



1. INTRODUCTION

This instruction sheet is intended to provide you with "Instructions" on product application and a "Maintenance and Inspection Procedure" for:

TERMASHIELD* FERRULE CRIMPING DIES
(USED IN TOOL NOS. 69319-1, 69365, AND 69710)

45316-2 Mod. J	45320-2 Mod. H	47817-3
45317-2 Mod. H	46610-3	47818-3
45318-2 Mod. H	47810-3	47819-3
45319-2 Mod. H	47816-3	

These dies are used to crimp:

- TERMASHIELD ferrules on single and multiple conductor shielded wires with a primary conductor insulation range of .033" to .270".

Basic instructions on the use of these tools, dies, die insertion and removal, etc., are provided in Section 2, "Instructions". For further instructions relative to the pneumatic tools and hand tool, refer to the instructions packaged with these tools. Section 3 contains a "Maintenance and Inspection Procedure" which will enable you to establish and maintain a die certification program.

These instructions may be used for dies not listed in Figure 1 but accompanied by this IS. For unlisted dies, strip wire and crimp in the same manner as for identical size dies.

2. INSTRUCTIONS

2.1 SELECTION DATA FOR DIES, FERRULES, AND INSULATING CAPS

2.1.1 Single Conductor Shielded Wire

To determine which dies, ferrule and insulating cap to use with single conductor shielded wire, refer to Figure 1. Note

that package numbers shown in Figure 1 are supplied with equal quantities of ferrules and insulating caps, but include only zinc plated ferrules.

- Determine the outside (insulation) diameter of the primary conductor.
- Locate this dimension in the appropriate primary conductor insulation range in column 2 of Figure 1. Opposite the insulation range, you will find the catalog numbers of the crimping die, ferrule and insulating cap to use.

2.1.2 Multiple Conductor Shielded Wire

To determine which dies, ferrule, and insulating cap to use with shielded wire having two or more conductors, use the following formula: Multiply the outside (insulation) diameter of one primary conductor by the "factor", see Figure 2, listed opposite the total number of conductors in the wire. For example:

- If you had a 3-conductor shielded wire, you would first find the outside (insulation) diameter of one conductor. In this case, we will use an O.D. of .082.
- Opposite the number "3" (the number of primary conductors in wire) in column 1 of Figure 2, you will find a multiplying factor of 2.17.
- Multiply the O.D. of the one conductor (.082) by this factor (2.17). The result is .177. This figure (.177) is the primary conductor insulation range of the 3-conductor shielded wire.
- Next, refer to column 2 of Figure 1. Opposite the insulation range of .145 to .184, you will find catalog numbers of the crimping die, ferrule and insulating cap to use.

2.2 WIRE STRIPPING AND FERRULE PREPARATION

2.2.1 Wire Stripping

Strip shielded wire and ground wire to dimensions given in Figure 3.

TOOL NO.	PRIMARY CONDUCTOR INSULATION RANGE	CRIMPING DIE CATALOG NUMBER	FERRULE CATALOG NUMBER			INSUL. CAP CATALOG NO.	DIE, FERRULE AND CAP COLOR CODE	PACKAGE CAT. NO.
			Zinc Plated With Inspection Hole	Tin Plated Without Inspection Hole	Tin Plated With Inspection Hole			Contains Equal Quantities of Insul. Caps & Zinc Plated Ferrules
69319-1 69365 69710	.033 MAX.	46610-3	327192††	2-327192-1		327768	GREEN	330297††
	.033 TO .059	47810-3	323930	2-323930-1	2-323930-2	325009	VIOLET	330298
	.059 TO .085	47816-3	323931	2-323931-1	2-323931-2	325010	WHITE†	330228
	.085 TO .095	47817-3	323932	2-323932-1	2-323932-2	325011	BROWN	330229
	.095 TO .115	47818-3	323933	2-323933-1	2-323933-2	325012	ORANGE	330230
	.115 TO .130	47819-3	323934	2-323934-1	2-323934-2	325013	GREEN	330231
69365 69710	.130 TO .145	45316-2 Mod. J	327137	2-327137-1	2-327137-2	328224	VIOLET	330232
	.145 TO .184	45317-2 Mod. H	327138	2-327138-1	2-327138-2	328225	WHITE†	330293
	.184 TO .220	45318-2 Mod. H	327139	2-327139-1	2-327139-2	328226	BROWN	330294
	.220 TO .245	45319-2 Mod. H	327140	2-327140-1	2-327140-2	328227	ORANGE	330295
	.245 TO .270	45320-2 Mod. H	327141	2-327141-1	2-327141-2	328228	GREEN	330296

† Indicates ferrule's natural metallic color; insulating cap is transparent.

