

customer manual

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SAFETY PRECAUTIONS AVOID INJURY

Safeguards are designed into this application equipment to protect operators and maintenance personnel from most hazards during equipment operation. However, certain safety precautions must be taken by the operator and repair personnel to avoid personal injury, as well as damage to the equipment. Do not operate equipment in a gaseous or hazardous environment.

Carefully observe the following safety precautions before and during operation of the equipment:

- ALWAYS wear appropriate ear protection.
- ALWAYS wear approved eye protection when operating powered equipment.
- ALWAYS follow local safety practices.
- NEVER wear loose clothing or jewelry that may catch in moving parts of the application equipment.
- NEVER alter, modify, or misuse the tool.
- NEVER fire the tool with a broken "fail safe."

AMPACT tools containing only three color-coded grooves around the coupling front and a continuous band of knurling on the coupling nut have been obsoleted and should be retrofitted.

- After a retrofit program has been completed at your facility by providing the four color-coded grooved version of the AMPACT tool, any AMPACT tools with the three color-coded grooves which were not retrofitted during the scheduled retrofit program must be returned to Tyco Electronics. Refer to Section 8.
- If using AMPACT tools with three color-coded grooves around the coupling front, you must consult Product Warning 408-9907. For copies of this document, call the Energy Division Customer Service Center at 1-800-327-6996.

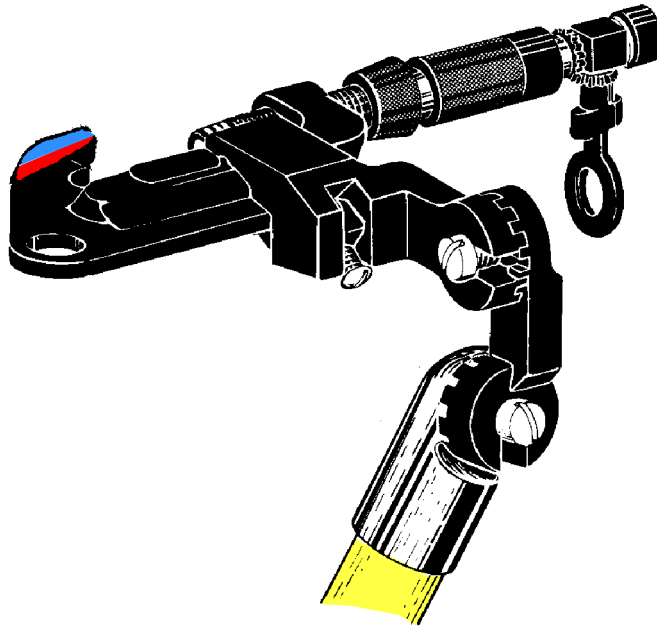
ENERGY DIVISION CUSTOMER SERVICE CENTER

CALL 1-800-327-6996

Tyco Electronics makes no warranty, express, implied (including but not limited to warranties of merchantability and fitness for intended purpose) extending beyond the description set forth in this product instruction sheet. Tyco Electronics shall not be responsible for any property damage, or other similar type of loss due to breach of the above referenced warranty or negligence on the part of the company resulting from the misuse or mishandling of the product by the user. The parties specifically agree that Buyer's sole and exclusive remedy due to breach of the above referenced warranty or negligence on the part of the company shall be limited to replacement of the product on a one to one basis."



POWDER ACTUATED TOOL



Frontispiece

1. INTRODUCTION

1.1. The Manual

This customer manual covers the use and maintenance of AMPACT Hot Stick Kit 69610-1. Carefully read this manual before using the kit and refer to it regularly for detailed information concerning operation and maintenance of the kit components. If information contained in this manual does not agree with the AMPACT tools or products being used, contact your local field service representative.

When reading this manual, pay particular attention to DANGER, CAUTION, and NOTE statements.

DANGER Denotes an imminent hazard which may result in moderate or severe injury.



CAUTION Denotes a condition which may result in product or equipment damage.



NOTE Highlights special or important information.



Reasons for revision can be found in Section 9, REVISION SUMMARY.

NOTE Dimensions in this manual are in metric units [with U.S. customary units in brackets].



1.2. Purpose of the Hot Stick Kit

AMPACT Hot Stick Kit 69610-1, makes it possible to adapt AMPACT tools to standard commercial hot stick equipment. This kit will handle all AMPACT taps and stirrups from No. 8 to 556.5 – 26/7 ACSR and, with

additional components can be used on conductors to 1192.5 - 45/7 ACSR. When used in hot line applications, the AMPACT tool permits the lineman to work parallel to a line instead of across it, thereby reducing his exposure to energized lines

1.3. Contents of the Hot Stick Kit

The contents of the Hot Stick Kit are shown in Figure 1. Unless otherwise indicated, one each of the items shown are supplied with the kit. Additional components required for use on wire sizes 795.0 to 1192.5 - 45/7 ACSR are shown in Figure 2. Components in Figure 2 are ordered separately and supplied only when ordered.

