

CRIMPING DIE ASSEMBLY		CRIMPING HEAD
68006	68007	69066
68008	68009	58422-1
68010	68010-2	1752787-1
314964-1	68008-1	1752877-1
1976441-1	59877-1	58422-1 1752787-1
1976442-1	68011-1	
1976443-1	314948-1	

Figure 1


## 1. INTRODUCTION

The crimping die assemblies listed in Figure 1 are used to crimp COPALUM sealed terminals and splices.

The crimping die assemblies must be installed into the crimping heads shown in Figure 1. Refer to the instruction sheet packaged with the crimping head for information concerning die installation and general performance of the head.

Reasons for reissue of this instruction sheet are provided in Section 7, REVISION SUMMARY.


Read these instructions thoroughly before using the die assemblies.

**NOTE**  Dimensions in this instruction sheet are in millimeters [with inches in brackets]. Figures and illustrations are for reference only and are not drawn to scale.


## 2. DESCRIPTION (Figure 1)

The die assemblies consist of stationary dies (nests) and moving dies (anvils). Refer to Figure 2 to ensure the compatibility of die assemblies, crimping heads, and terminals and splices.

### 2.1. Die Installation

**DANGER**  To avoid personal injury, ALWAYS DISCONNECT electrical and air supply to power unit before installing dies.


The shanks on the moving and stationary dies are offset, and there are alignment dots on the FRONT surface of the dies. The shanks of the dies must be offset to the same surface and the dots must be aligned, and face the operator, in order to achieve proper mating of the dies.


**CAUTION**  DO NOT mix die components from different die assemblies.

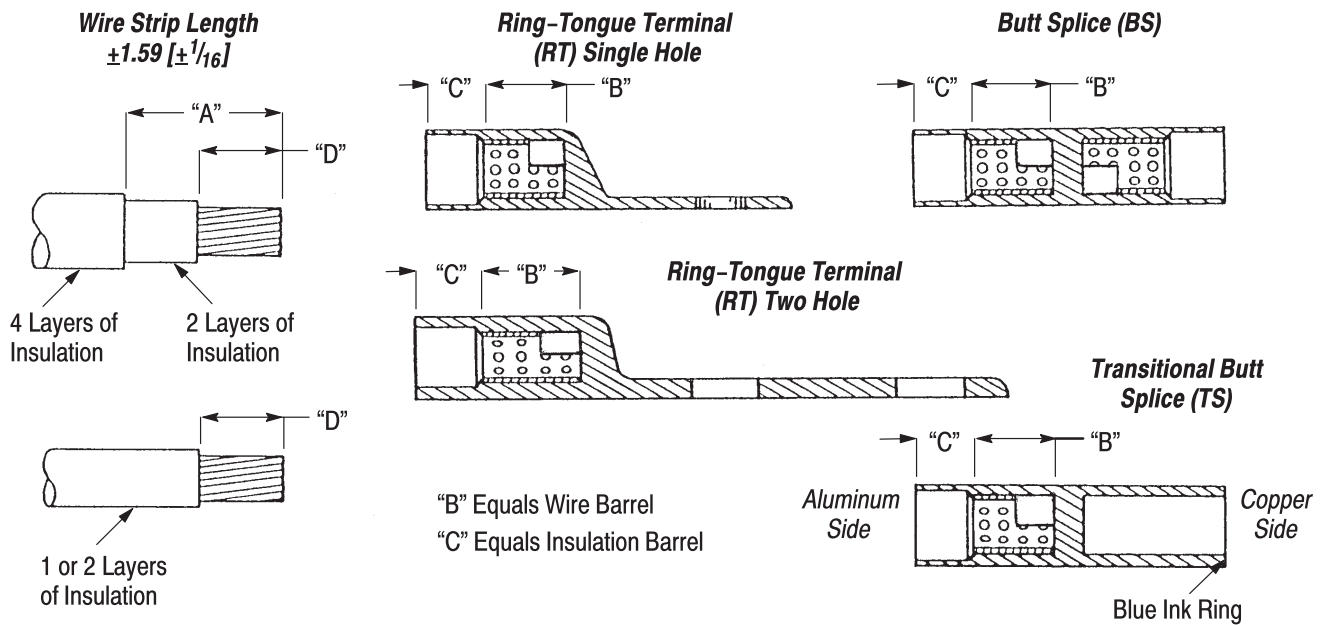
Refer to Instruction Sheet 408-9535 for die installation procedure for Crimping Head 58422-1; 408-2453 for Crimping Head 69066; 408-8914 for Crimping Head 1752787-1; and 408-8956 for Crimping Head 1752877-1.