†† Ferrule does not have braid inspection hole.

♦ These dies are also used to crimp heat resistant TERMASHIELD ferrules and insulating sleeves. See IS 1801.

Figure 1

NO. OF COND'S. IN WIRE	MULTIPLY FACTOR	NO. OF COND'S. IN WIRE	MULTIPLY FACTOR
2	2.00	14	4.30
3	2.17	15	4.45
4	2.42	16	4.60
5	2.57	17	4.75
6	2.82	18	4.88
7	3.04	19	5.01
8	3.25	20	5.14
9	3.45	21	5.27
10	3.64	22	5.39
11	3.81	23	5.52
12	3.98	24	5.63
13	4.15	25	5.75

Figure 2

2.2.2 Ferrule Preparation

- (a) Place ferrule on shielded wire as shown in Figure 4, Detail A. Flare braid so that it will pass over and around support sleeve of ferrule.

- (b) Insert ground wire into ferrule. See Figure 4, Details B & C.

NOTE: On six smaller ferrules (Part No. □-327192-□ and □-323930-□ thru □-323934-□) slide ground wire insulation under ferrule skirt approximately 1/16 inch as shown in Detail B. On five larger ferrules (Part No. □-327137-□ thru □-327141-□), DO NOT slide the ground wire insulation under ferrule skirt. See Figure 4, Detail C.

2.2.3 Color Coding

Crimping dies, ferrules and insulating caps are color coded. For example: Use dies color coded green to crimp a green ferrule. Place a green insulating cap on the green ferrule after ferrule is crimped.

2.3 CRIMPING PROCEDURE

Insert dies in tool.

NOTE: Refer to instructions shipped with tools for die insertion and tool operation before attempting to crimp ferrules.

2.3.1 Pneumatic Tool

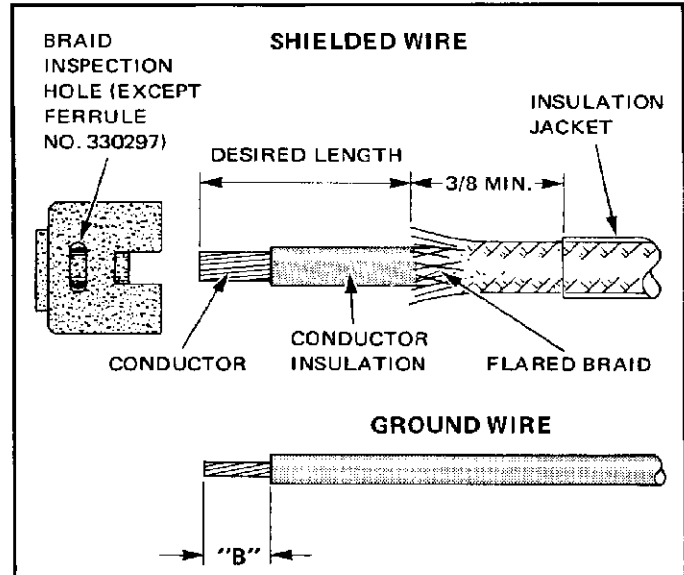
- (a) Place ferrule, with shielded wire and ground wire attached, in lower crimp area of dies. Push ferrule all the way into dies until ferrule bottoms against ferrule stop. See Figure 5.

NOTE: Make certain that ground wire holes are in line with die holding screws.

- (b) Hold ground wire and shielded wire in position and actuate take-up lever or trigger to hold ferrule in place.
(c) Simultaneously release take-up lever and depress trigger to complete crimp. Release trigger and remove crimped ferrule.