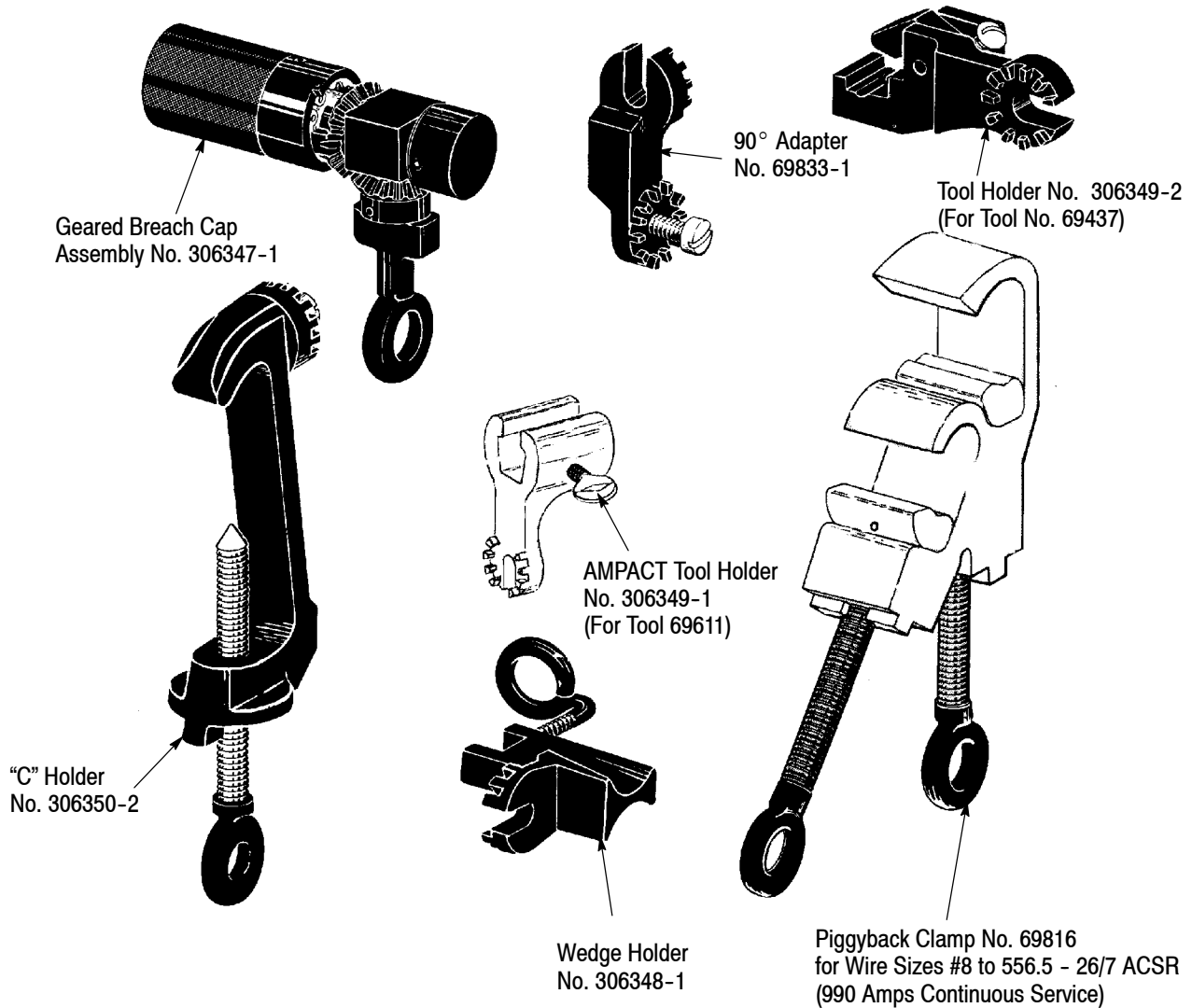


Figure 1

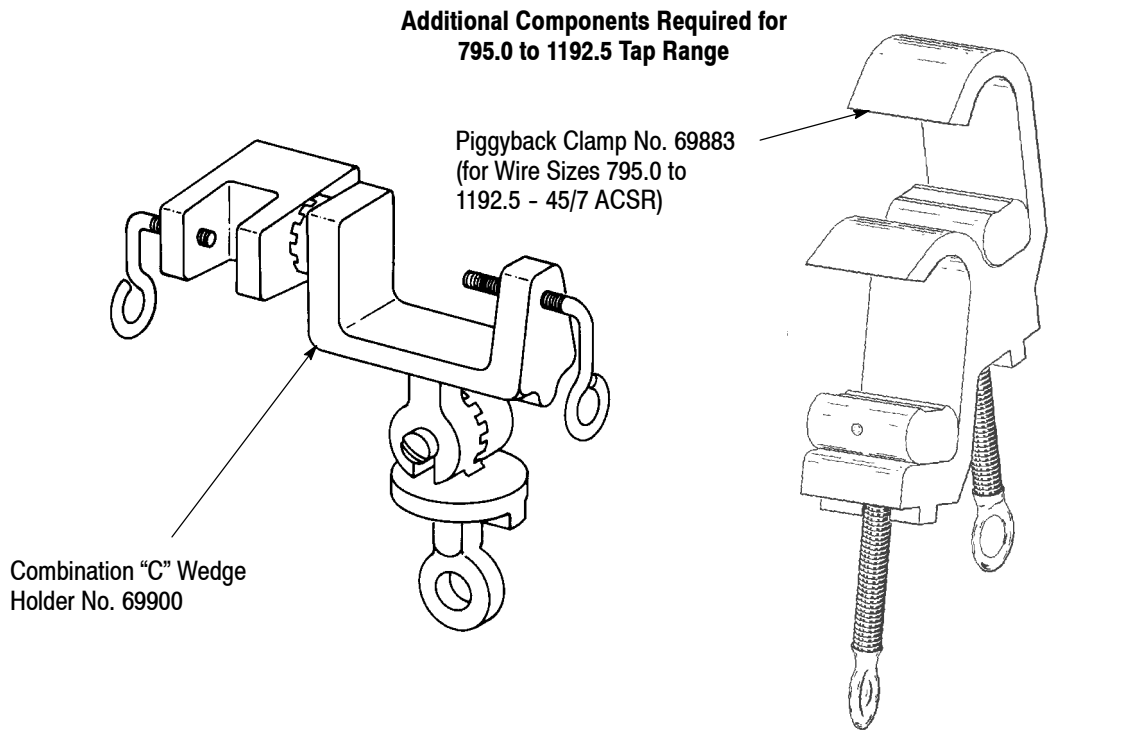


Figure 2

1.4. Related AMPACT Tooling

Related AMPACT tooling used with the Hot Stick Kit is shown in Figure 3.

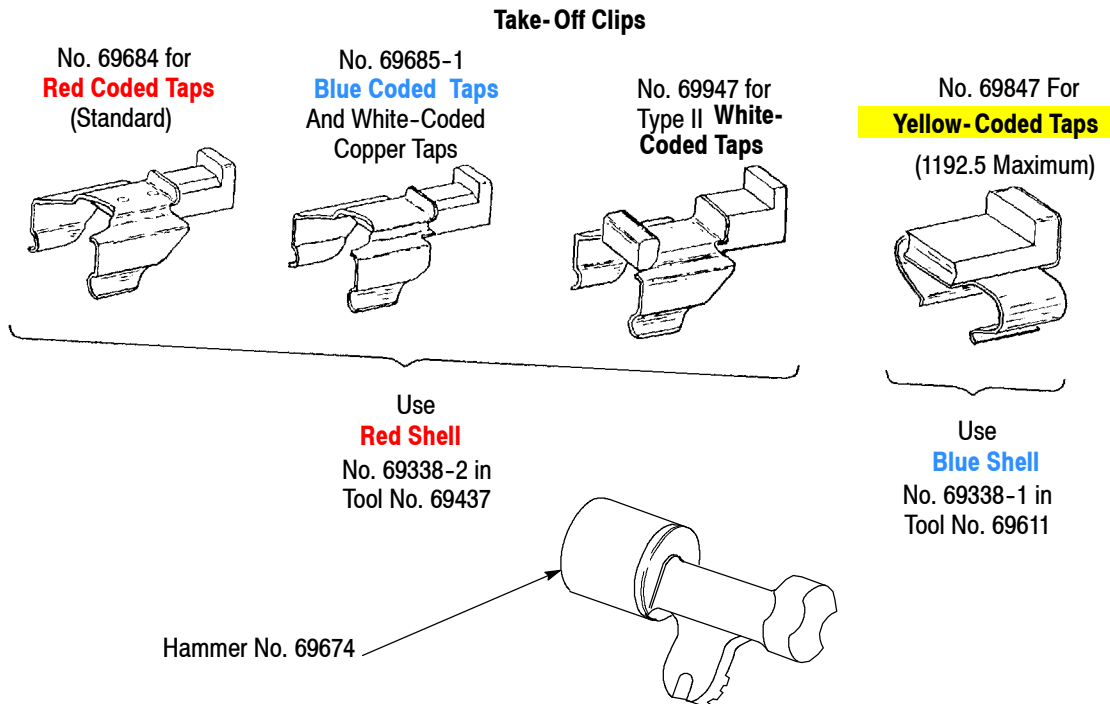


Figure 3

1.5. Commercial Hot Stick Equipment

The items shown in Figure 4 are commercial items and are not part of the Hot Stick Kit 69610-1. These items are, however, required for use with the hot stick kit as described in this manual.

