

All illustrations and information contained in this instruction sheet are based on the latest product information available at the time of publication.

**1. INTRODUCTION**

This instruction sheet provides "Instructions" on product application and a "Maintenance and Inspection Procedure" for:

INSULATION PIERCING COPALUM * TERMINAL AND SPlice CRIMPING JAWS (USED IN PNEUMATIC TOOL NO. 68068, 68068-1, & 68068-3)		
68100 Mod. C	68102 Mod. E	68192-1 Mod. A
68101 Mod. D	68118-1 Mod. A	68364-1

These crimping jaws are used to crimp:  
 •COPALUM terminals and splices on No. 20 thru 6 film insulated solid aluminum or copper wire or stranded copper wire.  
 NOTE: Do not use stranded aluminum wire.

Basic instructions on the use of these jaws, wire preparation, etc. are provided in Section 2, "Instructions". Section 3 features a terminal or splice "Crimp Inspection" procedure. Section 4 contains a "Maintenance and Inspection Procedure" which will enable you to establish and maintain a tool certification program.

Crimping jaws are coated with preservative to prevent rust and corrosion. Wipe this preservative from jaws, particularly from crimping surfaces.

For further instructions relative to the 68068, 68068-1, and 68068-3 tools, refer to instructions packaged with the tools.

**2. INSTRUCTIONS**

**WARNING: AVOID PERSONAL INJURY. KEEP FINGERS CLEAR OF CRIMPING JAWS WHEN ACTIVATING TOOL.**

**2.1 INSTALL CRIMPING JAWS**

- (a) Select the correct jaw set for the wire size being used. Wire range or size and the insulation piercing crimp symbol (▲) appear on one jaw as shown in Figure 1.
- (b) Inspect the die closure surfaces, bottoming surfaces and cam rollers for deposits of dirt or other foreign particles and wipe with a clean cloth. See Figure 2. Relubricate cam rollers as instructed in paragraph 4.3. NOTE: Be sure cam rollers are not binding.
- (c) DISCONNECT TOOL FROM AIR SUPPLY.
- (d) Pull one cowling pin and remove retaining pin from lower housing cover. Cover will swing open. See Figure 2.
- (e) Remove pivot pins as shown in Figure 2.
- (f) Position jaw with locators on bottom as shown in Figure 2.
- (g) Position crimping jaws in tool housing ensuring that cam rollers are properly mated with cam, and pivot pin holes of jaws and tool housing are aligned.
- (h) Insert pivot pins.
- (i) Pivot lower housing cover into closed position and replace retaining pin and cowling pin.
- (j) Connect air supply (80 to 100 PSI) and tool is ready for use.

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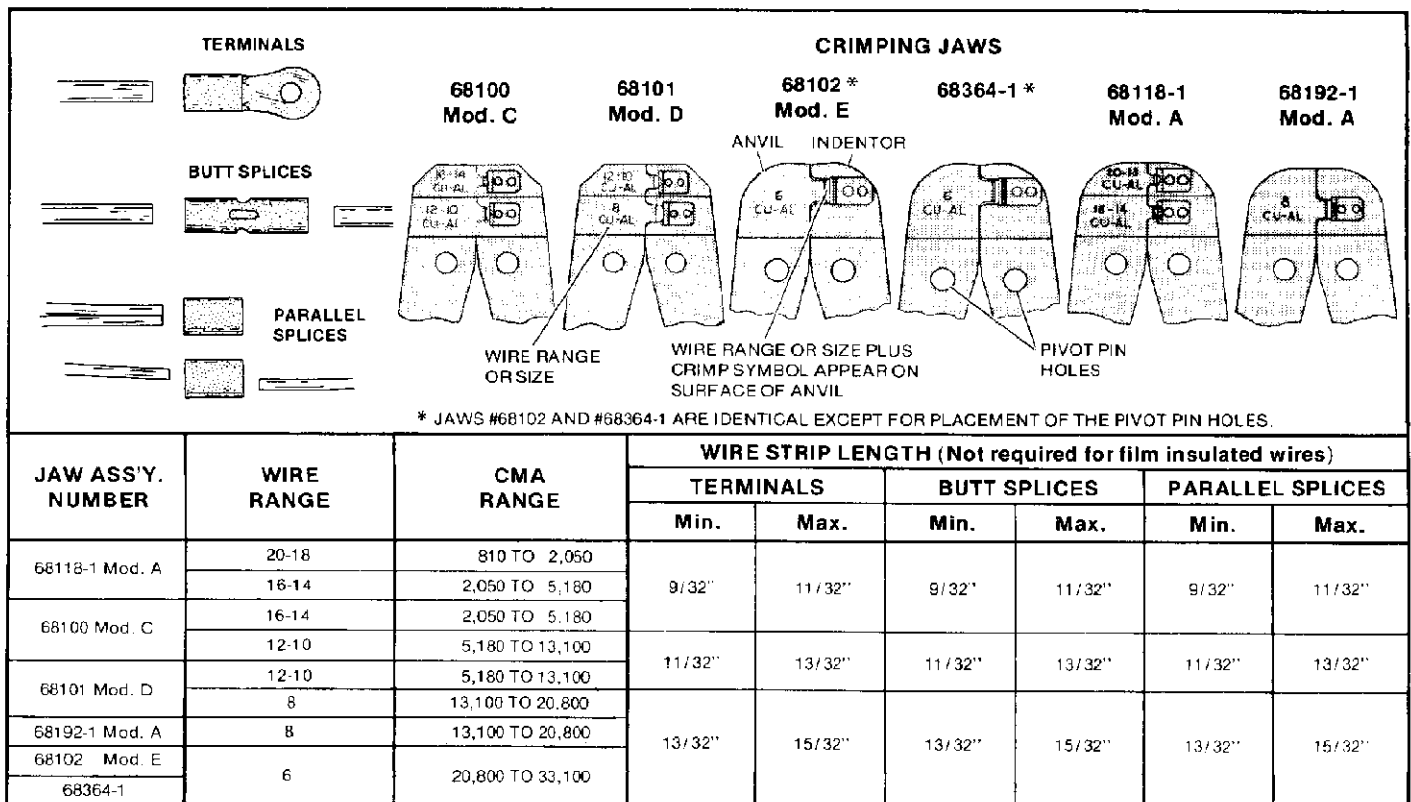