2.3.2 Hand Tool

- (a) Open tool handles all the way.
(b) Place ferrule with shielded wire and ground wire attached in lower crimp area of dies. Push ferrule all the way into dies until ferrule bottoms against ferrule stop. See Figure 5.
NOTE: Make certain that ground wire holes are in line with die holding screws.
(c) Hold ground wire and shielded wire in position and close handles until CERTI-CRIMP® ratchet releases. Handles will



FERRULE NUMBER	RECOMMENDED GROUND WIRE		"B" STRIP LENGTH
	No. of Wires	Max. Insul. Dia.	
□-327192-□	ONE #24	.063	1/4 MIN.
	TWO #24's	.055	
	ONE #22	.068	
□-323930-□ THRU □-323934-□	ONE #20	.078	
	ONE #22	.078	
	TWO #22's	.068	
□-327137-□ THRU □-327141-□	ONE #18	NO LIMIT ON INSULATION DIAMETER	7/16 MIN.
	ONE #20		
	TWO #20's		
	ONE #22		
	TWO #22's		

Figure 3

open automatically and crimped ferrule may be removed from dies.

2.4 APPLY FERRULE INSULATING CAPS

Insulating caps are color coded for easy matching with ferrule.

- (a) Select the correct insulating cap from the chart in Figure 1.
(b) Place insulating cap on ferrule as shown in Figure 6.

3. MAINTENANCE/INSPECTION PROCEDURE

AMP recommends that a maintenance/inspection program be performed periodically. This is necessary to assure that continued use of the dies will result in the same dependable and uniform terminations for which the dies were designed. We recommend an initial frequency of inspection of once a month. This frequency may be adjusted to suit your requirements through experience. The frequency of an inspection is dependent upon:

1. The care, amount of use, and handling of the dies.
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.

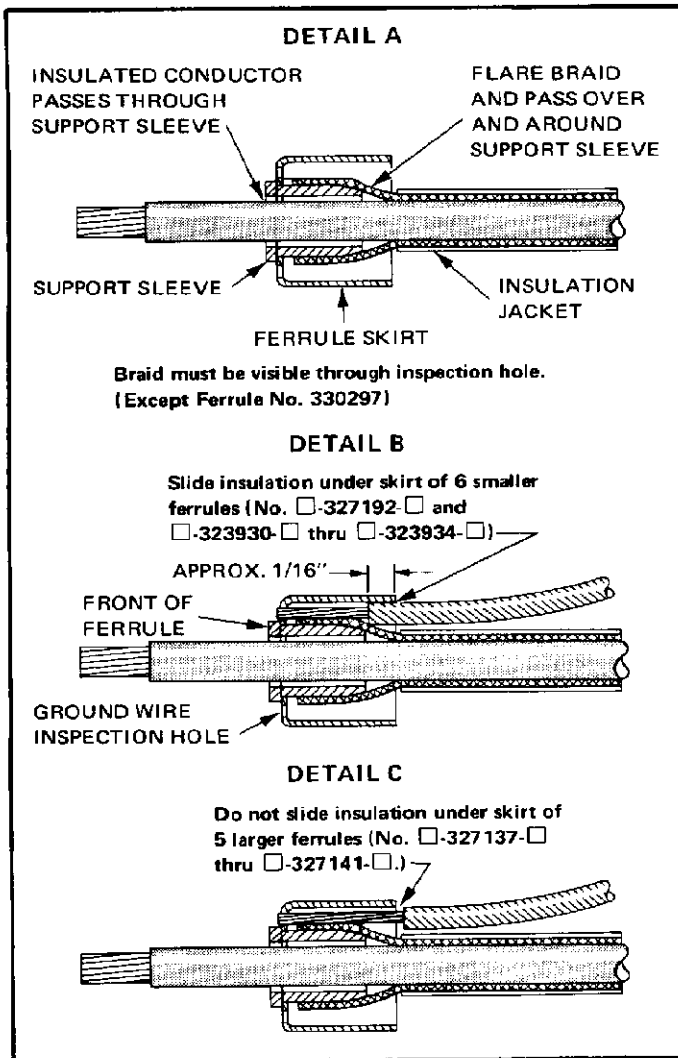


Figure 4

With proper maintenance and inspection, these dies will give years of satisfactory service.