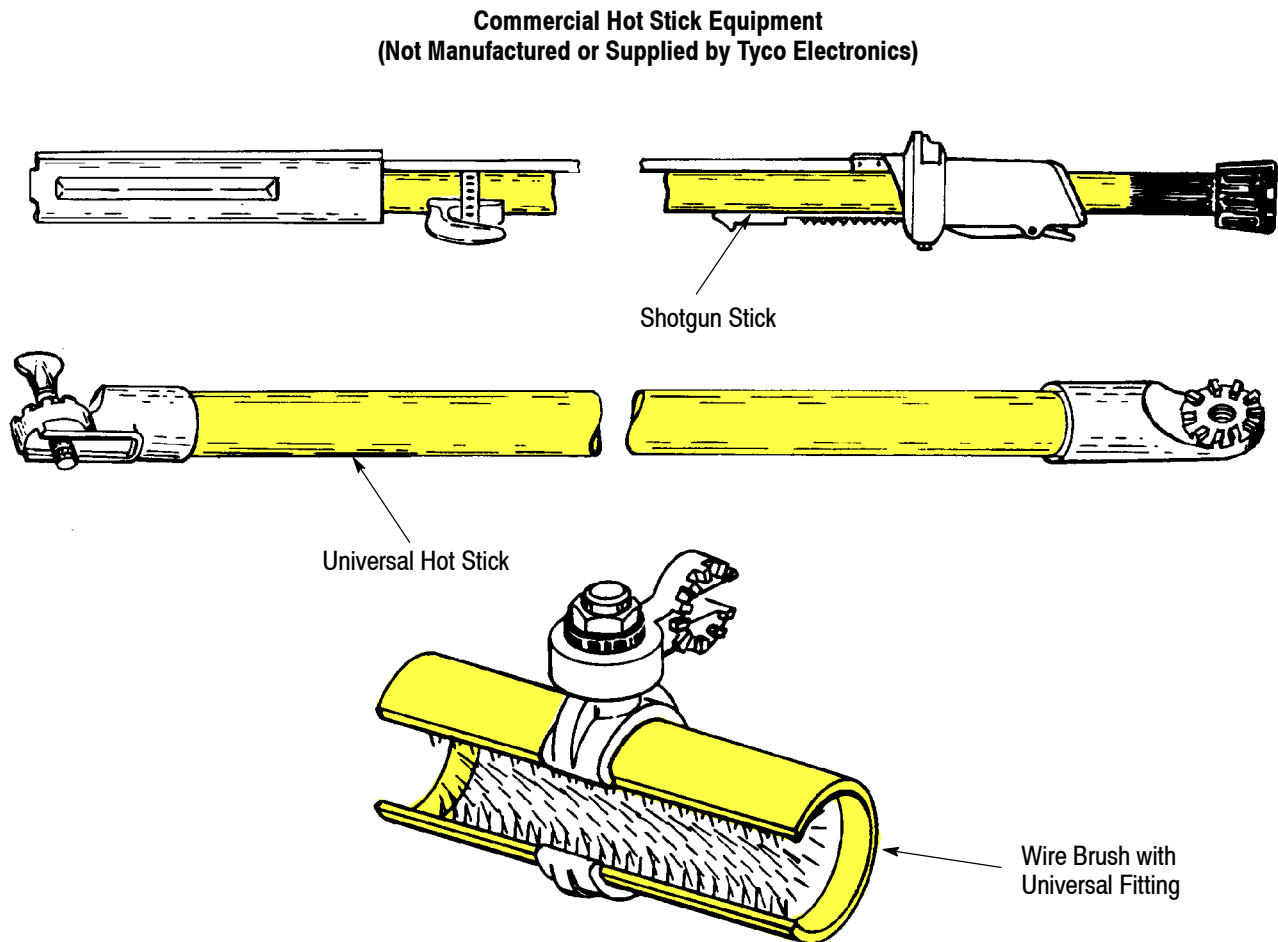


Figure 4

2. PREPARATION OF AMPACT TOOLS FOR HOT STICK APPLICATION

2.1. AMPACT Tools

The use of AMPACT tools reduces the time and effort required to tap a power line. The tools are safe to use because all the action takes place *within* the tools. Two sizes of AMPACT tools are used (see Figure 5). The small tool (Tool No. 69437) uses red, white or blue shells, and the large tool (Tool No. 69611) uses yellow shells. Shells are colored to match the color-code of the tap or stirrup with which they are to be used.

NOTE



Use of the AMPACT tools is fully described in Customer Manual 409-2106, "AMPACT Taps, Stirrups, and Application Tooling," which is supplied with AMPACT tools. Users of AMPACT tools with hot stick equipment must be familiar with the contents of 409-2106.

2.2. AMPACT Tool Adapters

Both small and large AMPACT tools are adapted for hot stick application by replacing the standard breech cap assembly with the geared breech cap assembly (Figure 5) and by using the small or large tool holder. The 90° adapter may be installed between the tool holder and the hot stick, if this will result in a better working position for the lineman. See Figure 6. Uses for the "C" and wedge holder, piggyback clamps, hammer, wire brush, and take-off clips are described in hot stick application procedures to follow.

2.3. AMPACT Tool Preparation

1. Attach selected tool holder to selected (large or small) AMPACT tool and tighten the securing screw.
2. Remove standard breech cap assembly (Figure 5) from the power unit of tool and install the geared breech cap assembly provided with the hot stick.
3. If desired, attach the universal hot stick to the tool holder, connecting a 90° adapter between the tool holder and the hot stick. See Figure 6.