Figure 1

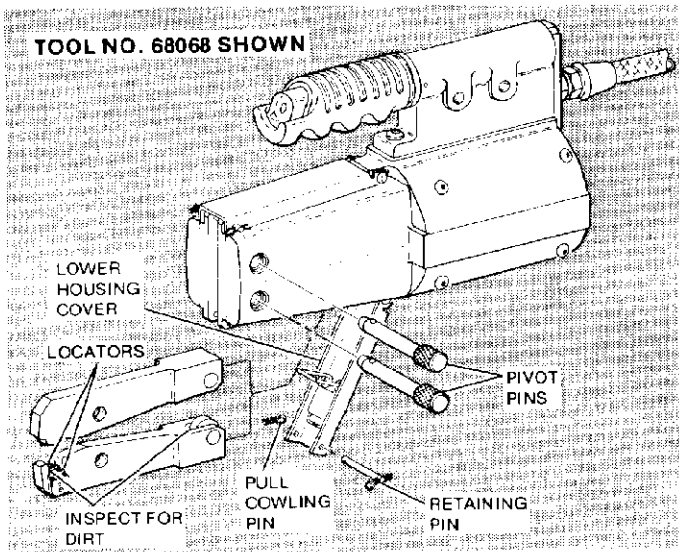


Figure 2

## 2.2 REMOVE CRIMPING JAWS

- DISCONNECT TOOL FROM AIR SUPPLY.
- Pull cowling pin and remove retaining pin from lower housing cover. Cover will swing open.
- Remove pivot pins and remove crimping jaws.

## 2.3 WIRE SELECTION AND LOADING

Solid aluminum or copper (or a combination of both) and stranded copper conductors may be crimped in the same wire barrel under the following conditions:  
NOTE: *Conductors must always be within CMA limits of wire barrel.*

Condition 1 - See Figure 3, Detail A.  
Maximum CMA fill for copper conductor should not exceed 40% of total CMA. Example:  
2 No. 15 solid aluminum (6,400 circular mils) plus 1 No. 14 stranded copper (4,000 circular mils) equals 10,400 circular mils. The 1 No. 14 stranded copper conductor is approximately 40% of total CMA (10,400 circular mils) being crimped.

Condition 2 - See Figure 3, Detail B.  
A maximum of 10 equal size round conductors may be crimped without removing film insulation.

Condition 3 - See Figure 3, Detail C.  
A maximum of 6 equal size square conductors may be crimped without removing film insulation.

Condition 4 - See Figure 3, Detail D.  
4 identical rectangular conductors, where one conductor thickness is equal to or greater than 1/4 of the width of one conductor, may be crimped without removing film insulation.

Condition 5 - See Figure 3, Detail E.

2 identical rectangular conductors, where thickness of one conductor is equal to or less than 1/4 of the width of one conductor, may be crimped without removing film insulation.

Condition 6 - See Figure 3, Detail F.

In some instances it may not be possible to fit a particular CMA loading into the normally recommended terminal or splice. In these cases, where 2 or more equal round, or a combination of solid aluminum and stranded copper conductors are used, and the total CMA is at least 50% of maximum CMA of the next larger size terminal or splice, the larger size may be used. Example:

3 No. 14 solid conductors equal about 12,000 circular mils. This falls within the CMA range of a 12-10 terminal or splice accepting a maximum CMA of 13,100 circular mils. However, it may not be possible to insert all three conductors into the recommended terminal or splice. It is possible to insert all three conductors into a No. 8 size terminal or splice accepting a CMA range of 13,100 - 20,800 circular mils. The 12,000 circular mils amounts to 59% loading of the maximum CMA for No. 8 size terminals or splices. Therefore, No. 8 size terminals or splices may be used.

Condition 7 - When using a variety of solid conductor sizes, none of the conductors should vary more than one (1) wire gage. (Ideally not more than 1/2 wire gage.)