All AMP* dies are thoroughly inspected before being shipped from the factory, however, since there is a possibility of die damage in shipment, AMP recommends that new dies be inspected in accordance with Section 3 when received in your plant.

3.1 CLEANING

Do not allow deposits of dirt, grease and foreign matter to accumulate in the die closure area and on the bottoming surfaces of the dies. These deposits may prevent the dies from bottoming fully and may also cause excessive wear in the die closure surfaces, thereby affecting the quality of the crimp. The dies should be wiped clean frequently with a clean cloth.

3.2 VISUAL INSPECTION

Visually inspect the die closure surfaces for broken or pitted conditions. Although dies may gage within permissible limits, worn or damaged die closure surfaces are objectionable and can affect the quality of the crimp. Examples of possible damaged die surfaces are shown in Figure 7.

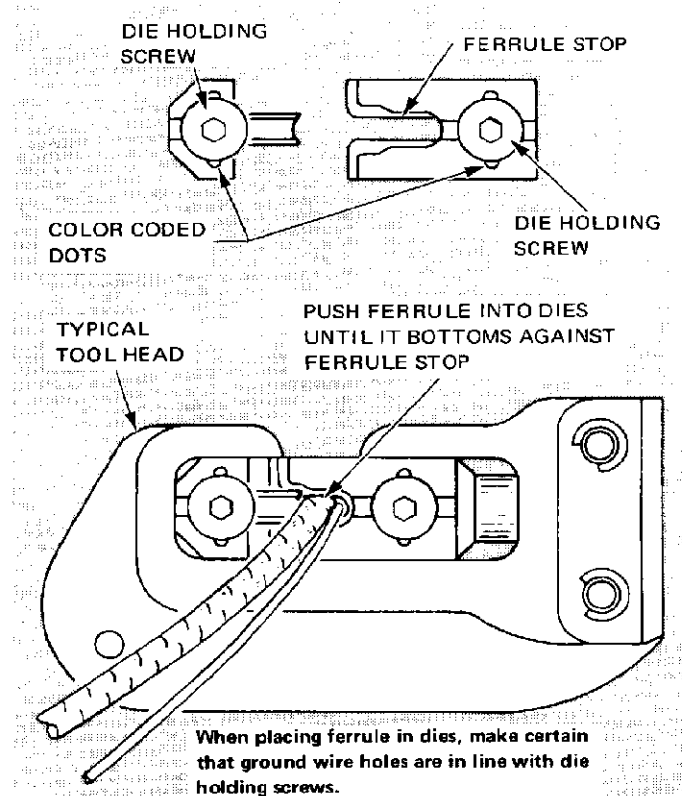


Figure 5

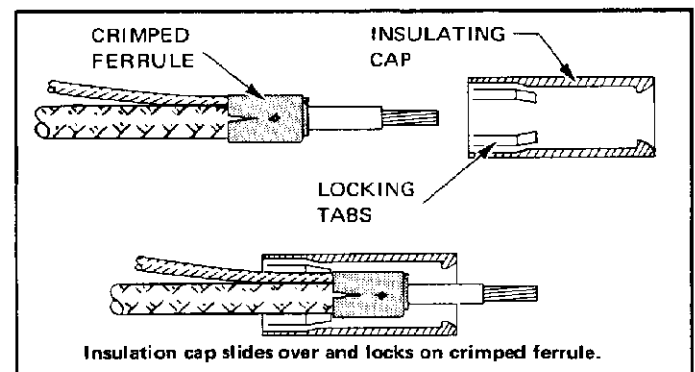


Figure 6

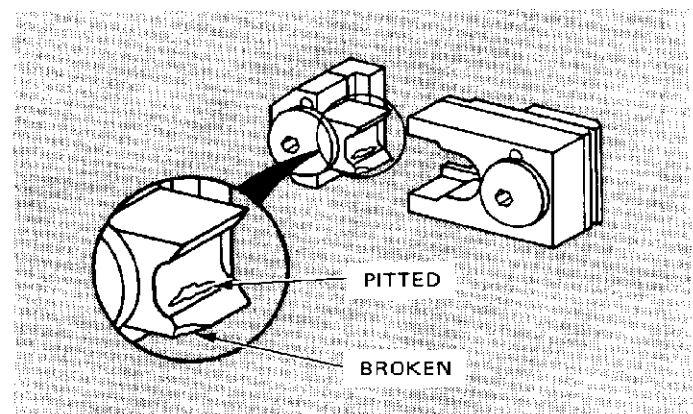


Figure 7

3.3 DIE CLOSURE INSPECTION

Every AMP die set is inspected and tested for proper die closure before being shipped from the factory. An inspection should, however, be performed periodically to measure the die closure.

