

| CRIMPING DIE ASSEMBLY | HYDRAULIC CRIMPING HEAD (Instruction Sheet) |
|--|--|
| 68006-3, 4 68007-3, 4 68008-3, 4 68009-3, 4 68010-3, 4 | 69066 (408-2453) 58422-1 (408-9535) 1752787-1 (408-8914) 1752877-1 (408-8956) |
| 59877-3, 4 68011-3, 4 314948-3, 4 | 58422-1 (408-9535) 1752787-1 (408-8914) |

Figure 1

1. INTRODUCTION

The crimping die assemblies are designed to be installed into the hydraulic crimping heads listed in Figure 1 and are used to crimp pre-lubed COPALUM Lite sealed terminals and splices identified in Figure 2 and Figure 3. The supports are designed to minimize crimp barrel and wire angle after crimping.

Read these instructions thoroughly before crimping any terminals or splices.

Reasons for reissue of this instruction sheet are provided in Section 8, REVISION SUMMARY.



NOTE

Dimensions in this instruction sheet are in millimeters [with inches in brackets]. Illustrations and figures are for reference only and are not drawn to scale.

2. DESCRIPTION [FIGURE 1]

Each crimping die assembly consists of a stationary die (nest), a moving die (anvil), a nest wire support, and an anvil wire support.

Additionally, Die Sets 59877-3, 68009-3, 68010-3, 68011-3, and 314948-3 utilize an anvil tongue support

NOTE: The anvil tongue support is not used with Die Sets 68006-3, 68007-3, and 68008-3.

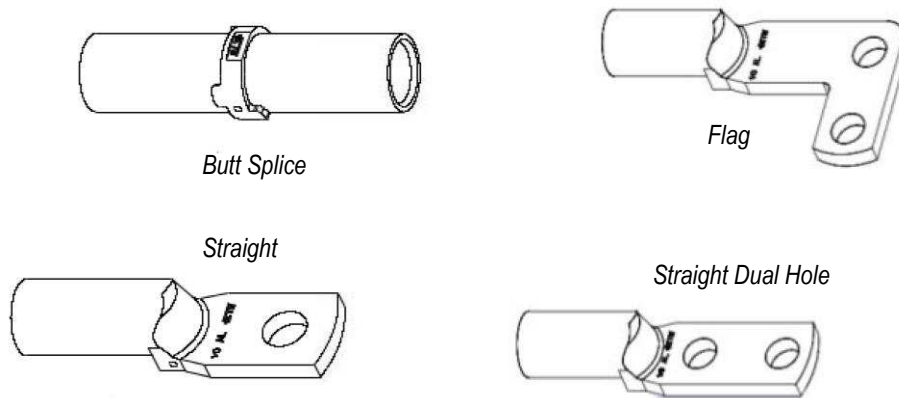


Figure 2

3. INSTALLATION

3.1. Support(s)



DANGER

To avoid personal injury, install the supports on the die outside of the crimping head. ALWAYS DISCONNECT electrical and air supply to the power unit before installing the hydraulic crimping head or supports.

The supports can be placed on the dies and removed as needed.

Each support is keyed to fit only where it is intended. To install a support, align the pins on the support with the pin holes on the die and tighten the support mounting screw. To remove a support, fully loosen the support mounting screw and pull the support away from the die.



DANGER

Installing the supports on dies will extend the pinch areas of the dies. BE SURE to keep hands and fingers clear of the supports while crimping. If necessary, use soft jaw pliers to grip the terminal tongue being careful not to impart damage.

3.2. Die Assembly

For information concerning die installation and general performance of the hydraulic crimping head, refer to the instruction sheet packaged with the crimping head.



DANGER

To avoid personal injury, ALWAYS DISCONNECT electrical and air supply to power unit before installing the hydraulic crimping head or die assembly.

In order to achieve proper mating of the dies during installation, ensure that:

- The shanks of the dies are offset to the same surface of the die, but that the alignment dots align and face the operator.
- The anvil moves and the nest is stationary.



CAUTION

DO NOT mix dies from different die assemblies (because of inconsistent wearing) – it is important that the dies are used as the set.



DANGER

To avoid personal injury, make sure to close the yoke of the hydraulic crimping 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 die assembly.