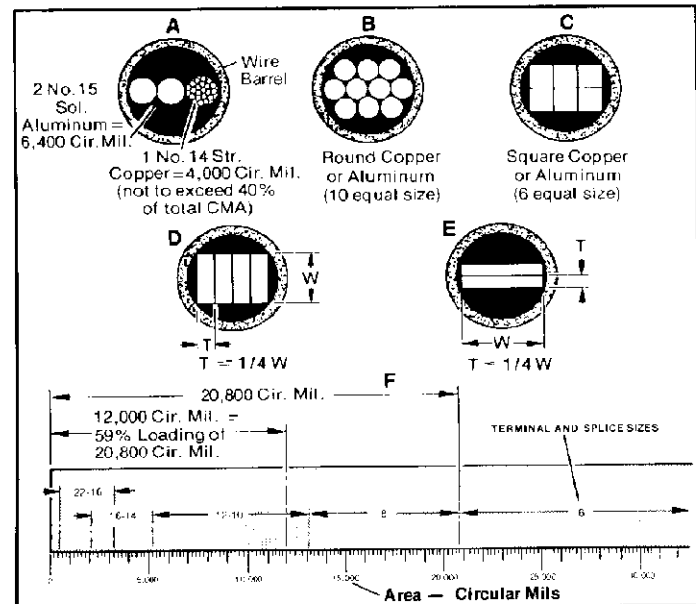


Figure 3

## 2.4 WIRE PREPARATION

NOTE: *Do not use stranded aluminum wire.*

- Select the proper terminal or splice wire range or size, and crimping head combination for the wire size being used. See Figure 1.
- Determine correct terminal or splice wire loading by referring to paragraph 2.3, and CMA range listed in Figure 1.
- Strip stranded copper wire to dimension indicated in Figure 1.

NOTE: *It is not necessary to strip film insulated aluminum or copper wires.*

## 2.5 CRIMPING PROCEDURE

WARNING: AVOID PERSONAL INJURY. WHEN OPERATING AIR TOOL, EXERCISE CAUTION WHILE HOLDING TERMINALS, SPLICES OR WIRE NEAR CRIMPING AREA.

### 2.5.1 Terminals

Ensure that the wire range or size stamped on the terminal corresponds with the wire range or size stamped on the crimping jaws.

If tool has the "holding" feature:

- Position terminal wire barrel between locators of lower jaw as shown in Figure 4A.
  - Activate the tool to move the jaws into "hold" position.
  - Insert wire into wire barrel of terminal until end of wire is flush with or extended slightly beyond end of wire barrel.
  - Activate tool to complete the crimp.
- If tool does not have the "holding" feature:
- Position terminal wire barrel between locators of lower jaw as shown in Figure 4A.
  - Insert wire into wire barrel of terminal until end of wire is flush with or extended slightly beyond end of wire barrel.
  - Activate tool to complete the crimp.
  - Refer to section 3 and Figure 5 for crimp inspection.

### 2.5.2 Butt Splices

Ensure that wire range or size stamped on splice corresponds with the wire range or size stamped on the crimping jaws.

If tool has the "holding" feature:

- Position butt splice in lower jaw so that end of splice butts against locator and window in splice is facing upper jaw. See Figure 4B.
  - Activate the tool to move the jaws into "hold" position.
  - Insert wire into wire barrel of splice until it bottoms against splice wire stop. See Figure 4B.
  - Activate the tool to complete the crimp.
- If tool does not have the "holding" feature:
- Perform step (a) and insert wire into wire barrel of splice until it bottoms against splice wire stop. See Figure 4B.
  - Activate tool to complete the crimp.
  - To crimp other end of butt splice, remove it and reposition uncrimped end in crimping jaws and follow same procedure used to crimp first end of splice.

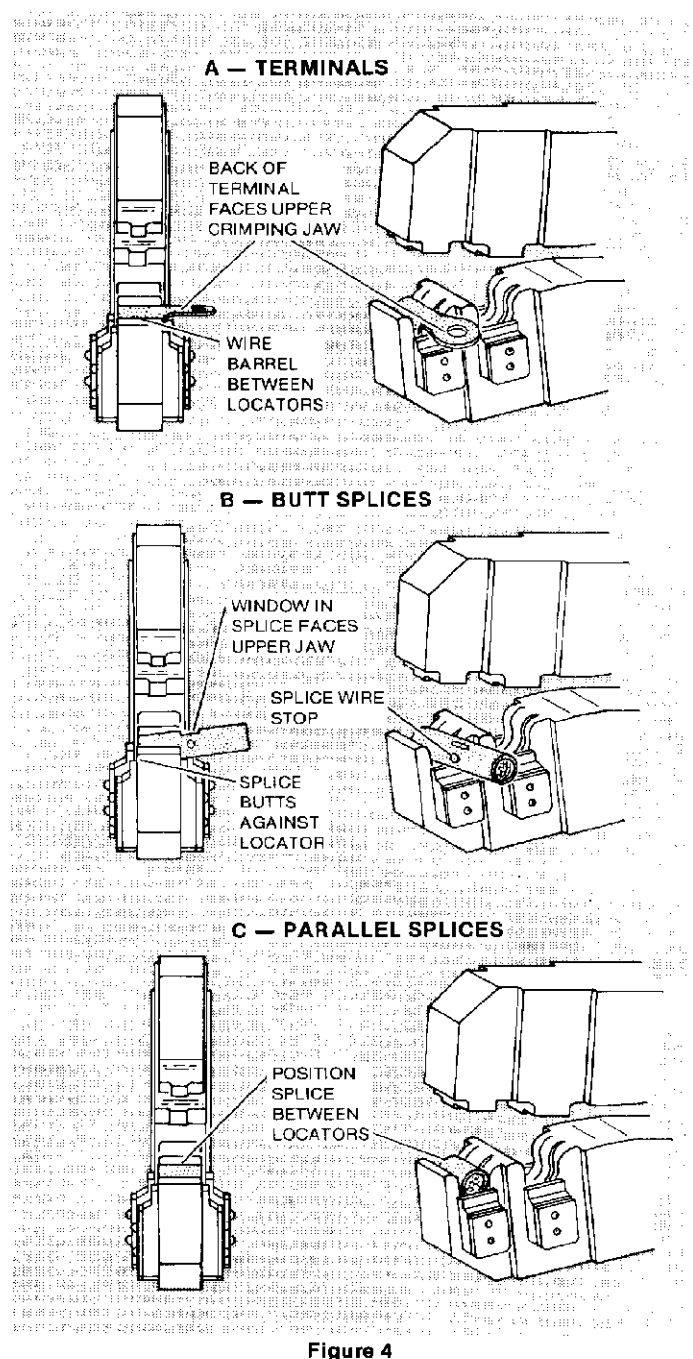


Figure 4

NOTE: *Butt splices may be slightly bent when crimped as instructed in step (g). If this bending is objectionable, use the following crimping procedure on uncrimped end:*