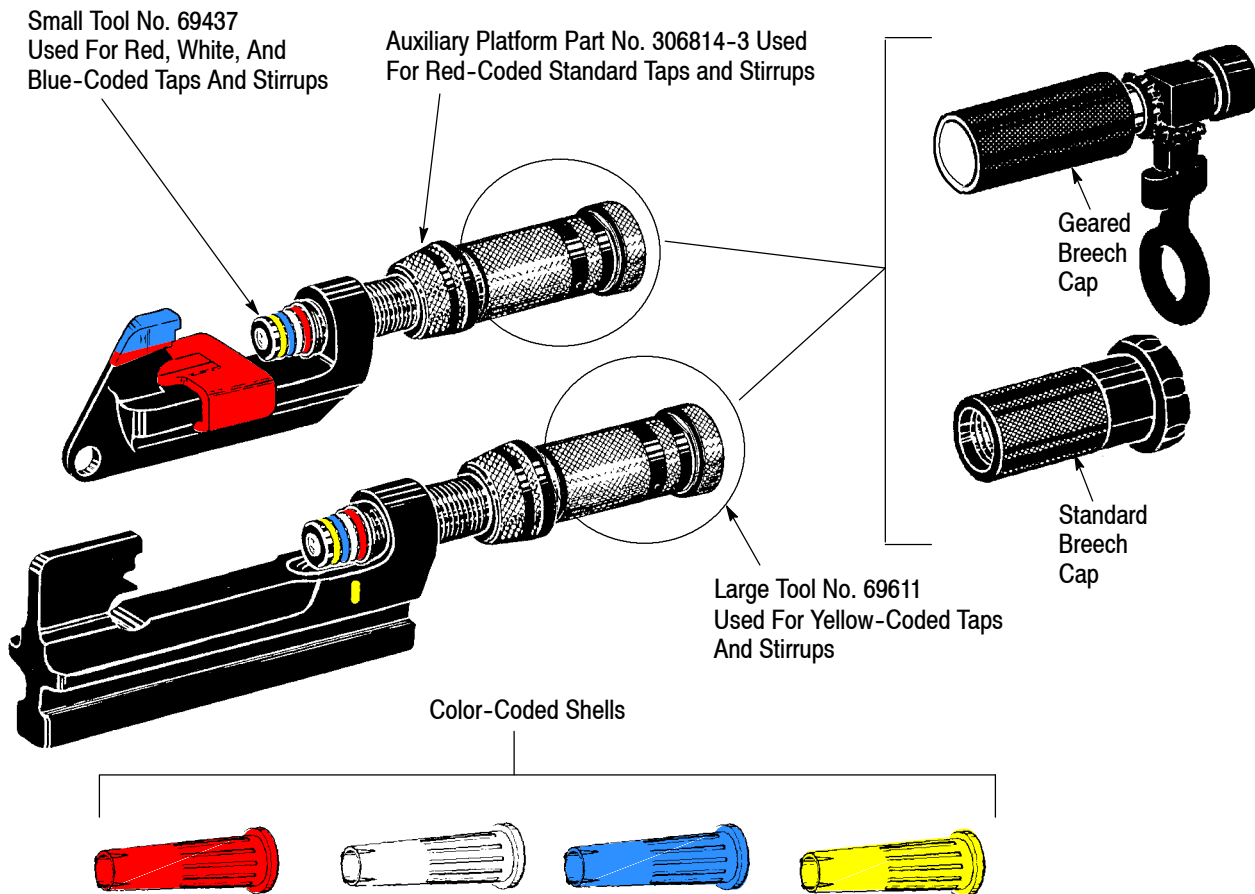


Figure 5

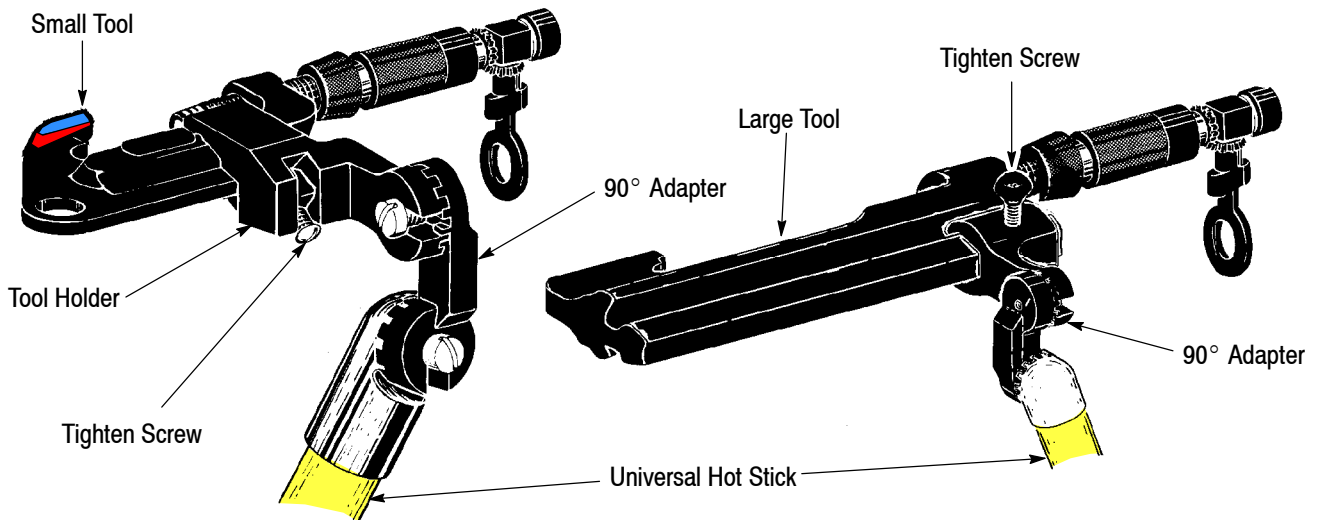


Figure 6

2.4. Application Tool Preparation

1. Attach AMPACT hammer to one end of the universal hot stick. See Figure 7,A.
2. Attach wire brush to the other end of universal hot hot stick. See Figure 7,B.
3. Assemble 90° adapter and “C” holder and wedge holder as shown in Figure 8.

