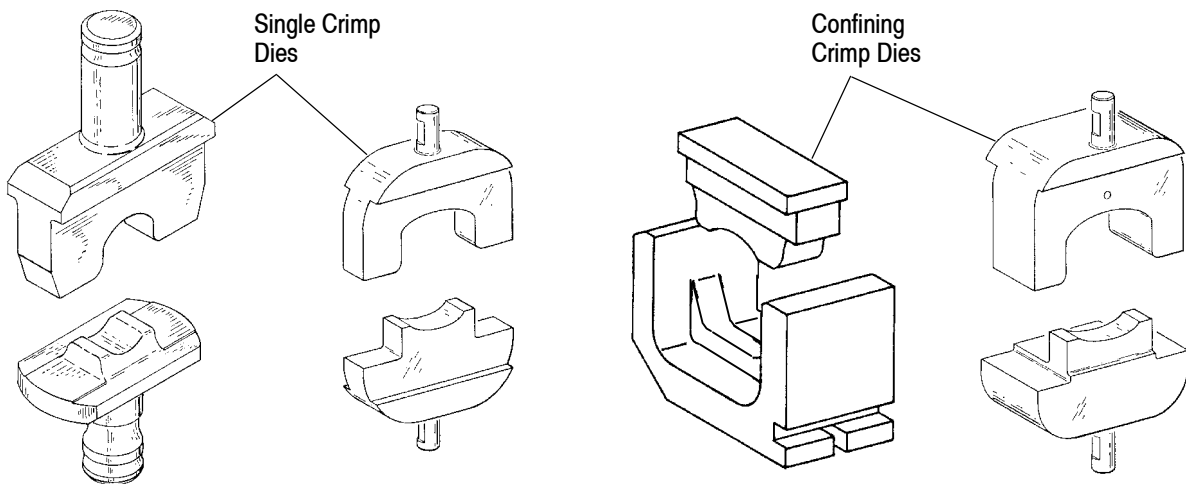
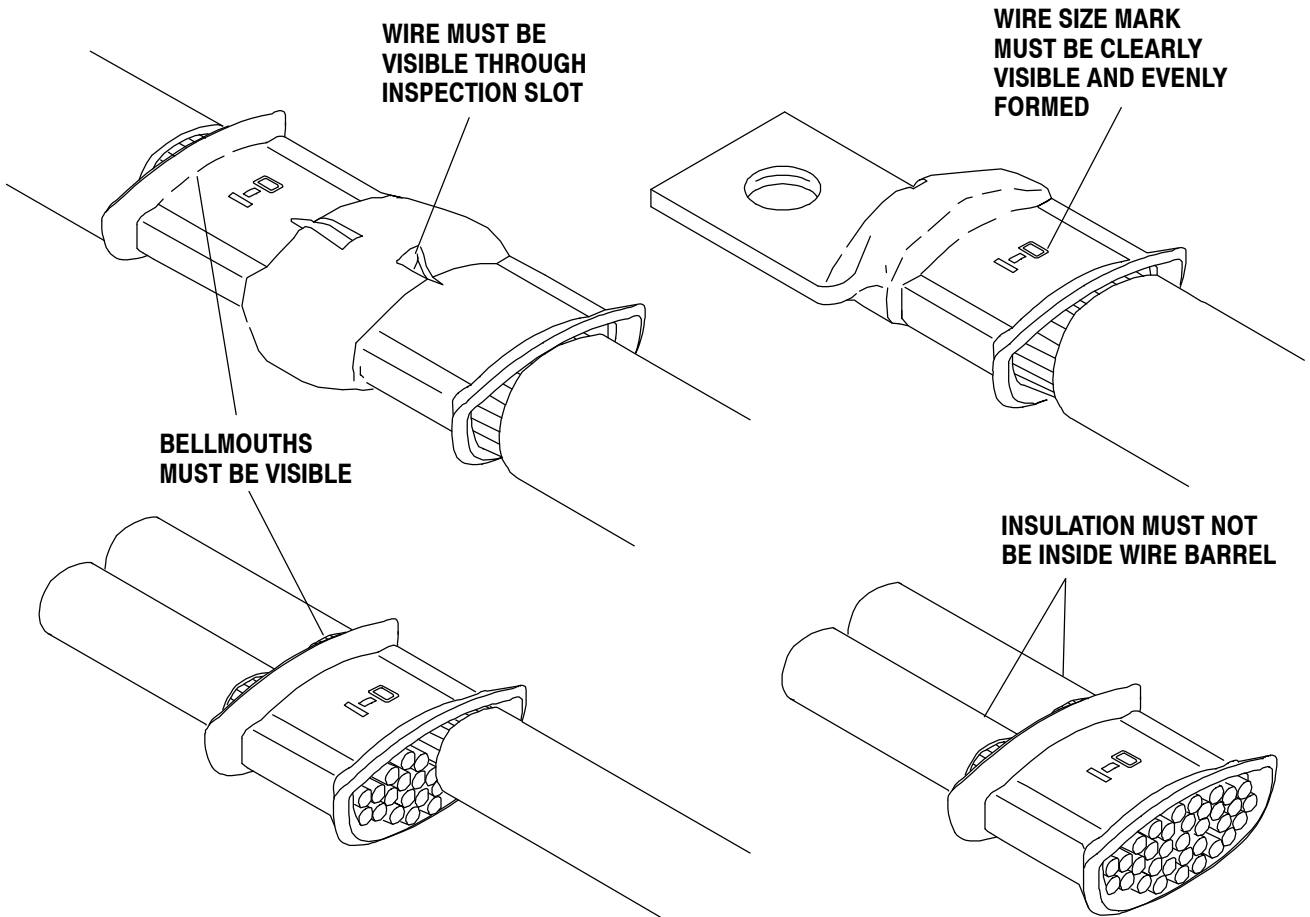


Figure 6 (end)

6. VISUAL AID

Figure 7 shows a typical application of an AMPOWER Splice. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.



NOTE: Splice is shown, terminal application would be the same.

FIGURE 7. VISUAL AID