4. CRIMPING

4.1. Selection

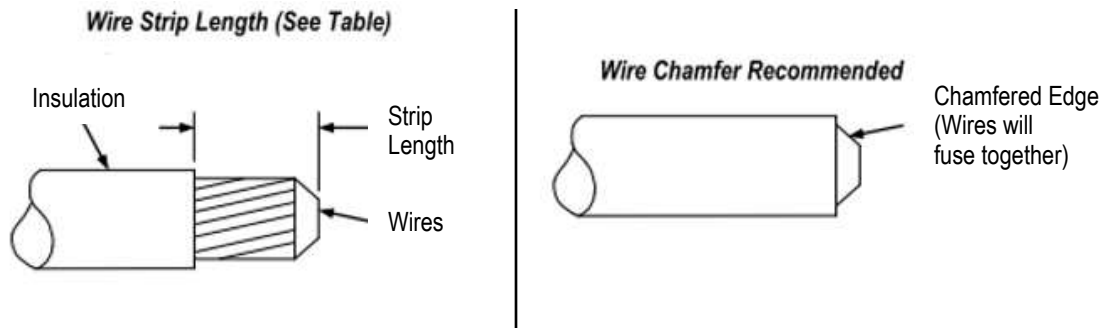
1. Refer to Figure 3 and select the appropriate die assembly and terminal or splice according to the wire.



NOTE

Butt splices will accept the same wire size at either end.

2. Cut the end of the wire perpendicular to the wire; the shape of the wire may be distorted, but can be formed back into a circular shape.
3. Strip the wire according to the Application Specification [114-32098](#). DO NOT nick or cut the wire strands.



| TERMINAL (RT) | | | BUTT SPICE (BS) | WIRE | | | | | DIE ASSEMBLY | CRIMPING HEAD |
|--------------------------|-------------|----------------------------------|-----------------|-----------------|-----|-----------------|-----------------------------|-------------------------------|-----------------------|--|
| SINGLE HOLE | DOUBLE HOLE | BENT | | ALUMINUM | | | INSULATION RANGE | STRIP LENGTH ±1.57 [.062 in.] | | |
| | | | | mm ² | AWG | CMA | | | | |
| 2102568-[] | --- | --- | 2226092-[] | 8.6 | 8 | 15526 - 16564 | 4.62 - 6.45 (.182 - .254) | 12.70 [.500] | 68006-3Δ * 68006-4 | 58422-1 69066 1752787-1 1752877-1 |
| 2102569-[] | 2102577-[] | --- | 2226080-[] | 14.6 | 6 | 26818 - 28281 | 5.72 - 7.57 (.225 - .298) | 12.70 [.500] | 68007-3Δ* 68007-4 | |
| 2102570-[] | 2102578-[] | --- | 2226093-[] | 21.9 | 4 | 42143 - 43229 | 7.01 - 9.04 (.276 - .356) | 16.51 [.650] | 68008-3Δ* 68008-4 | |
| 2102571-[] | 2102579-[] | --- | 2226081-[] | 35 | 2 | 65130 - 67874 | 8.64 - 10.59 (.340 - .417) | 20.32 [.800] | 68009-3Δ 68009-4 | |
| 2102572-[] | 2102580-[] | 2487149-[] 30° 2487151-[] 10° | 2226082-[] | 55.5 | 1/0 | 104450 - 107464 | 10.79 - 13.03 (.425 - .513) | 20.32 [.800] | 68010-3Δ 68010-4 | |
| 2102573-[] 2340362-[] | 2102581-[] | 2487145-[] 30° 2487147-[] 10° | 2226083-[] | 71.3 | 2/0 | 134292 - 138168 | 12.45 - 14.58 (.490 - .574) | 20.32 [.800] | 68011-3Δ 68011-4 | 58422-1 1752787-1 |
| 2102574-[] 2340364-[] | 2102582-[] | --- | 2226084-[] | 87.2 | 3/0 | 168872 - 172512 | 13.21 - 16.38 (.520 - .645) | 20.32 [.800] | 59877-3Δ 59877-4 | |
| 2102575-[] 2340367-[] | 2102583-[] | --- | 2226085-[] | 110.94 | 4/0 | 201438 - 214928 | 14.99 - 17.35 (.590 - .683) | 20.32 [.800] | 314948-3Δ 314948-4 | |

Δ Die Assembly with Straighteners. Remove straighteners to crimp splices and bent terminals.