- To crimp other end of butt splice, remove and rotate splice 180° end over end, or twist splice 180°. Reposition uncrimped end in lower jaw so that end of splice butts against locator. If splice cannot be rotated, rotate tool. Insert wire and then crimp the splice.
- Refer to section 3 and Figure 5 for crimp inspection.

### 2.5.3 Parallel Splices

Ensure that wire range or size stamped on splice corresponds with wire range or size stamped on the crimping jaws.

If tool has the "holding" feature:

- Position splice between locators as shown in Figure 4C.
  - Activate the tool to move the jaws into "hold" position.
  - Insert wire into splice until end of wire is flush with or extends slightly beyond end of splice wire barrel.
  - Activate the tool to complete the crimp.
- If tool does not have "holding" feature:
- Perform step (a) and insert wire into splice until end of wire is flush with or extends slightly beyond end of wire barrel.

(f) Activate tool to complete the crimp.

- Refer to section 3 and Figure 5 for crimp inspection.
- NOTE:** If COPALUM terminal or splice sticks in crimping jaw die after crimping, apply a rocking action to remove from die.

### 3. CRIMP INSPECTION

Inspect crimped terminals and splices by checking the features described in Figure 5.

Use only the terminals and splices that meet the conditions shown in the "ACCEPT" column.

"REJECT" terminals and splices can be avoided through careful use of instructions in Section 2, and by performing regular crimping jaw maintenance as instructed in Section 4.