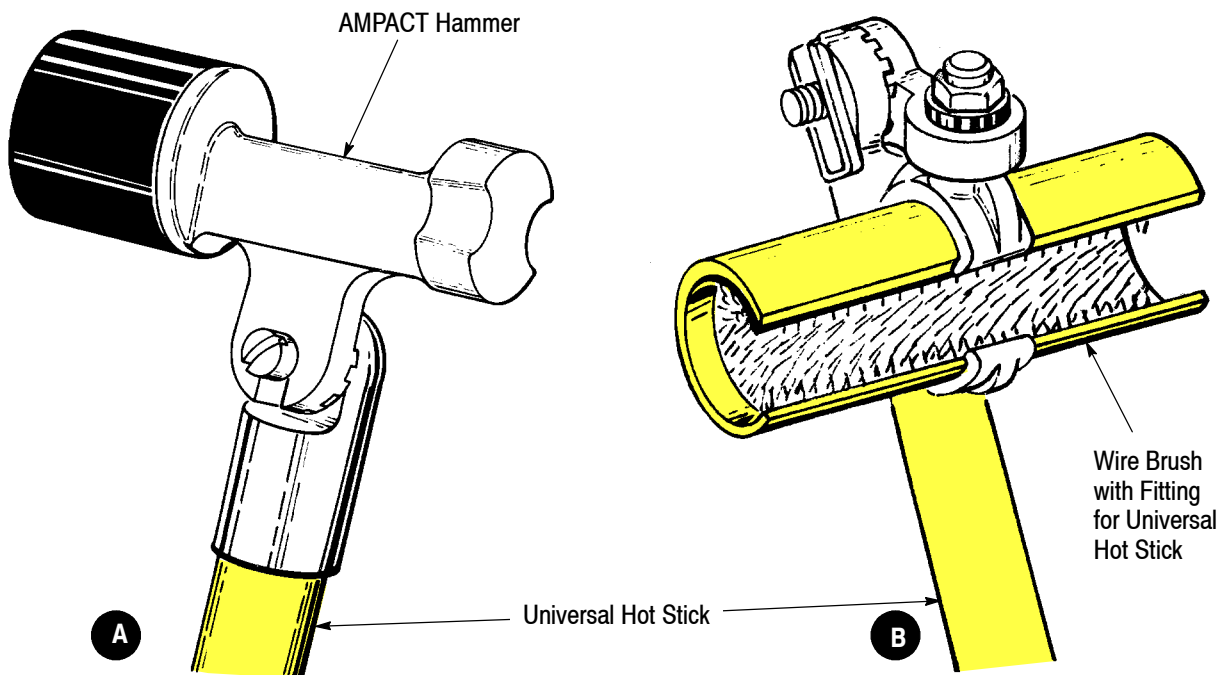


Figure 7

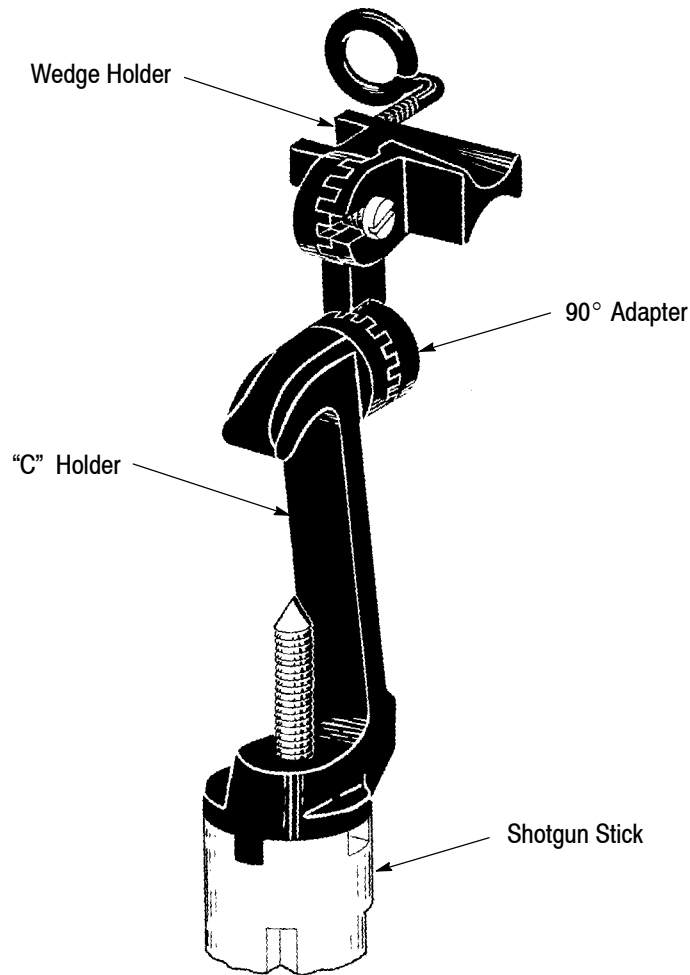


Figure 8

3. PRECAUTIONARY PROCEDURES

DANGER



To avoid personal injury, carefully observe the following safety precautions. They are the result of years of experience with the AMPACT tools in the field.

1. NEVER load a tool until you are ready to install or remove a tap or stirrup. *If tap installation is NOT completed after tool is loaded*, remove and dispose of shell. DO NOT RE-USE SHELLS THAT HAVE BEEN LOADED AND THEN REMOVED FROM TOOL.
2. Always keep power unit fully retracted (see Figure 9) while transporting tool or until ready to install or remove a tap or stirrup. If the tool is accidentally dropped and fired with power unit ram fully retracted, the soft aluminum crush sleeve will absorb the force of ram travel and prevent additional damage to the tool. See Customer Manual 409-2106, Paragraph 7.2.
3. Do not fire a tool that has a broken "fail safe." Test and inspect "Fail Safe" on a daily basis, as described in Customer Manual 409-2106, Paragraph 7.3, to ensure that "Fail Safe" is not broken. If the "fail safe" is broken, return the damaged tool to the address shown in Section 8.
4. Make sure that the geared breech assembly is fully tightened after inserting a shell.
5. Never strike the end of a shell while it is in the breech without the breech cap assembly properly installed and the tool clamped to tap or stirrup.

6. Always use a hammer to fire the tool. Never use a wrench or pliers.
7. Never fire the tool while other people are standing directly in the line of action. Although wedge movement is “contained” by the tool when it is fired, high velocity wedge movement may throw off excess inhibitor.
8. Protect tool from damage, and do not use tools with nicks, cracks, damaged threads, or burns from cross-phasing. Return damaged tool for servicing or replacing. Refer to Section 8, RETURN OR REPLACEMENT.
9. If shell sticks in breech, carefully follow the procedure in Paragraph 4.7, Removing the Tool. Do not attempt to remove shell with pliers or by prying under the lip of shell.
10. When removing a tap or stirrup, use only properly color-coded shells, and do not abuse or experiment with tools or shells.
11. Clean and lubricate the tool power unit regularly, as described in Customer Manual 409-2106.

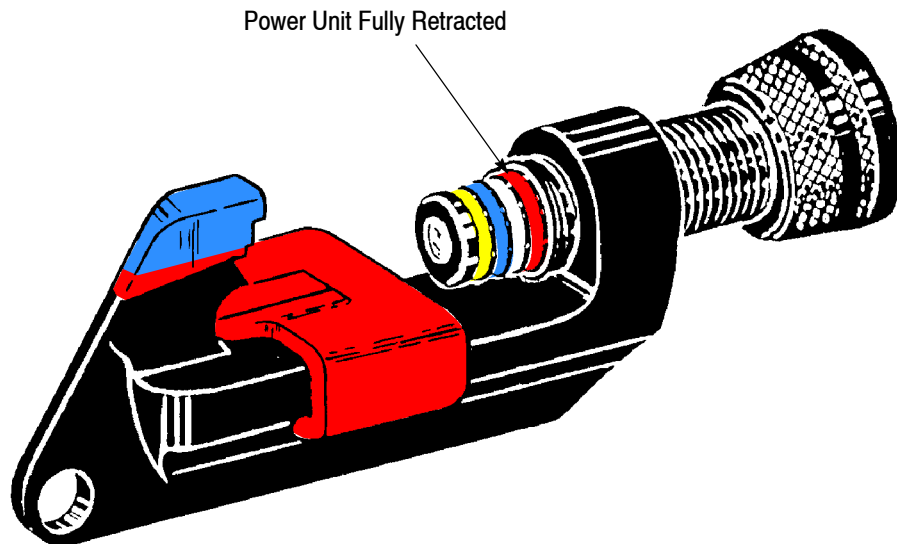


Figure 9

4. APPLICATION OF AMPACT TAPS

Several methods of installing AMPACT taps, using hot sticks, are described in this section. The standard method, in which 152.4 mm to 254 mm [6 to 10 inches] of tap wire extends beyond the installed tap and must be cut off, is described in Paragraph 4.2. Paragraph 4.3 describes an alternate method, in which the tap is installed close to the end of the tap wire and cutting of the excess wire is not required. In either method, the tap wire can be installed above or below the through-line, and the “C” member and wedge can be positioned so that the tool can be fired from the left or right side. Check the sizes and types of wires being used and refer to AMPACT Product Selection Chart 408-1931 to select the proper tap for the application.

4.1. Wire Preparation

Thoroughly clean conductors with wire brush on hot stick.

NOTE



Insulated conductors must be stripped before installing taps or stirrups. Thicker insulations require a longer strip length. Avoid removing more insulation than required to position the tool on the tap or stirrup. Use suggested strip length for the through-line from the table in Figure 10.

SUGGESTED STRIP LENGTH		
Tap Color Code	Tap Size	Strip Length
Red	Small	82.55 mm [3.25 in.]
White	Small and Medium	101.6 mm [4 in.]
Blue	Medium	4/0
		266.8
		350.0
Yellow	Large	336.4
		477.0
		556.5
		795.0
		1033.5
		1192.5
		107.95 mm [4.25 in.]
		152.4 mm [6 in.]
		158.75 mm [6.5 in.]

Figure 10

4.2. Standard Tap Application Method

1. Determine whether the tap wire is to be installed above or below the through-line and proceed as follows:

Above Through-Line Installation -- Slip the end of the tap wire into the *upper* section of the piggyback clamp and tighten the eye-bolt to hold the wire securely in place (Figure 11, A). Then using the shotgun stick, hook lower section of piggyback clamp over the through-line. Turn shotgun stick clockwise to tighten the clamp on the through-line.

Below Through-Line Installation -- Slip the end of the tap wire into the *lower* section of the piggyback clamp and tighten the eye-bolt to hold the wire securely in place (Figure 11, B). Then using the shotgun stick, hook upper section of piggyback clamp over the through-line. Turn shotgun stick clockwise to tighten the clamp on the through-line.

2. Slip the "C" member into the "C" holder and tighten eye-bolt to hold "C" member in place. Align the large groove with the larger wire. Place wide end of wedge in notch of wedge holder and tighten holding bolt. See Figure 12.

NOTE



Make sure the upper and lower wedge grooves match the through-line and tap wire sizes. Observe code letter or numbers on label, end of wedge, or in wedge groove.