*These die sets only have wire straighteners.

For Butt splice 2 AWG thru 4/0 can use (-3) die sets with terminal straighteners removed.

Figure 3 (continued)

| Flag Terminal | | Wire | | | | | Die Assembly | Crimping Head |
|---------------|-----------|-----------------|-----|-----------------|--------------------------------|---------------------------------|-----------------------|------------------------|
| Straight | 90° Bend | Aluminum | | | Insulation Range | Strip Length +/-1.57 [.062 in.] | | |
| | | mm ² | AWG | CMA | | | | |
| 2102964-1 | 2102972-1 | 35 | 2 | 65130 - 67874 | 8.64 - 10.59 [.340 - .417] | 20.32 [.800] | 68009-3Δ 68009-4 | 58422-1 69066 |
| 2102965-1 | 2102973-1 | 55.5 | 1/0 | 104450 – 107464 | 10.79 - 13.03 [.425 - .513] | 20.32 [.800] | 68010-3Δ 68010-4 | 1752787-1 1752877-1 |
| 2102966-1 | 2102974-1 | 71.3 | 2/0 | 134292 – 138168 | 12.45 - 14.58 [.490 - .574] | 20.32 [.800] | 68011-3Δ 68011-4 | 58422-1 |
| 2102968-1 | 2102976-1 | 110.94 | 4/0 | 201438 - 214928 | 14.99 - 17.35 [.590 - .683] | 20.32 [.800] | 314948-3Δ 314948-4 | 1752787-1 |

Δ Die Assembly with Straighteners. Remove straighteners to crimp 90° bend parts.

Figure 3 (end)

4.2. Procedure

There are two approved methods for crimping the terminals and splices using these die assemblies and hydraulic crimping heads when NOT using the spring-loaded tongue support.

A. Terminals



NOTE

To ensure a quality crimp, gage the die assembly at the beginning of a run, after changing a die assembly — and then periodically during the run. Refer to Paragraph 6.2 for gaging instructions.



NOTE

Terminals are pre-lubed to reduce sticking of the terminal in the dies.

1. **The first (preferred) method is:**

- a. Insert the properly stripped wire fully into the wire barrel of the terminal. Ensure there are no exposed strands.



CAUTION

AVOID moving the wire IN ANY WAY once it is inserted, otherwise the result may be an improperly terminated wire.

- b. Position the terminal in the stationary die (nest) with the locating shoulder of the tongue resting against the die, with the crimping head yoke closed and pin fully inserted.

BE SURE to align the terminal tongue using the scribe lines on the nest. See Figure 4.



NOTE

Make sure the terminal is positioned so the crimper of the moving die (anvil) will crimp the wire barrel of the terminal.

NOTE: This view is for 59877-3, 68009-3, 68010-3, 68011-3, and 314948-3 only.

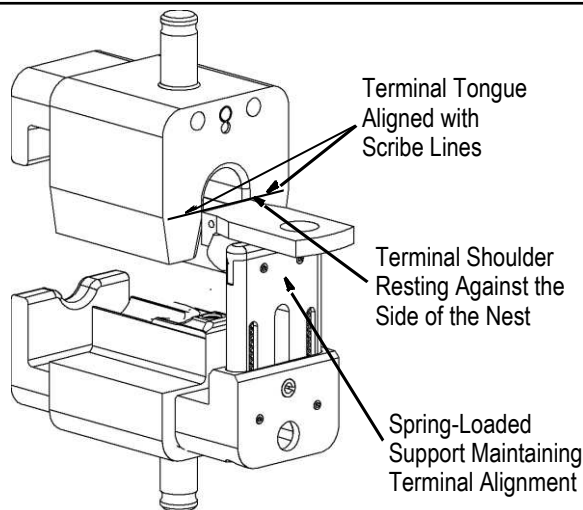


Figure 4

- c. Holding the wire in place and fully inserted, activate the power unit to complete the crimp.
- d. Remove the crimped terminal from the die assembly.

**NOTE**

If the terminal sticks in the die after crimping, apply a rocking action to remove it from the die. Initial force required to break loose or release terminal from the die will be higher with clean or new dies. It is acceptable to add spray dry lubricant to die set to reduce initial force of removing crimped terminal.

2. The second (alternate) method is:**NOTE**

This method is only slightly different than the first (preferred) method. The difference is when the wire is inserted into the wire barrel.