### 2.2. Wire, Terminal, and Splice Selection (Figure 2)

Refer to Figure 2 and select the appropriate wire, die assembly, and terminal or splice. Strip the wire to the length indicated in the table.

**CAUTION**  DO NOT nick or cut the wire strands.

**NOTE**  For aluminum-to-aluminum application, butt splices will accept the same wire size at either end. However, for aluminum-to-copper applications, the size of the copper wire must be decreased to a smaller size to compensate for differences in the electrical properties of copper and aluminum. It is also necessary to use a smaller wire size when using copper wire in a terminal. Refer to CMA range listed with each wire size in Figure 2.



TERMINALS (RT)		BUTT SPLICES (BS)	ALUMINUM WIRE		COPPER WIRE		STRIP LENGTH		DIE ASSEMBLY	HEAD	
SINGLE HOLE	DOUBLE HOLE		mm <sup>2</sup> (CMA) ●	AWG ▲	mm <sup>2</sup> (CMA) ●	AWG ■	DIM. A (Insulation)	DIM. D (Conductor)			
277147-[]	—	277156-[]	8.60 (16,564)	8	4.80 (9,354)	10	22.23 [7/8]	11.11 [7/16]	68006	58422-1 69066 1752787-1 1752877-1	
277148-[]	55832-[]	277157-[]	14.60 (28,280)	6	8.80 (16,983)	8	22.23 [7/8]	12.70 [1/2]	68007		
277149-[]	55833-[] 55834-[]**	277158-[]	21.90 (42,420)	4	13.80 (26,818)	6	25.40 [1]	17.45 [11/16]	68008 68008-1		
277150-[]	55835-[] 55836-[]**	277159-[]	35.00 (67,872)	2	22.00 (42,615)	4	31.75 [1 1/4]	19.10 [3/4]	68009		
277151-[]	55837-[] 55838-[]**	277160-[]	55.50 (107,464)	1/0	34.30 (66,500)	2	32.54 [1 9/32]	25.40 [1]	68010		
227152-[]	55839-[] 55844-[]**	277161-[]	71.30 (138,168)	2/0	53.90 (104,500)	1/0	34.93 [1 3/8]	25.40 [1]	314964-1 68011-1		
277153-[]	55840-[]	277162-[]	87.20 (168,872)	3/0	68.60 (133,000)	2/0	34.93 [1 3/8]	25.40 [1]	59877-1		
—	55841-[]**	—	110.94 (214,928)	4/0	85.94 (166,500)	3/0	33.34 [1 5/16]	25.40 [1]	314948-1		
<b>TRANSITIONAL BUTT SPLICES (TS)</b>											
277163-[]			55.50 (107,464)	1/0	22.00 (42,615)	4	32.54 [1 9/32]	25.40 [1]	68010		58422-1 69066 1752787-1 1752877-1
277164-[]			21.90 (42,420)	4	8.80 (16,983)	8	25.40 [1]	17.45 [11/16]	68008-1		
277165-[]			21.90 (42,420)	4	22.00 (42,615)	4	25.40 [1]	17.45 [11/16]	68008 68008-1		
277168-[]			87.20 (168,872)	3/0	53.90 (104,500)	1/0	34.93 [1 3/8]	25.40 [1]	59877-1		

● Circular Mill Area ▲ See MIL-W-7072 for Specific Wire Requirements  
■ See MIL-W-22759E for Specific Wire Requirements \*\* High Temperature Silver Plated

Figure 2 (Cont'd)

## TERMINALS AND SPLICES FOR USE WITH BOEING BMS13-78 WIRE

TERMINALS (RT)		BUTT SPLICES (BS)	ALUMINUM WIRE		COPPER WIRE†		STRIP LENGTH		DIE ASSEMBLY	HEAD
SINGLE HOLE	DOUBLE HOLE		mm <sup>2</sup> (CMA)●	AWG ▲	mm <sup>2</sup> (CMA)●	AWG ■	DIM. A (Insulation)	DIM. D (Conductor)		
696866-[]	696804-[]	696852-[]	8.60 (16,564)	8	4.80 (9,354)	10	—	11.11 [7/16]	68006	58422-1 69066 1752787-1 1752877-1
696869-[]	696999-[] 696887-[] 696951-[] 696953-[]	696847-[]	14.60 (28,280)	6	8.80 (16,983)	8	—	12.70 [1/2]	68007	
696872-[]	696834-[]	696854-[]	21.90 (42,420)	4	13.80 (26,818)	6	—	15.88 [5/8]	68008 68008-1	
696838-[]	696890-[]	696857-[]	35.00 (67,872)	2	22.00 (42,615)	4	—	19.10 [3/4]	68009	
696875-[]	696830-[] 696957-[] 696959-[]	696843-[]	55.50 (107,464)	1/0	34.30 (66,500)	2	—	20.57 [.810]	68010-2	
696878-[] 696819-[]◆	696840-[]	696861-[]	71.30 (138,168)	2/0	53.90 (104,500)	1/0	—	25.40 [1]	68011-1	
696881-[] 696821-[]◆	696825-[] 696961-[] 696963-[]	696863-[]	87.20 (168,872)	3/0	68.60 (133,000)	2/0	—	25.40 [1]	59877-1	58422-1 1752787-1
696884-[] 696823-[]◆	696893-[]	696849-[]	110.94 (214,928)	4/0	85.94 (166,500)	3/0	—	25.40 [1]	314948-1	