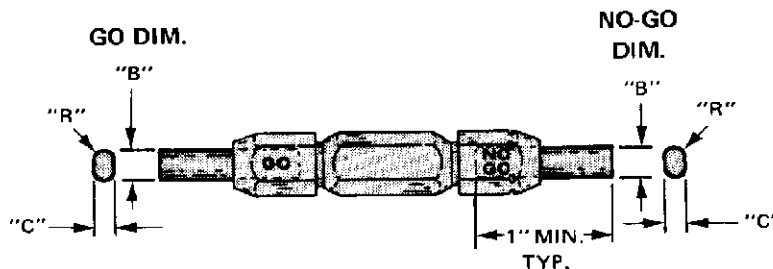
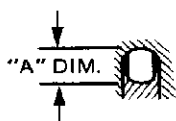
The die closure inspection is accomplished using GO NO-GO plug gages. AMP neither manufactures nor sells plug gages, however, a suggested plug gage design and the GO NO-GO dimensions of the plug gage members are listed in Figures 8 and 9. The following procedure is recommended

for measuring the die closures.

- Remove traces of oil or dirt from die crimping area and plug gage members.
- Insert dies in tool.
- When using hand tool, close handles of tool until dies bottom. Do not apply additional pressure to tool handles.
- When using pneumatic tool, reduce air supply pressure to a range between 15-20 P.S.I. Depress trigger to bottom dies.

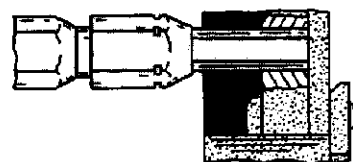
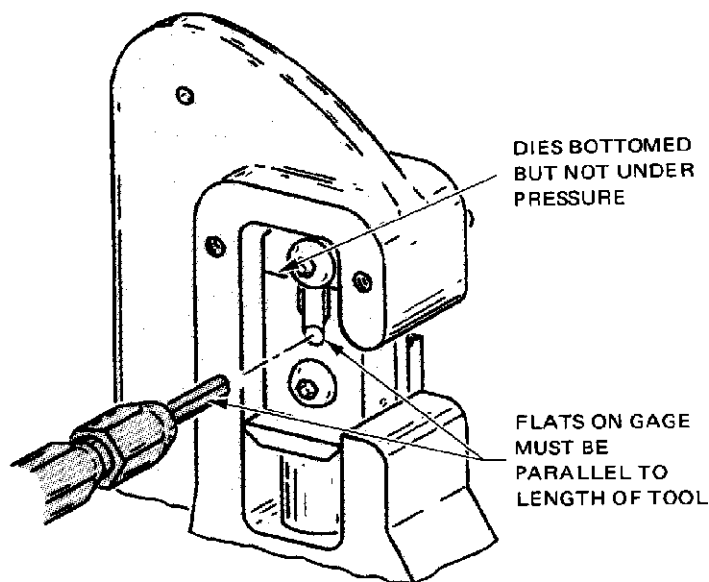
SUGGESTED PLUG GAGE DESIGN

DIE CLOSURE CONFIGURATION

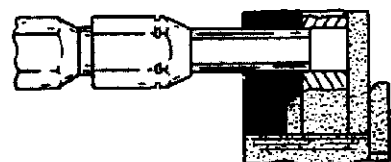


DIE SET NUMBER	DIE CLOSURE DIM'S. "A" [†]		GAGE MEMBER ^{††} DIM'S. "B"		"C" (MAX)	"R" (MAX)
	GO	NO-GO	GO	NO-GO		
45316-2 Mod. J	.2850	.2910	.2850-.2853	.2909-.2910	.170	.141
45317-2 Mod. H	.3070	.3130	.3070-.3073	.3129-.3130	.180	.152
45318-2 Mod. H	.3310	.3370	.3310-.3313	.3369-.3370	.220	.164
45319-2 Mod. H	.3550	.3610	.3550-.3553	.3609-.3610	.280	.176
45320-2 Mod. H	.3770	.3830	.3770-.3773	.3829-.3830	.374	.187

INSPECTION OF CRIMPING DIES WITH PLUG GAGE



"GO" gage must pass completely through the die closure.