- a. Position the terminal in the stationary die (nest) with the locating shoulder of the tongue resting against die, with the crimping head yoke closed and pin fully inserted.

BE SURE to align the terminal tongue using the scribe lines on the nest.

**NOTE**

Make sure the terminal is positioned so the crimper of the moving die (anvil) will crimp the wire barrel of the terminal. See Figure 4.

- b. Jog the power unit to advance the ram to hold the terminal in place. Make sure not to deform the wire barrel; otherwise, it may be difficult to insert the wire into the wire barrel of the terminal.
- c. Insert the properly stripped wire fully into the wire barrel of the terminal. Ensure there are no exposed strands.

**CAUTION**

AVOID moving the wire IN ANY WAY once it is inserted, otherwise the result may be an improperly terminated wire.

- d. Holding the wire in place and fully inserted, activate the power unit to complete the crimp.
- e. Remove the crimped terminal from the die assembly.

**NOTE**

If the terminal sticks in the die after crimping, apply a rocking action to remove it from the die. Initial force required to break loose or release terminal from the die will be higher with clean or new dies. It is acceptable to add spray dry lubricant to die set to reduce initial force of removing crimped terminal.

3. When using the spring-loaded tongue support, proceed as follows:**CAUTION**

Make sure the yoke is closed, and the yoke pin is fully inserted before crimping. If the yoke is open or the pin is not fully inserted, the crimping motion may damage the dies and crimping head.

- a. Pull the yoke pin and open the yoke on the crimping head.
- b. Insert the properly stripped wire fully into the wire barrel of the terminal. Ensure there are no exposed strands.

**CAUTION**

AVOID moving the wire IN ANY WAY once it is inserted, otherwise the result may be an improperly terminated wire.

- c. Position the terminal in the stationary die (nest) and align the terminal tongue with the scribe lines.
- d. Pivot the crimping head yoke closed while maintaining the position of the terminal. The terminal tongue will contact the spring-loaded support.
- e. Replace the yoke pin and make sure it is fully inserted.
- f. Recheck the alignment of the terminal, make sure the terminal locating shoulder is resting against the side of the stationary die (nest), and make sure the wire is fully inserted into the terminal.
- g. Make sure hands and fingers are clear of the die and supports.
- h. Holding the wire in place and fully inserted, activate the power unit to complete the crimp.

- i. Remove the crimped terminal from the die assembly.



NOTE

If the terminal sticks in the die after crimping, apply a rocking action to remove it from the die. Initial force required to break loose or release terminal from the die will be higher with clean or new dies. It is acceptable to add spray dry lubricant to a clean or new die to reduce initial force of removing crimped terminal.

B. Splice



NOTE

To ensure a quality crimp, gage the die assembly at the beginning of a run, after changing a die assembly — and then periodically during the run. Refer to Paragraph 6.2 for gaging instructions.



CAUTION

Remove the tongue straighteners from the dies before crimping the splices.

1. The first (preferred) method is:

- a. Insert the properly stripped wire fully into the wire barrel of the splice. Ensure that there are no exposed strands.



CAUTION

AVOID moving the wire IN ANY WAY once it is inserted, otherwise the result may be an improperly terminated wire.

- b. Position the splice in the stationary die (nest) with the splice shoulder resting against the side of the die. Orient the part marking as shown in Figure 5.



NOTE

Make sure the splice is properly aligned in the stationary die (nest) so the moving die (anvil) will crimp the wire barrel of the splice.

CAUTION: Tongue Straighteners must be removed in order to crimp splices and 90 degree Bent Flag terminals.