## TERMINALS FOR USE WITH NEXANS ALUMINUM WIRE

TERMINALS (RT)			ALUMINUM WIRE		STRIP LENGTH		DIE ASSEMBLY	HEAD
3/8 STUD	3/8 STUD DOUBLE HOLE	3/8 STUD, 15° BEND	mm <sup>2</sup> (CMA)●	AWG ▲	DIM. A (Insulation)	DIM. D (Insulation)		
1958058-1	1958080-1	1958060-1	71.30 (138,168)	2/0	—	25.40 [1]	1976441-1	58422-1 1752787-1
1958091-1	—	1958093-1	87.20 (168,872)	3/0	—	25.40 [1]	1976442-1	
1958054-1	1958078-1	1958056-1	110.94 (214,928)	4/0	—	25.40 [1]	1976443-1	

## CRN TERMINALS

STRAIGHT	90° BEND	ALUMINUM WIRE		COPPER WIRE		STRIP LENGTH		DIE ASSEMBLY	HEAD
		mm <sup>2</sup> (CMA)●	AWG ▲	mm <sup>2</sup> (CMA)●	AWG ■	DIM. A (Insulation)	DIM. D (Insulation)		
696931-[]	696933-1	55.50 (107,464)	1/0	34.30 (66,500)	2	32.54 [1 <sup>9</sup> / <sub>32</sub> ]	25.40 [1]	68010-2	58422-1 69066 1752787-1 1752877-1
696925-[]	696927-1	71.30 (138,168)	2/0	53.90 (104,500)	1/0	34.93 [1 <sup>3</sup> / <sub>8</sub> ]	20.57 [.810]	68011-1	58422-1 1752787-1
696910-[]	696912-1	110.94 (214,928)	4/0	85.94 (166,500)	3/0	33.34 [1 <sup>5</sup> / <sub>16</sub> ]	25.40 [1]	314948-1	

† Only Applies to Splices (Not Terminals) ● Circular Mill Area ▲ See MIL-W-7072 for Specific Wire Requirements  
■ See MIL-W-22759E for Specific Wire Requirements ◆ Break Away Terminal

Figure 2 (End)

**3. CRIMPING PROCEDURE** (Figures 3, 4, and 5)

There are two approved methods for crimping the connectors with this hydraulic tool, on both terminals and splices.



To avoid personal injury, close the yoke of the hydraulic head and fully insert the pin. When operating the power unit, be careful when handling terminals, splices, or wire near the crimping area of the crimping head.

**3.1. Terminals**

The preferred (first) method is:

1. Insert properly stripped wire fully into terminal.



DO NOT turn or twist the wire or terminal during insertion.

2. Position terminal in stationary die (nest) with back of tongue resting against die, with yoke closed and pin inserted.



Make certain that the terminal is positioned so that the crimper of the moving die (anvil) will crimp wire barrel of the terminal. See Figure 3.

3. Holding wire in place, and fully inserted (yoke closed and pin fully inserted), activate power unit to complete crimp.

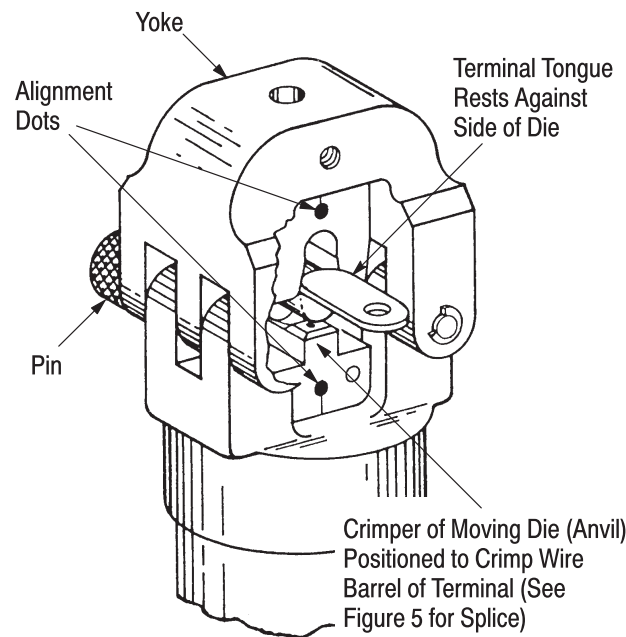


Figure 3

4. Remove crimped terminal from the die assembly. Refer to Figure 4 on where to grip breakaway terminals when removing them from the die assembly.