3. Hook the "C" member over the tap wire and through-line 152.4 mm to 254 mm [6 to 10 inches] from the piggyback clamp, with narrow end of "C" toward the piggyback clamp. See Figure 13.

4. Turn the shotgun stick counterclockwise to loosen "C" member from "C" holder and remove shotgun stick and "C" holder.

5. Insert wedge between the wires into wide end of "C" member. See Figure 14. Back of the wedge holder may be used to spread wires to ease insertion of wedge. Strike wedge holder sharply to secure wedge temporarily. The tap is now self-supporting.

NOTE



*If the "C" member slides when the wedge is inserted, use a second hot stick with a "C" holder to hold the "C" member in place. Make sure the wedge is securely seated before attaching tool. Proper insertion depth of the wedge is about halfway into the "C" member. If wedge is inserted **more** than half-way, or if it is not inserted far enough, the wrong size tap is being used or the wedge grooves are reversed. Correct the situation before proceeding.*

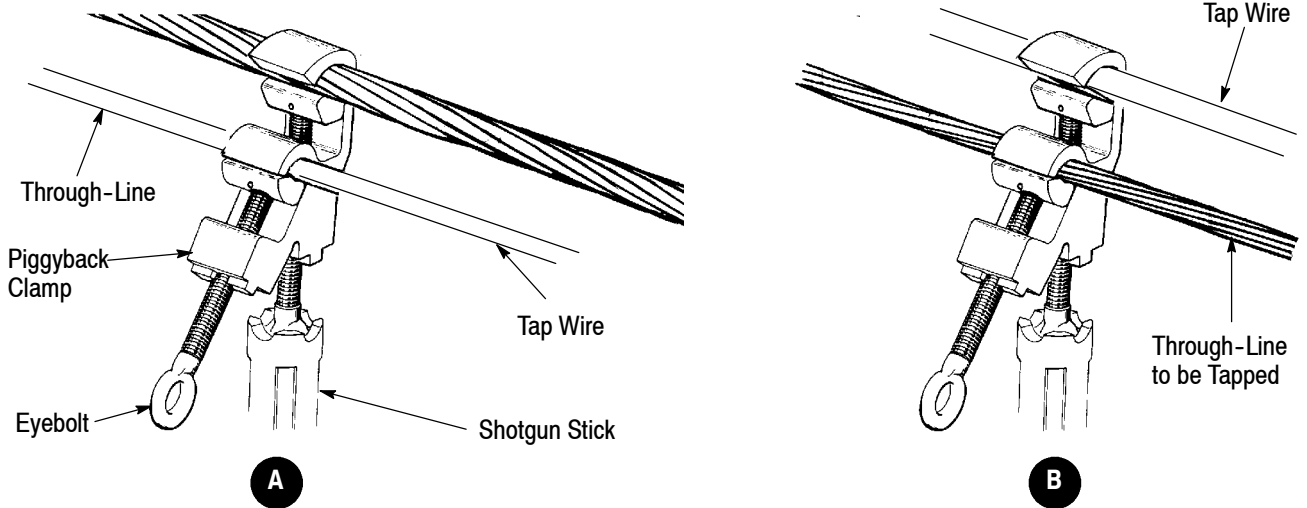


Figure 11

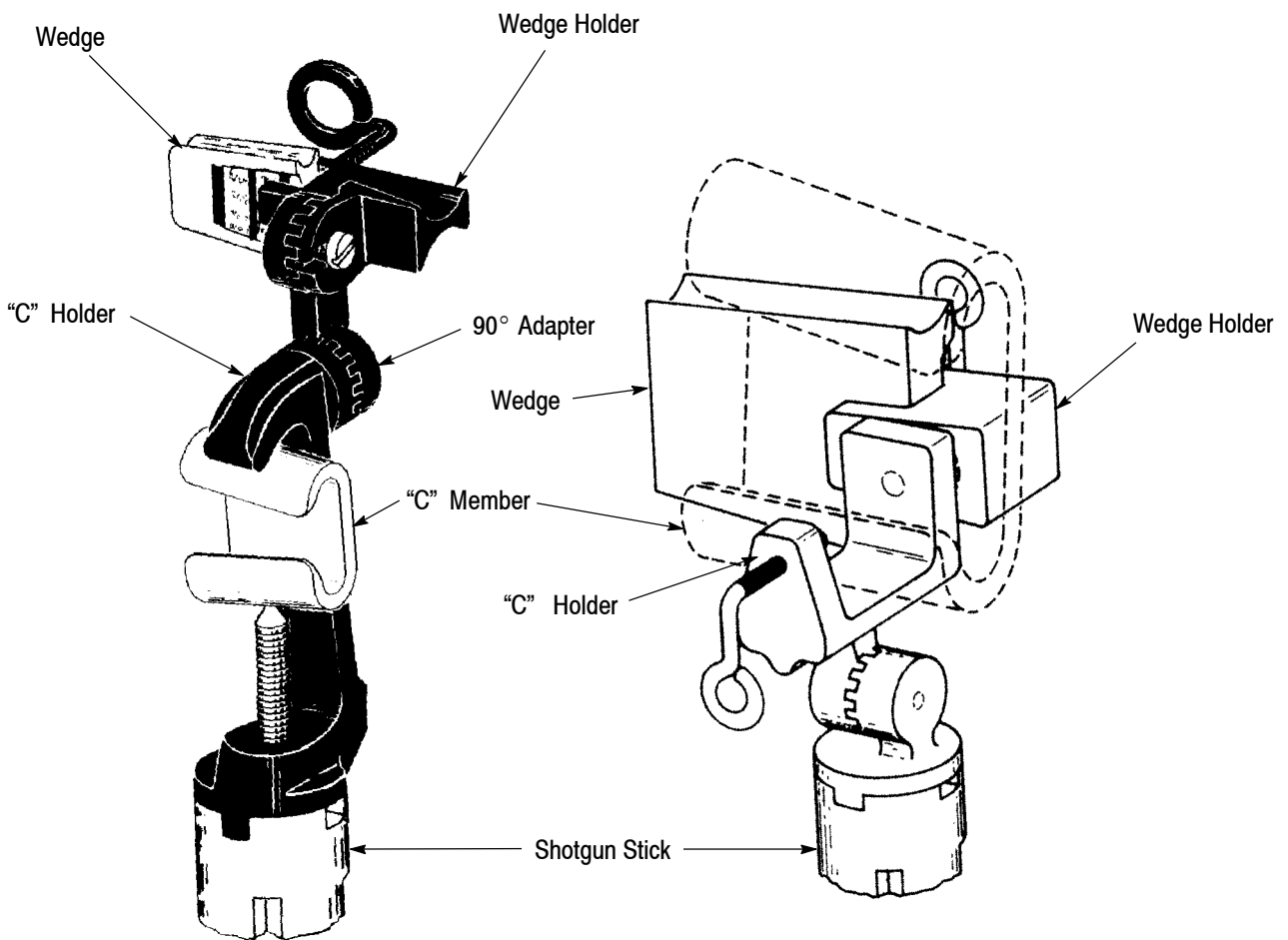


Figure 12

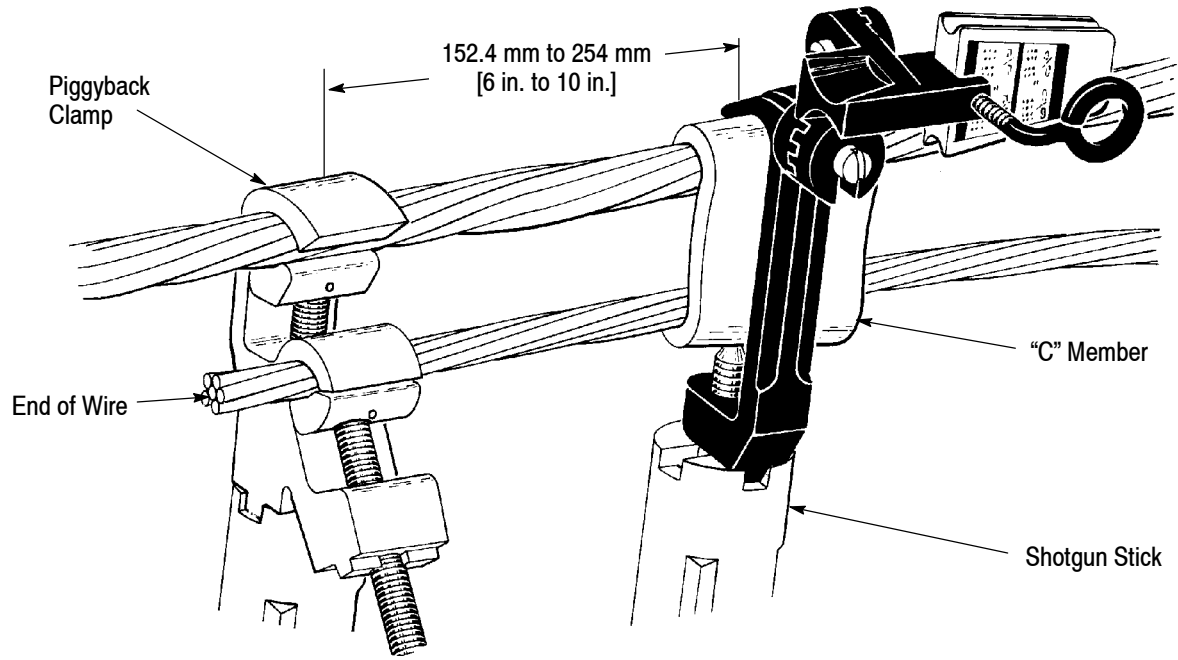


Figure 13

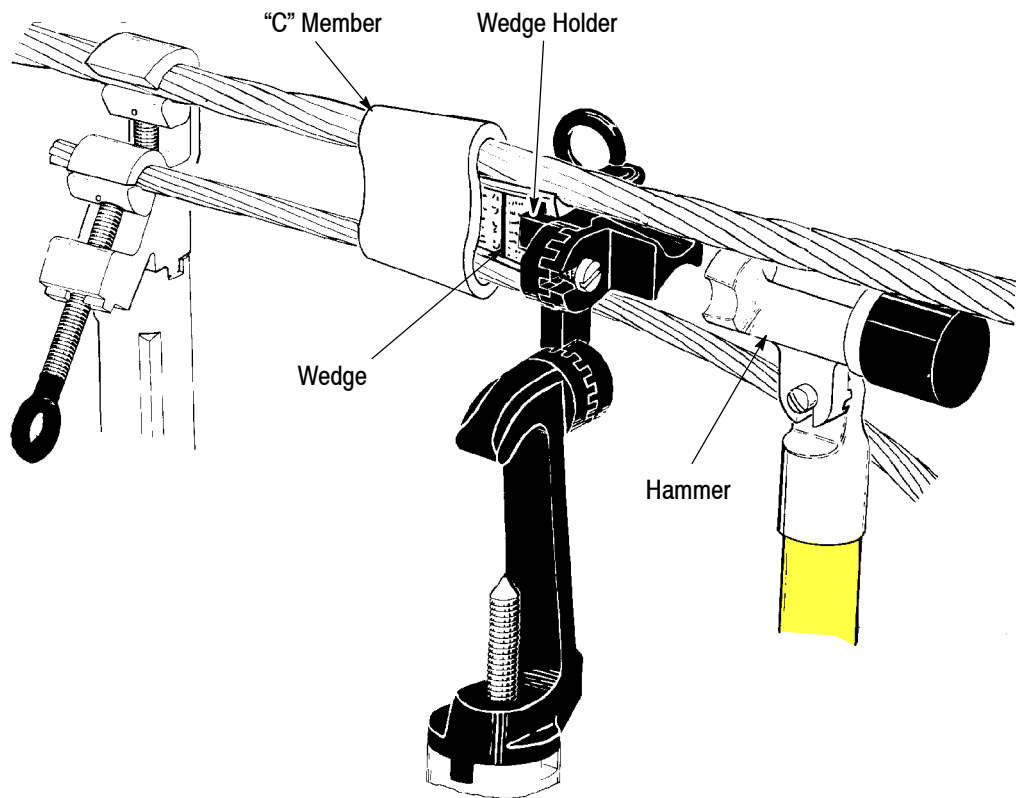


Figure 14

6. Use the rubber end of hammer to loosen wedge holder. Then remove shotgun assembly, leaving wedge in position. See Figure 15.
7. Proceed to Paragraph 4.4, Tool Selection and Preparation.

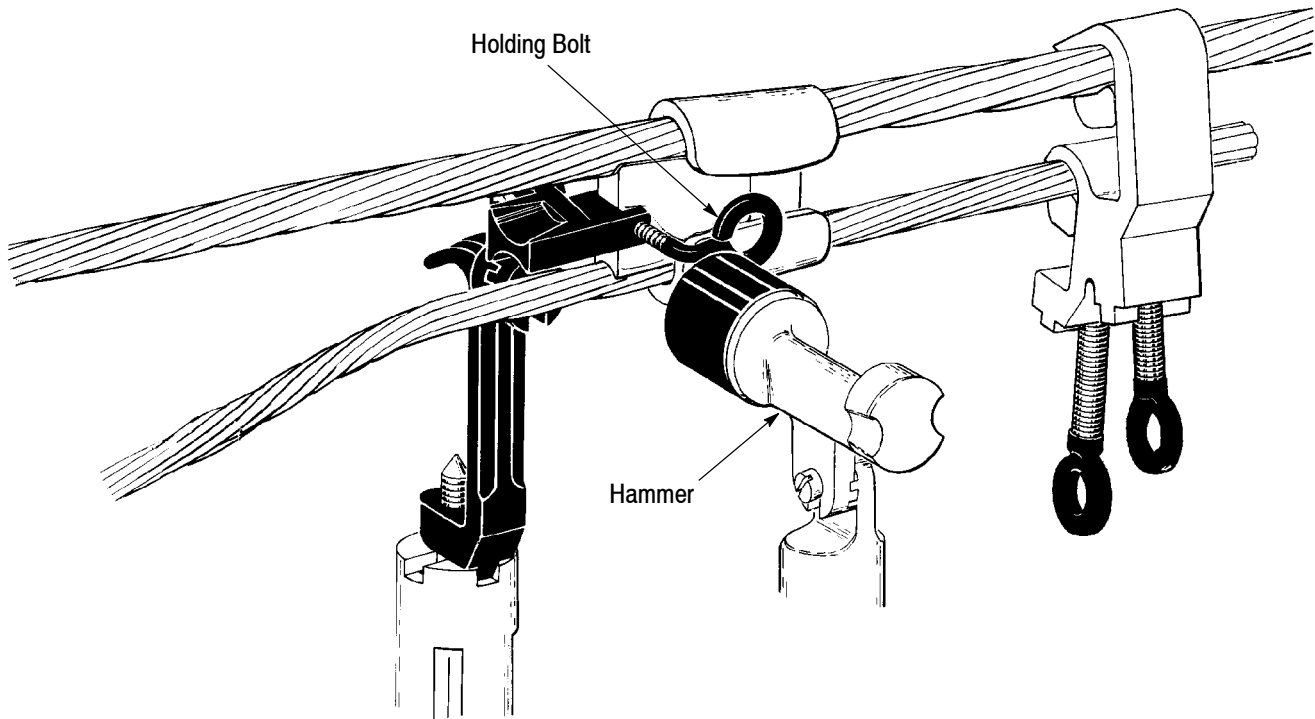


Figure 15

4.3. Alternate Tap Application Method

1. Tape wire ends to prevent fanning of strands. Assemble piggyback clamp to tap wire approximately 209.2 mm to 304.8 mm [8 to 12 inches] from wire end, and install the tap wire on through-line as shown in Figure 16.