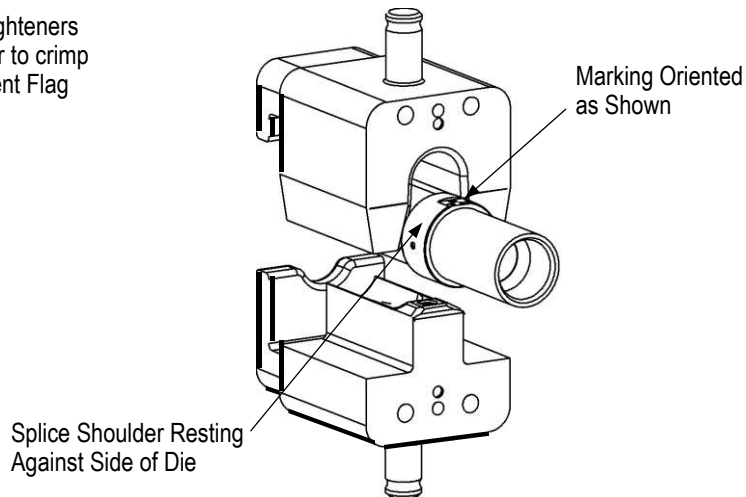


Figure 5

- c. Holding the wire in place, activate the power unit to complete the first wire barrel crimp.
- d. When the first wire barrel crimp is completed, remove the crimping head pin, open the yoke, and remove the splice.
- e. To crimp the other wire barrel of the splice:
 - (1) First close the yoke and replace the yoke pin.
 - (2) Rotate the splice or crimping head 180 degrees and position the splice in the stationary die (nest) with the splice shoulder of the uncrimped portion resting against the side of the die.
 - (3) Orient the part marking as shown in Figure 5.
 - (4) Follow the same steps used to crimp the first wire barrel (Step a through Step d).

2. The second (alternate) method is:



NOTE

This method is only slightly different than the first (preferred) method. The difference is when the wire is inserted into the wire barrel.

- a. Position the splice in the stationary die (nest) with the splice shoulder resting against the side of the die. Orient the part marking as shown in Figure 5.
- b. Jog the power unit to advance the ram to hold the splice in place. Make sure not to deform the wire barrel; otherwise, it may be difficult to insert the wire into the wire barrel of the splice.
- c. Insert the properly stripped wire fully into wire barrel of the splice. Ensure that there are no exposed strands.



CAUTION

AVOID moving the wire IN ANY WAY once it is inserted, otherwise the result may be an improperly terminated wire.

- d. Holding the wire in place, activate the power unit to complete the other wire barrel crimp.
- e. When the wire barrel crimp is completed, remove the crimping head pin, open yoke, and remove the splice.
- f. To crimp the other wire barrel of the splice:
 - (1) First close the yoke and replace the yoke pin.
 - (2) Rotate the splice or crimping head 180 degrees and position the splice in the stationary die (nest) with the splice shoulder of the uncrimped portion resting against the side of the head.
 - (3) Orient the part marking as shown in Figure 5.
 - (4) Follow the same steps used to crimp the first wire barrel (Step a through Step e).

5. CRIMP INSPECTION

Refer to Application Specification [114-32098](#) for detailed criteria to check that the crimp is applied properly.

The crimp inspection mark (created by the die assembly) on the terminal or splice can be used as a visual indicator of an acceptable termination, but it does not indicate that the crimp is not acceptable. If the crimp inspection mark is centered in the crimp area and is evenly and distinctly formed, the crimp is considered properly applied; however, if it is not:

- Refer to Figure 3 to verify that the proper terminal or splice and die combination according to the wire size was used,
- Verify that the dies fully bottom during the crimp cycle, and
- Ensure that the die assembly is dimensionally correct as specified in Paragraph 6.2.

6. MAINTENANCE AND INSPECTION

Each die assembly is 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 the customer drawings and that it has not been damaged during shipment.

6.1. Daily

Each operator of the power unit must be made aware of - and responsible for - the following 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. When the dies are not in use, mate them and store in a clean dry area.

6.2. Gaging the Die Assembly



NOTE

It is highly recommended to gage the die assembly at the beginning of a run, after changing a die assembly — and then periodically during the run.



NOTE

Be sure to remove the supports prior to gaging the die assemblies.

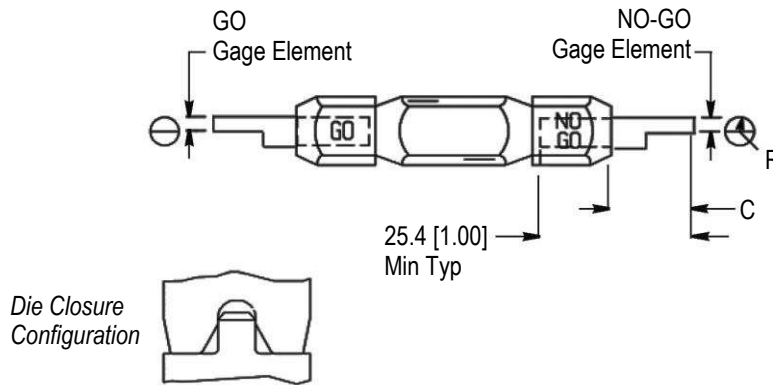


NOTE

Gages can be purchased from: Pennoyer-Dodge Company, 6650 San Fernando Road, Glendale, CA 91201, (e-mail sales@pdgage.com).