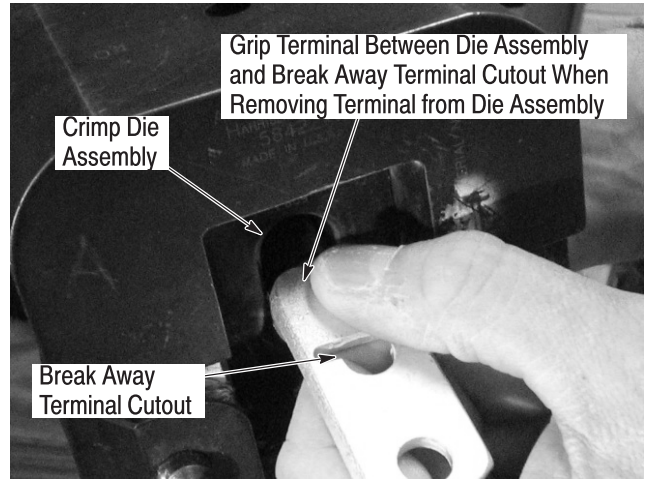


Figure 4



If the terminal sticks in the die after crimping, apply a rocking action to remove it from the die. Wipe light oil or use spray dry lubricant on the dies to prevent sticking.

The alternate (second) method is:

1. Position terminal in stationary die (nest) with back of tongue resting against die, with yoke closed and pin inserted.



Make certain that the terminal is positioned so that the crimper of the moving die (anvil) will crimp the wire barrel of the terminal. See Figure 3.

2. The wire is not inserted into the terminal. Instead, Jog to advance the ram to hold the terminal. This is difficult to do; If the terminal barrel is deformed, the wire may not be inserted properly.

3. Insert properly stripped wire fully into terminal.



DO NOT turn or twist the wire or terminal during insertion.


4. Holding wire in place, with yoke closed and pin inserted, activate power unit to complete crimp.
5. Remove crimped terminal from the die assembly. See Figure 4 for information on where to grip break away terminals when removing them from the die assembly.




If the terminal sticks in the die after crimping, apply a rocking action to remove it from the die. Wipe light oil or use spray dry lubricant on the dies to prevent sticking.


### 3.2. Splices

The preferred (first) method is:


**DANGER**  To avoid personal injury, close the yoke of the hydraulic head and fully insert the pin. When operating the power unit, be careful when handling terminals, splices, or wire near the crimping area of the crimping head.

1. Insert properly stripped wire fully into splice.

**CAUTION**  DO NOT turn or twist the wire or splice during insertion.


**NOTE**  Make sure that the splice is properly aligned in the stationary die so that moving die will crimp the wire barrel of the splice.

2. Position splice in die assembly so that edge of die is within width of splice crimp mark. The stripe marking on splice must be inside die, facing up, and in alignment with dot on nest. See Figure 5.

**NOTE**  When crimping a splice with a color coded band around the end of the splice, use the correct copper conductors in the color coded end of the splice.

3. Holding wire in place, activate power unit to complete first splice crimp.

4. When crimp is completed, remove pin, open yoke, and remove splice.

**NOTE**  If the splice sticks in die after crimping, apply a rocking action to remove it from the die. Wipe light oil or use spray dry lubricant on the dies to reduce sticking.

5. To crimp other half of splice, rotate the splice/tool 180°, making sure the stripe marking on the splice is inside the assembly, facing up, and in alignment with dot on nest. See Figure 5. Follow the same procedure used to crimp first side of splice (steps 1 through 4).

The alternate (second) method is slightly different, but very important. The difference is in preceding Step 1.

1. Position splice in die assembly so that edge of die is within width of splice crimp mark. The stripe marking on splice must be inside die, facing up, and in alignment with dot on nest. See Figure 5.

2. Do NOT insert wire into splice, instead, jog to advance the ram to hold the splice. This is difficult to do; If the splice is deformed, the wire may not be inserted properly.