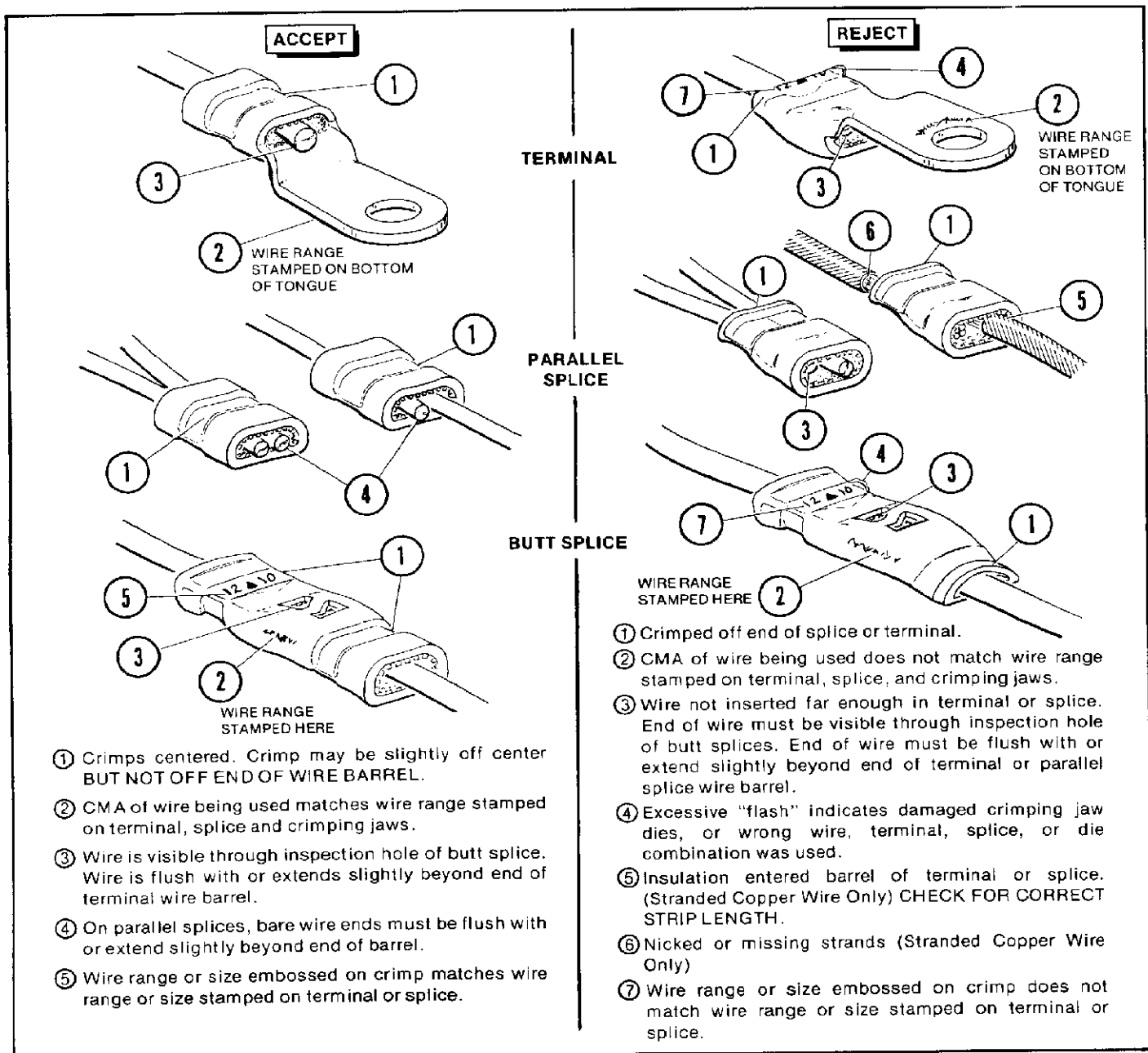


Figure 5

#### 4. MAINTENANCE/INSPECTION PROCEDURE

AMP recommends that a maintenance/inspection program be performed periodically to ensure dependable and uniform terminations. Crimping jaws should be inspected at least once a month. Frequency of inspection may be adjusted to suit your requirements through experience. Frequency of inspection is dependent upon:

1. The care, amount of use, and handling of the jaws.
2. The type and size of the products crimped.
3. The degree of operator skill.
4. The presence of abnormal amounts of dust and dirt.
5. Your own established standards.

Since there is a possibility of damage in shipment, new jaws should be inspected in accordance with the following instructions when received in your plant.

##### 4.1 CLEANING

Do not allow deposits of dirt, grease and foreign matter to accumulate on the jaw bottoming surfaces and die closure surfaces. These deposits may cause excessive wear, thereby affecting the quality of the crimp.

The crimping jaws should be immersed in a reliable commercial de-greasing compound to remove accumulated dirt, grease and foreign matter. Remove remaining de-greasing compound with a lint free cloth. When de-greasing compounds are not available, jaws may be wiped clean with a lint free cloth. Relubricate jaws as instructed in paragraph 4.3, before placing them back in service.

##### 4.2 VISUAL INSPECTION

- (a) Inspect the cam rollers for binding and worn or pitted conditions.
- (b) Inspect the pivot pin holes for excessive wear.
- (c) Inspect the die closure surfaces of the jaws for worn, pitted or chipped conditions. Although dies may gage within permissible limits, worn or damaged die closure surfaces are objectionable and can affect the quality of the crimp.
- (d) Examples of possible worn or damaged jaw or cam roller surfaces are shown in Figure 6. If jaws are defective, refer to Figure 10 for customer replacement part numbers.

##### 4.3 LUBRICATION

Lubricate cam rollers, pivot pins and pivot pin holes with CMD Anti-Scouring Extreme Pressure Lubricant\* No. 3 or equivalent.

Lubricate cam roller pins with No. 20 non-detergent motor oil.

Lubricate as follows:

- Jaws used in daily production — Lubricate daily
- Jaws used daily (occasional) — Lubricate weekly
- Jaws used weekly — Lubricate monthly

Wipe excess lubricant from jaws, particularly from crimping surfaces. Lubricant transferred from the crimping surfaces onto certain terminations may affect the electrical characteristics of an application.