1. Verify that the plug gages to be used to inspect the wire barrel section and insulation sealing section of the crimping chamber conform to the measurements provided in Figure 6 and Figure 7.

Suggested Plug Gage Design for Wire Barrel Section of Crimping Chamber

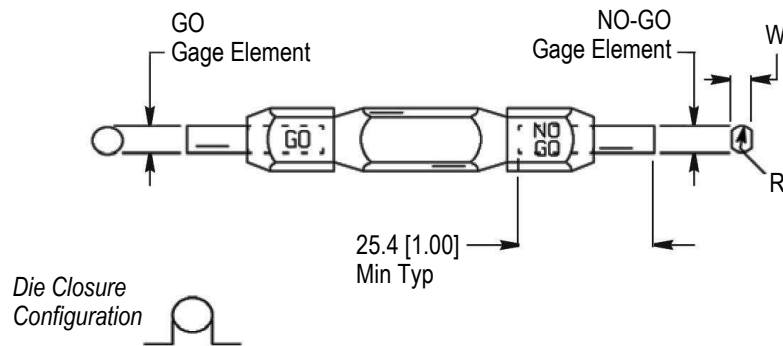


| DIE ASSEMBLY■ | GAGE ELEMENT | | C (EXPOSED LENGTH) | R RADIUS (MAX) |
|---------------|---------------------------|---------------------------|--------------------|----------------|
| | GO | NO-GO | | |
| 59877-3, 4 | 7.518-7.526 [.2960-.2963] | 7.769-7.772 [.3059-.3060] | 9.91 [.390] | 7.62 [.300] |
| 68006-3, 4 | 2.870-2.877 [.1130-.1133] | 3.045-3.048 [.1199-.1200] | 6.35 [.250] | 3.18 [.125] |
| 68007-3, 4 | 3.200-3.208 [.1260-.1263] | 3.375-3.378 [.1329-.1330] | 6.35 [.250] | 3.556 [.140] |
| 68008-3, 4 | 3.937-3.944 [.1550-.1553] | 4.112-4.114 [.1619-.1620] | 6.35 [.250] | 4.34 [.171] |
| 68009-3, 4 | 5.003-5.011 [.1970-.1973] | 5.179-5.181 [.2039-.2040] | 9.91 [.390] | 5.54 [.218] |
| 68010-3, 4 | 6.197-6.205 [.2440-.2443] | 6.372-6.375 [.2509-.2510] | 9.91 [.390] | 6.73 [.265] |
| 68011-3, 4 | 7.924-7.932 [.3120-.3123] | 8.100-8.102 [.3189-.3190] | 9.91 [.390] | 7.52 [.296] |
| 314948-3, 4 | 9.550-9.558 [.3760-.3763] | 9.802-9.804 [.3859-.3860] | 9.91 [.390] | 8.13 [.320] |

■ Gages are for all die sets with or without straighteners.

Figure 6

Suggested Plug Gage Design for Insulation Sealing Section of Crimping Chamber



| DIE ASSEMBLY■ | GAGE ELEMENT | | W TIP WIDTH (MAX) | R RADIUS (MAX) |
|---------------|-----------------------------|-----------------------------|-------------------|----------------|
| | GO | NO-GO | | |
| 59877-3, 4 | 16.256-16.264 [.6400-.6403] | 16.558-16.561 [.6519-.6520] | 16.15 [.636] | 8.08 [.318] |
| 68006-3, 4 | 6.299-6.307 [.2480-.2483] | 6.601-6.604 [.2599-.2600] | 6.20 [.244] | 3.10 [.122] |
| 68007-3, 4 | 7.569-7.577 [.2980-.2983] | 7.871-7.874 [.3099-.3100] | 7.47 [.294] | 3.73 [.147] |
| 68008-3, 4 | 9.246-9.253 [.3640-.3643] | 9.548-9.550 [.3759-.3760] | 9.14 [.360] | 4.57 [.180] |
| 68009-3, 4 | 11.430-11.438 [.4500-.4503] | 11.732-11.735 [.4619-.4620] | 11.33 [.446] | 5.66 [.223] |
| 68010-3, 4 | 13.868-13.876 [.5460-.5463] | 14.171-14.173 [.5579-.5580] | 13.77 [.542] | 6.88 [.271] |
| 68011-3, 4 | 15.088-15.095 [.5940-.5943] | 15.390-15.392 [.6059-.6060] | 14.99 [.590] | 7.49 [.295] |
| 314948-3, 4 | 16.256-16.264 [.6400-.6403] | 16.558-16.561 [.6519-.6520] | 16.15 [.636] | 8.08 [.318] |