3. Insert properly stripped wire fully into splice wire barrel.

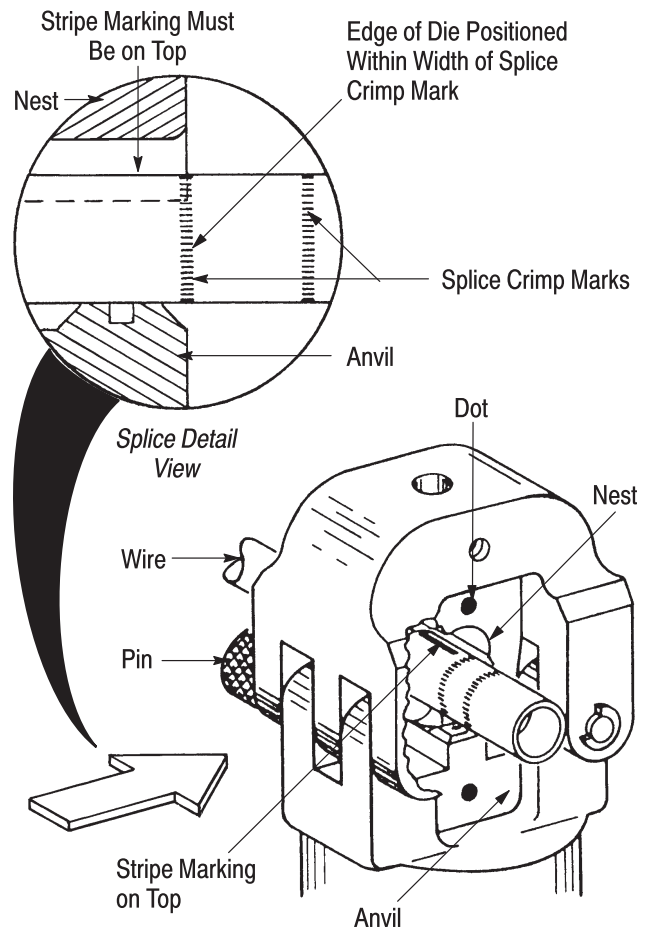





Figure 5

**CAUTION**  DO NOT turn or twist the wire or splice during insertion.

**NOTE**  When crimping a splice with a color coded band around the end of the splice, use the correct copper conductors in the color coded end of the splice.

4. Holding wire in place, activate power unit again to complete crimp.

5. When crimp is completed, remove pin, open yoke, and remove splice.

**NOTE**  If the splice sticks in die after crimping, apply a rocking action to remove it from the die. Wipe light oil or use spray dry lubricant on the dies to reduce sticking.

6. To crimp other half of splice, rotate the splice/tool 180°, making sure the stripe marking on splice is inside the assembly, facing up, and in alignment with dot on nest. See Figure 5. Follow the same procedure used to crimp first side of splice (Steps 1 through 5).

## 4. CRIMP INSPECTION

A crimp inspection mark is featured on each crimped terminal or splice. The mark consists of a dimple on the face of a cylinder which is embossed in the primary crimp area of the terminal or splice. The inspection mark must appear as shown in Application Specification 114–2134.

The inspection mark must appear as indicated in 114–2134, in order to qualify the terminal or splice as an acceptable termination. The terminal or splice is unacceptable and should be rejected if the identification mark is deformed.

If the mark is deformed, refer to Figure 2 to verify proper wire CMA and terminal and die combination.

Verify that crimping dies fully bottom during crimp cycle. Also, determine if dies are in proper configuration by gaging the crimp chamber specified in Paragraph 5.2.B.

## 5. MAINTENANCE AND INSPECTION



*To avoid personal injury, ALWAYS DISCONNECT electrical and air supply to power unit before performing adjustments, inspections, or repairs.*

Die assemblies are inspected before shipment. It is recommended that the die assembly be inspected immediately upon arrival at your facility to ensure that it conforms to the dimensions provided in Figure 7, and that it has not been damaged during shipment.

### 5.1. Daily Maintenance

It is recommended that each operator of the dies be made aware of — and responsible for — the following three steps of daily maintenance.

1. Remove dust, dirt, and other contaminants with a clean brush, or a soft, lint-free cloth. DO NOT use objects that could damage the dies.
2. Make certain the dies are protected with a thin coat of any good SAE 20 motor oil. DO NOT OIL EXCESSIVELY.
3. When the dies are not in use, mate them and store in a clean dry area.