"NO-GO" gage may enter partially, but must not pass completely through the die closure.

[†] Plug gage dimensions apply when dies are bottomed, but not under pressure
^{††} Material — Tool steel

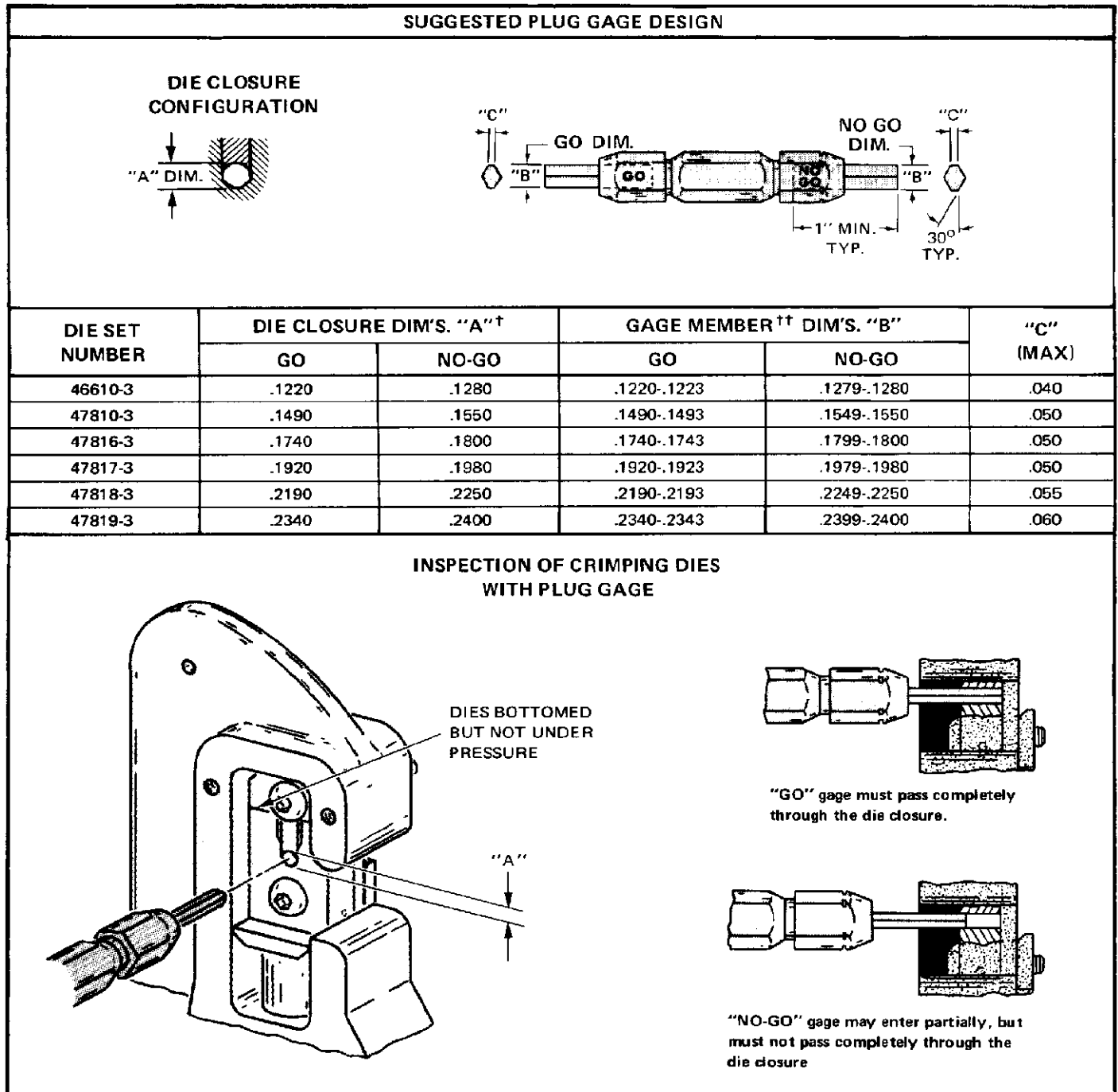
Figure 8

- (e) With crimping dies bottomed, check the die closure using the proper plug gage. Hold gage in straight alignment with the die closure and carefully try to insert without forcing the GO member, and then the NO-GO member. See Figures 8 and 9. The GO member must pass completely through the die closure.
- (f) The NO-GO member may enter partially, but must not pass completely through the die closure.
- (g) If the die closures meet the GO NO-GO gage conditions, the dies 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.

3.4 REPLACEMENT PARTS