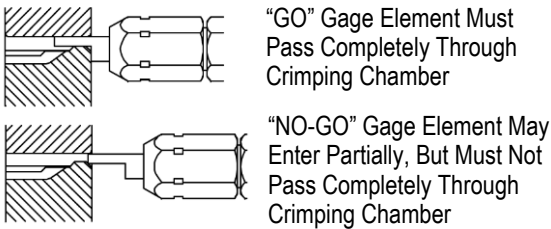
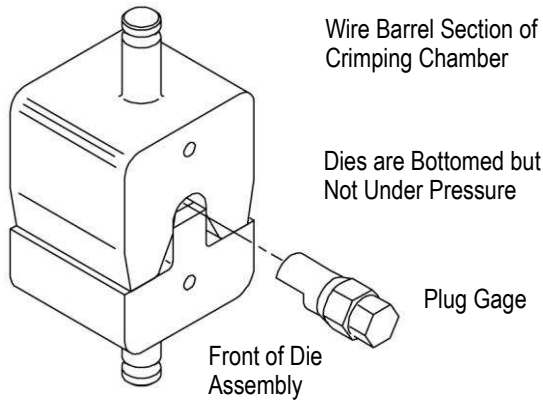
■ Gages are for all die sets with or without straighteners.

Figure 7

2. Inspect the wire barrel section and insulation sealing section, as follows:
 - a. Mate the dies until it is evident that they have bottomed. Hold the dies in this position.
 - b. Align the GO element of the plug gage with the crimping chamber. Push the element straight into the crimping chamber as shown in Figure 8. The GO element must pass completely through the crimping chamber.
 - c. Align the NO-GO element with the crimping chamber and try to insert it straight into the crimping chamber. The NO-GO element may start entry, but must not pass completely through as shown in Figure 8.

If the crimping chamber conforms to the gage inspection, the die assembly is considered dimensionally correct. If not, the die assembly must be replaced.

**Inspection of
Wire Barrel Section of Crimping Chamber**



**Inspection of
Insulation Sealing Section of Crimping Chamber**

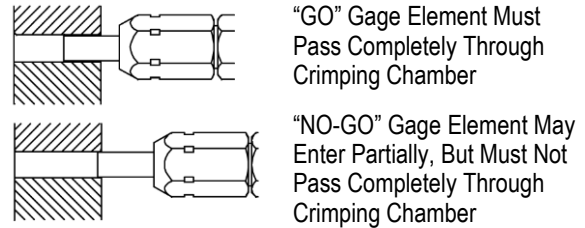
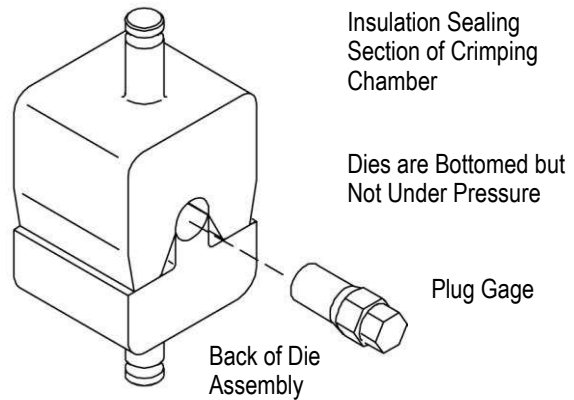