### 5.2. Periodic Inspection

Regular inspections should be performed by quality control personnel. A record of scheduled inspections should remain with the dies and/or be supplied to

supervisory personnel responsible for the dies. Though recommendations call for at least one inspection a month, the inspection frequency should be based on the amount of use, ambient working conditions, operator training and skill, and established company standards. These inspections should be performed in the following sequence:

#### A. Visual Inspection

1. Remove all lubrication and accumulated film by immersing the die assembly in a suitable commercial degreaser that will not affect the painted alignment dots.
2. Inspect the crimp area for flattened, chipped, cracked, worn, or broken areas. If damage is evident, the dies must be replaced or repaired. If desired, you may return them for evaluation and repair (see Section 6, REPLACEMENT AND REPAIR).

#### B. Gaging the Crimping Chamber

This inspection requires the use of a plug gage conforming to the measurements provided in Figure 6. Gages may be purchased from:

Pennoyer–Dodge Company  
6634–T San Fernando Road  
Glendale, CA 91201

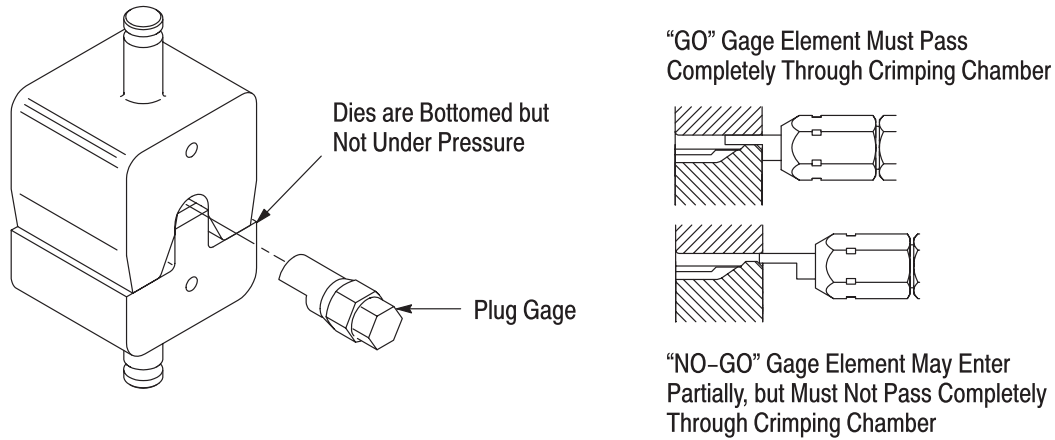
Proceed as follows:

1. Mate the dies until it is evident that they have bottomed. Hold the dies in this position.
2. Align the GO element of the gage with the crimping chamber. Push the element straight into the chamber without using force. The GO element must pass completely through the crimping chamber without using force as shown in Figure 6.
3. Align the NO–GO element with the crimping chamber and try to insert it straight into the chamber. The NO–GO element may start entry but must not pass completely through, as shown in Figure 6.

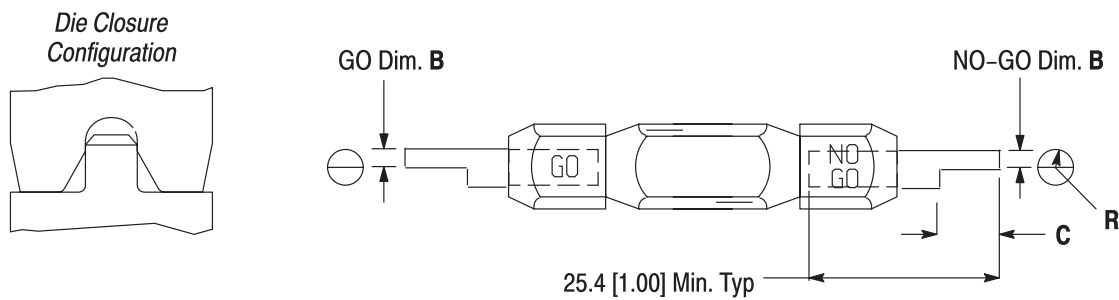
If the crimping chamber conforms to the gage inspection, the dies are considered dimensionally correct and should be lubricated with a thin coat of any good SAE 20 motor oil. If not, the dies must be replaced or repaired before returning them to service.

For additional information concerning the use of the plug gage, refer to Instruction Sheet 408–7424.