\*Chicago Mfg. & Distributing, Chicago, Illinois 60609

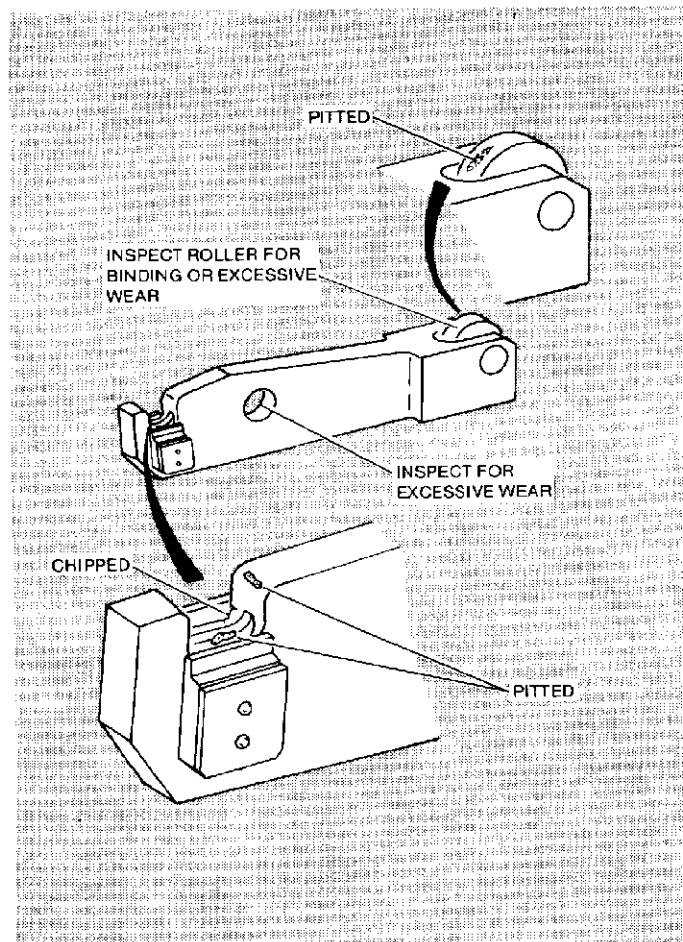


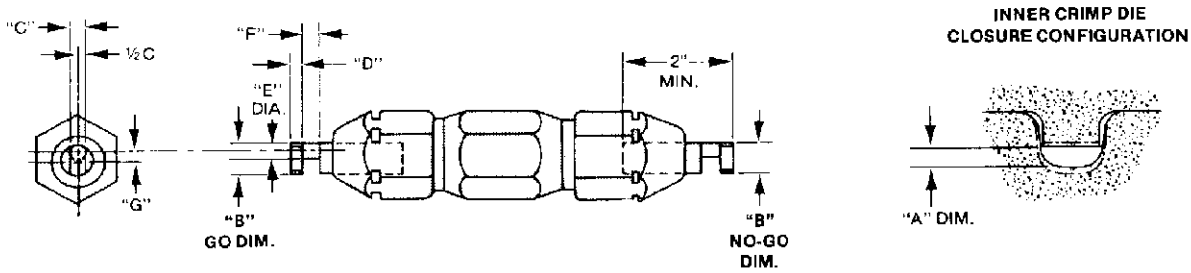
Figure 6

##### 4.4 DIE CLOSURE INSPECTION

AMP★ crimping jaws are inspected for proper die closure before packaging. An inspection should be performed periodically to check the die closure for excessive wear. The die closure inspection is accomplished using the GO NO-GO plug gages. AMP neither manufactures nor sells plug gages. A suggested plug gage design and the GO NO-GO dimensions of the plug gage members are listed in Figures 7 and 8. The following procedure is recommended for inspecting the die closures.

- (a) Clean oil or dirt from die closure surfaces, bottoming surfaces, and plug gage members.
- (b) Select the proper GO gage. Position gage member in lower jaw inner crimp closure so that locator is in notch of gage member. See Figure 9, Detail A.
- (c) Mate the crimping jaws so that they are bottomed but not under pressure.
- (d) To meet the GO gage conditions, the plug gage must be able to rotate freely in either direction as shown in Figure 9, Detail A.
- (e) Select the proper NO-GO gage. Position gage member in lower jaw inner crimp closure so that locator is in notch of gage member. See Figure 9, Detail B.
- (f) Mate the crimping jaws so that inner crimp surfaces are seated on the NO-GO gage member.

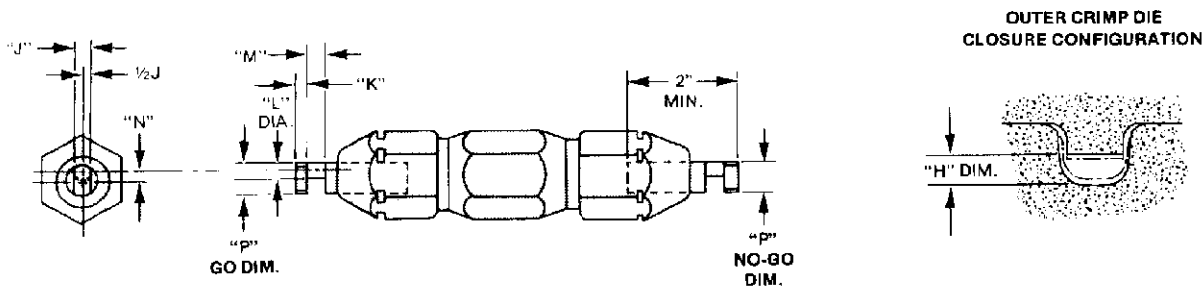
**SUGGESTED PLUG GAGE DESIGN — INNER CRIMP**



JAW NUMBER	WIRE SIZE	DIE CLOSURE DIM'S. "A"		GAGE MEMBER† DIM'S. "B" DIA.		"C"	"D"	"E" DIA.	"F"	"G"
		GO‡	NO-GO	GO	NO-GO					
68100 Mod. C	16-14	.0610	.0710	.0610-.0613	.0709-.0710	.030	.170	.030	.340	.015
	12-10	.0930	.1030	.0930-.0933	.1029-.1030	.040	.230	.040	.310	.027
68101 Mod. D	12-10	.0930	.1030	.0930-.0933	.1029-.1030	.040	.230	.040	.310	.027
	8	.1180	.1280	.1180-.1183	.1279-.1280	.065	.290	.065	.310	.024
68102 Mod. E	6	.1290	.1390	.1290-.1293	.1389-.1390	.075	.300	.075	.350	.024
68364-1										
68118-1 Mod. A	20-18	.0560	.0660	.0560-.0563	.0659-.0660	.024	.200	.024	.310	.015
	16-14	.0610	.0710	.0610-.0613	.0709-.0710	.030	.170	.030	.340	.015
68192-1 Mod. A	8	.1180	.1280	.1180-.1183	.1279-.1280	.065	.290	.065	.310	.024

Figure 7

**SUGGESTED PLUG GAGE DESIGN — OUTER CRIMP**



JAW NUMBER	WIRE SIZE	DIE CLOSURE DIM'S. "H"		GAGE MEMBER† DIM'S. "P" DIA.		"J"	"K"	"L" DIA.	"M"	"N"
		GO‡	NO-GO	GO	NO-GO					
68100 Mod. C	16-14	.0880	.1020	.0880-.0883	.1019-.1020	.040	.069	.040	.310	.023
	12-10	.1350	.1490	.1350-.1353	.1489-.1490	.070	.100	.070	.310	.035
68101 Mod. D	12-10	.1350	.1490	.1350-.1353	.1489-.1490	.070	.100	.070	.310	.035
	8	.1750	.1890	.1750-.1753	.1889-.1890	.090	.130	.090	.310	.045
68102 Mod. E	6	.1950	.2090	.1950-.1953	.2089-.2090	.100	.130	.100	.350	.045
68364-1										
68118-1 Mod. A	20-18	.0800	.0940	.0800-.0803	.0939-.0940	.033	.070	.033	.310	.022
	16-14	.0880	.1020	.0880-.0883	.1019-.1020	.040	.069	.040	.310	.023
68192-1 Mod. A	8	.1750	.1890	.1750-.1753	.1889-.1890	.090	.130	.090	.310	.045

Figure 8

† Material — Tool Steel

‡ "GO" die closure dimensions apply when jaws are bottomed but not under pressure.