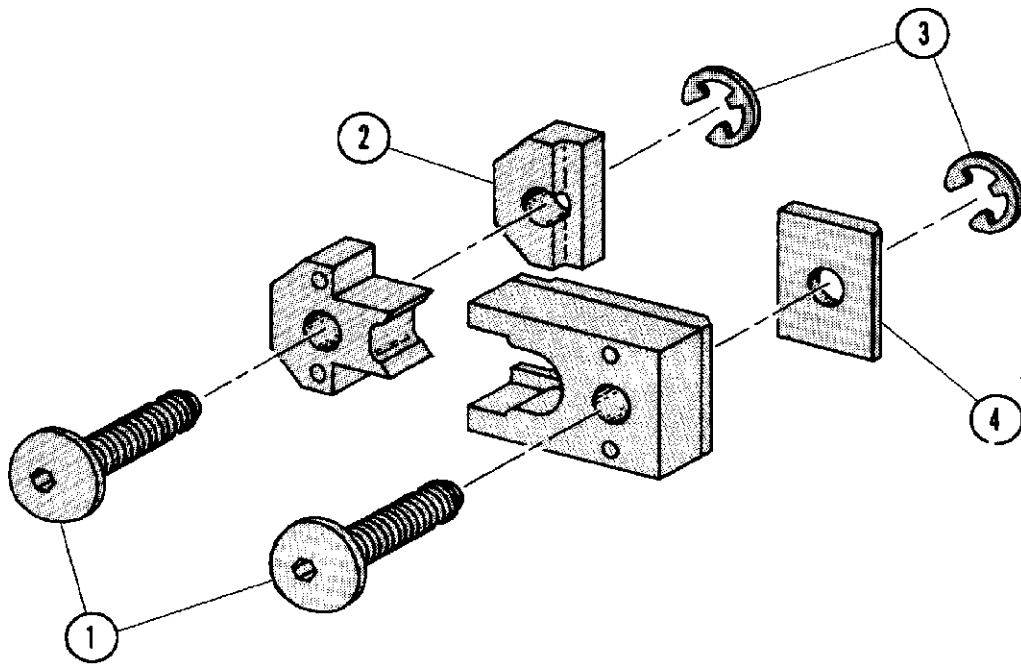
It may be advantageous to stock certain replaceable parts to prevent loss of production time. Figure 10 lists the customer replaceable parts that can be purchased from AMP Incorporated, Harrisburg, Pa. 17105, or a wholly owned subsidiary of AMP Incorporated.



† Plug gage dimensions apply when dies are bottomed, but not under pressure.

†† Material — Tool steel

Figure 9



ITEM NO.	DESCRIPTION	QTY.	COMPONENT PART NUMBERS	DIE ASSEMBLY NUMBERS	
1	SCREW	2	4-306131-8	45316-2 Mod. J	46610-3
2	SPACER, UPPER	1	306803	45317-2 Mod. H	47810-3
3	RING, RETAINING	2	1- 21046-3	45318-2 Mod. H	47816-3
4	SPACER, LOWER	1	306804	45319-2 Mod. H	47817-3
				45320-2 Mod. H	47818-3
					47819-3

Figure 10

REL. DATE	REV. DATE	APPROVALS	
7-8-58	3-21-73	ENG. <i>James S. Ball</i>	PUB. <i>Paul Felty</i>