**Inspection of Wire Barrel Crimping Chamber**



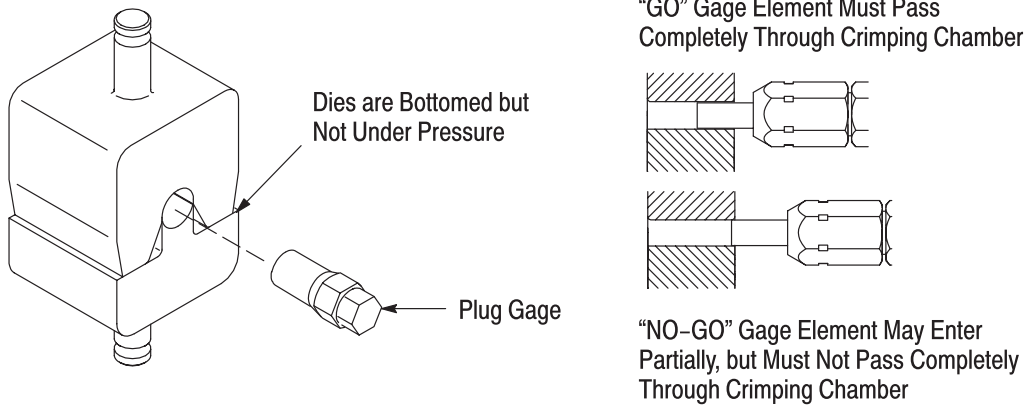
**Suggested Plug Gage Design — Wire Barrel Crimping Chamber**



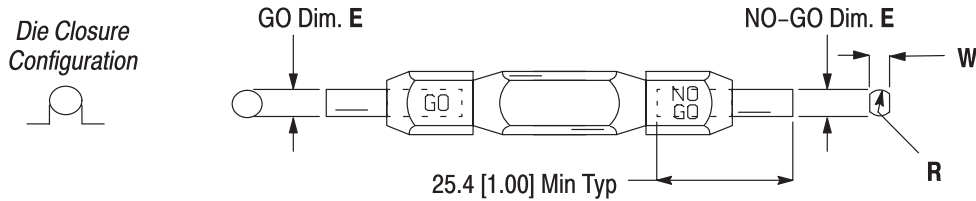
DIE ASSEMBLY	GAGE ELEMENT DIM. B		DIM. C	“R” (Radius) (Max)
	GO	NO-GO		
59877-1	7.518-7.526 [.2960-.2963]	7.769-7.772 [.3059-.3060]	9.91 [.390]	7.62 [.300]
68006	2.870-2.877 [.1130-.1133]	3.045-3.048 [.1199-.1200]	6.35 [.250]	3.16 [.125]
68007	3.200-3.208 [.1260-.1263]	3.375-3.378 [.1329-.1330]	6.35 [.250]	3.556 [.140]
68008 68008-1	3.937-3.944 [.1550-.1553]	4.112-4.114 [.1619-.1620]	6.35 [.250]	4.34 [.171]
68009	5.003-5.011 [.1970-.1973]	5.179-5.181 [.2039-.2040]	9.91 [.390]	5.54 [.218]
68010	6.197-6.205 [.2440-.2443]	6.372-6.375 [.2509-.2510]	9.91 [.390]	6.73 [.265]
68010-2	6.579-6.586 [.2590-.2593]	6.754-6.756 [.2659-.2660]	9.91 [.390]	6.73 [.265]
68011-1	7.924-7.932 [.3120-.3123]	8.100-8.102 [.3189-.3190]	9.91 [.390]	7.52 [.296]
314948-1	9.550-9.558 [.3760-.3763]	9.802-9.804 [.3859-.3860]	9.91 [.390]	8.13 [.320]
314964-1	10.922-10.930 [.4300-.4303]	11.097-11.100 [.4369-.4370]	9.91 [.390]	7.52 [.296]
1976441-1	7.924-7.932 [.3120-.3123]	8.100-8.102 [.3189-.3190]	9.91 [.390]	7.52 [.296]
1976442-1	7.518-7.526 [.2960-.2963]	7.769-7.772 [.3059-.3060]	9.91 [.390]	7.62 [.300]
1976443-1	9.550-9.558 [.3760-.3763]	9.802-9.804 [.3859-.3860]	9.91 [.390]	8.13 [.320]

Figure 6 (Cont'd)