- (g) To meet the NO-GO gage conditions, jaw bottoming surfaces will *NOT* bottom, and NO-GO gage member will be held stationary (will not rotate) by the dies. See Figure 9, Detail B.
- (h) Inspect the right and left outer crimp closures in the same manner as steps (b) thru (g). See Figure 9, Details C and D.
- (i) If both the inner crimp and the outer crimp closures meet the GO NO-GO gage conditions, the die closures may be considered dimensionally correct. If

you find that the die closures do not conform with the GO NO-GO gage conditions, contact your local AMP field representative.

**4.5 REPLACEMENT PARTS**

Refer to Figure 10 for crimping jaw replacement part numbers. Replacement crimping jaw parts can be purchased from AMP Incorporated, Harrisburg, Pa. 17105, or a wholly owned subsidiary of AMP Incorporated.

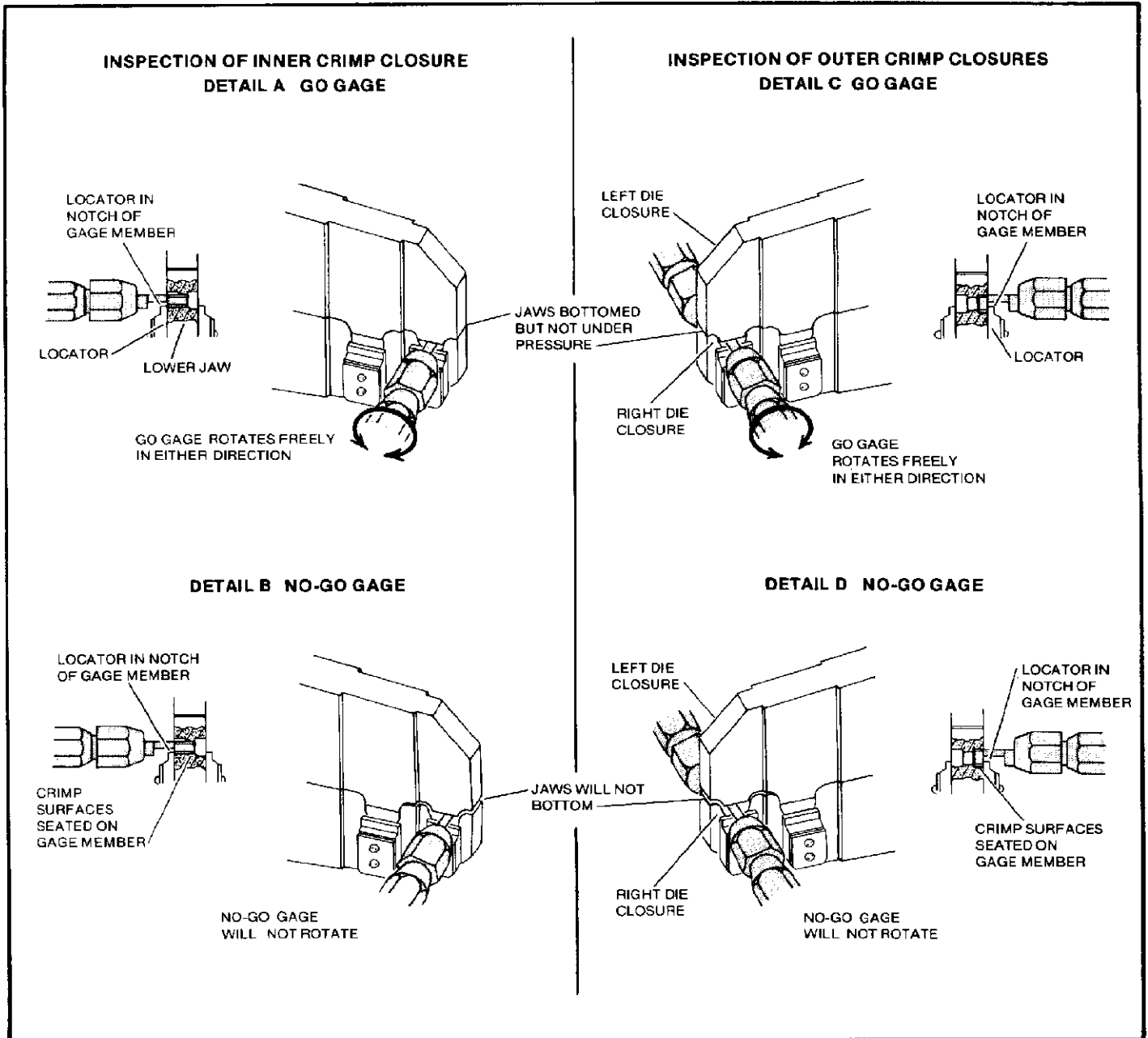
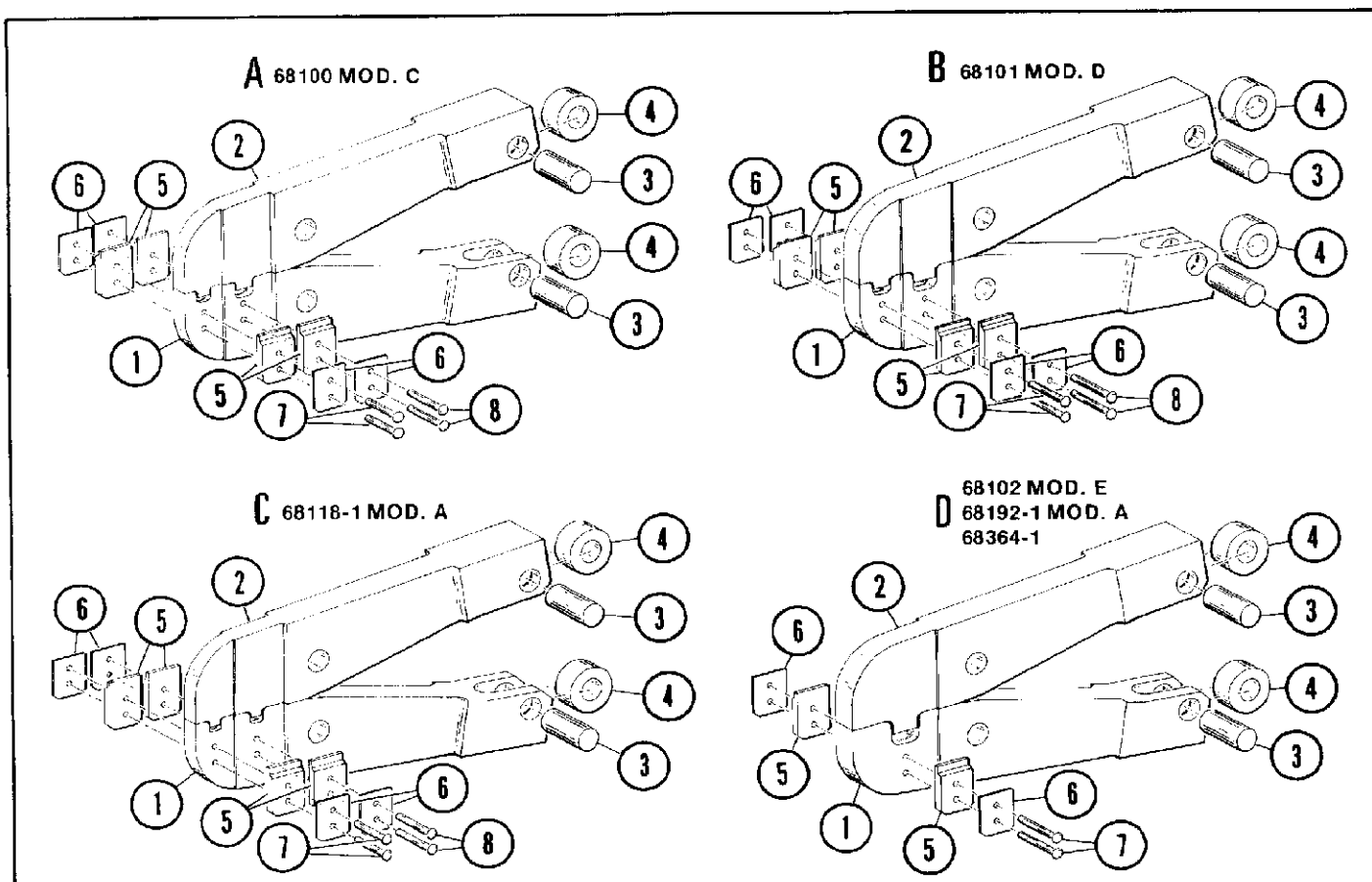