Figure 8

6.3. Periodic

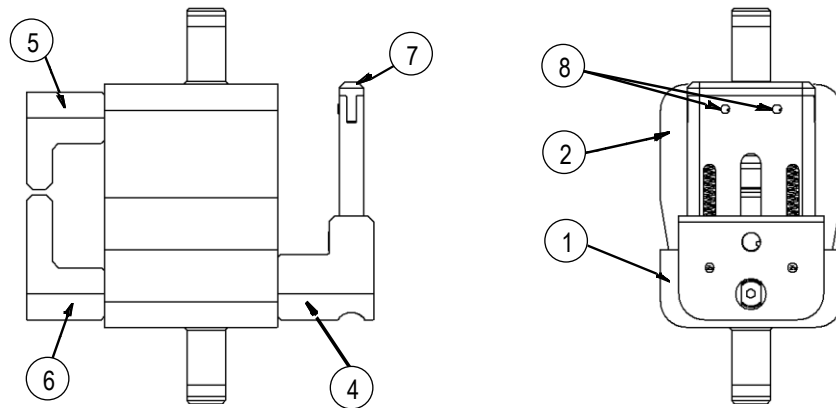
Regular inspections should be performed by quality control personnel. A record of scheduled inspections should remain with the dies and/or be supplied to personnel responsible for the dies. Although recommendations call for at least one inspection a month, the inspection frequency should be based on the amount of use, ambient working conditions, operator training and skill, and established company standards. This inspection should be performed as follows:

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 die assembly must be replaced.

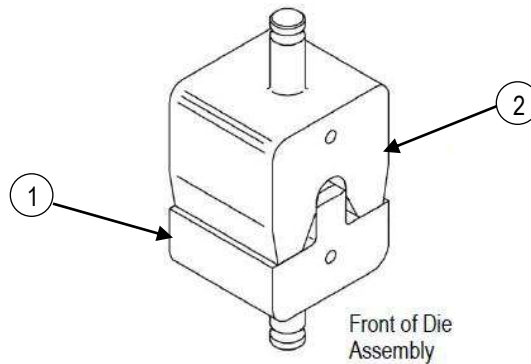
7. REPLACEMENT AND REPAIR

Order die assemblies (see Figure 9) through your TE Representative, or call 1-800-526-5142, or write to:

CUSTOMER SERVICE (038-035)
 TE CONNECTIVITY CORPORATION
 PO BOX 3608
 HARRISBURG PA 17105-3608



| Item | Die Assembly with Straighteners | | | | | | | |
|------|---------------------------------|------------|------------|------------|------------|------------|------------|------------|
| | 68006-3 | 68007-3 | 68008-3 | 68009-3 | 68010-3 | 68011-3 | 59877-3 | 314948-3 |
| 1 | 2-312309-0 | 2-312309-1 | 2-312309-2 | 2-312309-3 | 2-312309-4 | 2-312309-5 | 2-312309-6 | 314951-3 |
| 2 | 2-307465-0 | 2-307465-1 | 2-307465-2 | 2-307465-3 | 2-307465-4 | 2-307465-5 | 2-307465-6 | 2-307465-6 |
| 4 | --- | --- | --- | 2217326-4 | 2217326-5 | 2217326-6 | 2217326-7 | 2217326-8 |
| 5 | 2217323-1 | 2217323-2 | 2217323-3 | 2217323-4 | 2217323-5 | 2217323-6 | 2217323-7 | 2217323-7 |
| 6 | 2217324-1 | 2217324-2 | 2217324-3 | 2217324-4 | 2217324-5 | 2217324-6 | 2217324-7 | 2217324-8 |
| 7 | --- | --- | --- | 2217998-1 | 2217998-1 | 2217998-1 | 2217998-1 | 2217998-1 |
| 8 | --- | --- | --- | 3-21028-2 | 3-21028-2 | 3-21028-2 | 3-21028-2 | 3-21028-2 |



| Item | Die Assembly without Straighteners | | | | | | | |
|------|------------------------------------|----------|------------|----------|----------|----------|----------|----------|
| | 68006-4 | 68007-4 | 68008-4 | 68009-4 | 68010-4 | 68011-4 | 59877-4 | 314951-4 |
| 1 | 312309-1 | 312309-2 | 1-312309-4 | 312309-4 | 312309-5 | 312309-7 | 312309-9 | 314951-1 |
| 2 | 307465-1 | 307465-2 | 1-307465-3 | 307465-4 | 307465-5 | 307465-7 | 307465-9 | 307465-9 |

Figure 9

8. REVISION SUMMARY

- Added new column (Bent) in Figure 3 on page 3.