**Inspection of Insulation Sealing Crimping Chamber**



**Suggested Plug Gage Design — Insulation Sealing Crimping Chamber**



DIE ASSEMBLY	GAGE ELEMENT DIM. E		DIM. W (Max)	“R” (Radius) (Max)
	GO	NO-GO		
59877-1	16.205-16.213 [.6380-.6383]	16.609-16.612 [.6539-.6540]	16.15 [.636]	8.08 [.318]
68006	6.248-6.256 [.2460-.2463]	6.652-6.665 [.2619-.2620]	6.20 [.244]	3.10 [.122]
68007	7.518-7.526 [.2960-.2963]	7.922-7.925 [.3119-.3120]	7.47 [.294]	3.73 [.147]
68008 68008-1	9.195-9.202 [.3620-.3623]	9.599-9.601 [.3779-.3780]	9.14 [.360]	4.57 [.180]
68009	11.379-11.387 [.4480-.4483]	11.783-11.786 [.4639-.4640]	11.33 [.446]	5.66 [.223]
68010 68010-2	13.818-13.825 [.5440-.5443]	14.221-14.224 [.5599-.5600]	13.77 [.542]	6.88 [.271]
68011-1	15.037-15.044 [.5920-.5923]	15.441-15.443 [.6079-.6080]	14.99 [.590]	7.49 [.295]
314948-1	16.205-16.213 [.6380-.6383]	16.609-16.612 [.6539-.6540]	16.15 [.636]	8.08 [.318]
314964-1	15.037-15.044 [.5920-.5923]	15.441-15.443 [.6079-.6080]	14.99 [.590]	7.49 [.295]
1976441-1	15.037-15.044 [.5920-.5923]	15.441-15.443 [.6079-.6080]	14.99 [.590]	7.49 [.295]
1976442-1	16.205-16.213 [.6380-.6383]	16.609-16.612 [.6539-.6540]	16.15 [.636]	8.08 [.318]
1976443-1	16.205-16.213 [.6380-.6383]	16.609-16.612 [.6539-.6540]	16.15 [.636]	8.08 [.318]

Figure 6 (End)

**6. REPLACEMENT AND REPAIR**

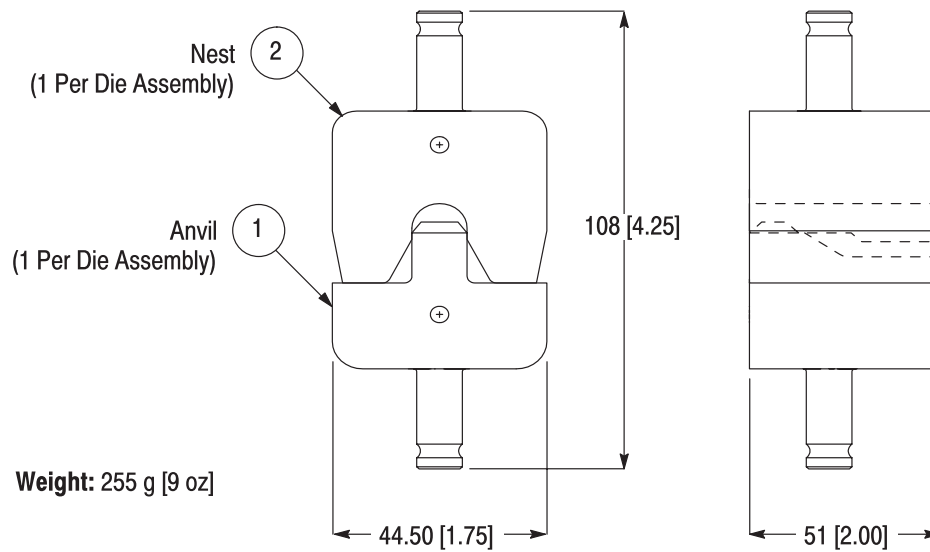
Parts listed in Figure 7 are customer- replaceable. A complete inventory can be stocked and controlled to prevent lost time when replacement of parts is necessary. Order replacement parts through your representative, or call 1-800-526-5142, or send a facsimile of your purchase order to 1-717-986-7605,

or write to:

CUSTOMER SERVICE (38-35)  
 TYCO ELECTRONICS CORPORATION  
 PO BOX 3608  
 HARRISBURG, PA 17105-3608

Dies may also be returned for evaluation and repair. For die repair service, call 1-800-526-5136.





**REPLACEMENT PARTS**

ITEM	DIE ASSEMBLY									
	59877-1	68006	68007	68008	68009	68010	68010-2	68011-1	314948-1	314964-1
1	312309-9	312309-1	312309-2	312309-3	312309-4	1-312309-0	1-312309-1	312309-7	314951-1	314965-1
2	307465-9	307465-1	307465-2	307465-3	307465-4	307465-5	307465-5	307465-7	307465-9	307465-7

ITEM	DIE ASSEMBLY			
	1976441-1	1976442-1	1976443-1	68008-1
1	1-312309-2	1-312309-3	314951-2	1-312309-4
2	1-307465-1	1-307465-2	1-307465-2	1-307465-3

Figure 7

**7. REVISION SUMMARY**

Revisions to this instruction sheet include:

- Updated document to corporate requirements
- Added part number 68008-1 in tables in Figures 1, 2, 6, and 7