Figure 9



ITEM NO.	DESCRIPTION	QTY.	COMPONENT PART NUMBERS					
			68100 Mod. C Detail A	68101 Mod. D Detail B	68102 Mod. E Detail D	68118-1 Mod. A Detail C	68192-1 Mod. A Detail D	68364-1 Detail D
1	INDENTOR	1	307693-2	307693-1	307697-1	307693-3	307697-2	307697-4
—	INDENTOR SUB-ASSY. •	—	307824-1	307824-2	307824-3	307824-4	307824-5	—
2	ANVIL	1	307692-2	307692-1	307696-1	307692-3	307696-2	307697-4
—	ANVIL SUB-ASSY. ♦	—	307825-1	307825-2	307825-3	307825-4	307825-5	—
3	PIN, DOWEL †	2	4-21030-6					
4	ROLLER, CAM	2	5-59591-5					
5	LOCATOR	4	308132-1	308132-1	—	308132-1	—	—
		2	—	—	308132-1	—	308132-1	308132-1
6	PLATE, LOCATOR	4	308134-1	308134-1	—	308134-1	—	—
		2	—	—	308134-1	—	308134-1	308134-1
7	RIVET	2	1-59573-9	1-59573-8	1-59573-5	1-59573-9	1-59573-5	1-59573-5
8	RIVET	2	1-59573-8	1-59573-5	—	2-59573-0	—	—

- INCLUDES ITEMS 1, 3 THRU 8
- ♦ INCLUDES ITEMS 2, 3 AND 4
- † MUST BE CENTERED AND STAKED BOTH SIDES TO SECURE

Figure 10

REL. DATE	REV. DATE	APPROVALS	
9-27-72	2-2-79	ENG. <i>Tom R. Williams</i>	PUB. <i>Paul Felty</i>