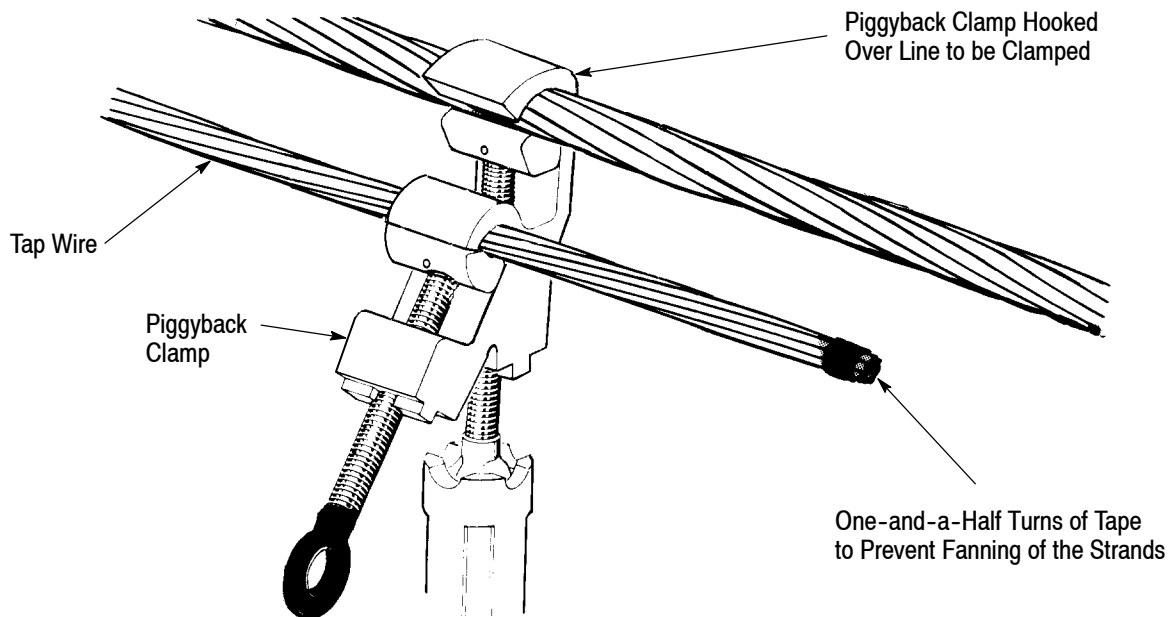


Figure 16

2. Place "C" member into "C" holder and tighten eye-bolt to hold "C" member in place. Place the wide end of the wedge into notch of wedge holder, making certain that wedge grooves match the through-line and tap wire sizes. Tighten the holding bolt. See Figure 12.
3. Install the "C" holder in shotgun stick and hook "C" member over tap wire and through-line 152.4 mm to 254 mm [6 to 10 inches] away from the piggyback clamp, with narrow end of "C" toward the piggyback clamp. See Figure 17.

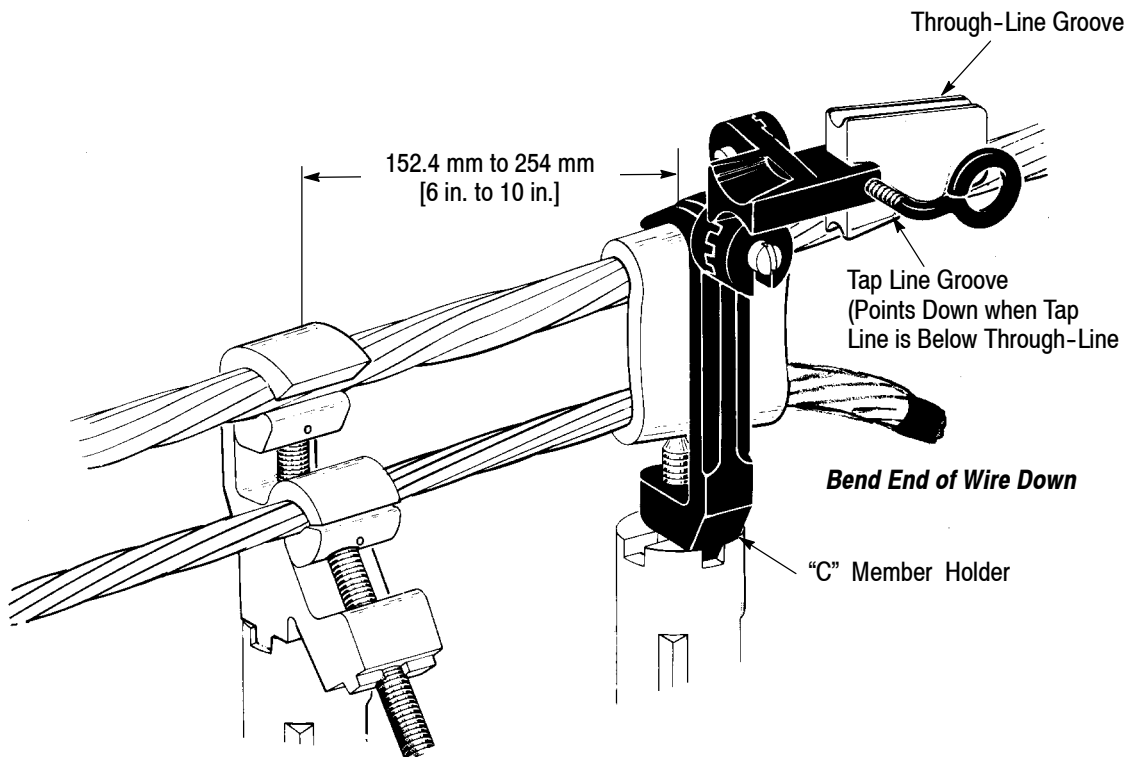


Figure 17

4. Turn the shotgun stick counterclockwise to loosen the "C" holder from the "C" member and remove the shotgun stick.
5. Maneuver the wedge between wires and into end of "C" member (Figure 18). The back of wedge holder may be used to bend end of tap wire to ease insertion of wedge. Strike the wedge holder with hammer sharply to secure wedge temporarily. The tap is now self-supporting.

NOTE

*If "C" member slides on conductor when wedge is inserted, use a second hot stick with a "C" holder to hold the "C" member in place. Proper insertion depth is about halfway into the "C" member. If wedge is inserted **more** than halfway, or if it is not inserted far enough, the wrong size tap is being used or the wedge grooves are reversed. Correct the situation before proceeding.*

6. Use rubber end of hammer to loosen and remove wedge holder, leaving wedge in position. See Figure 15.
7. Proceed to Paragraph 4.4, Tool Selection and Preparation.

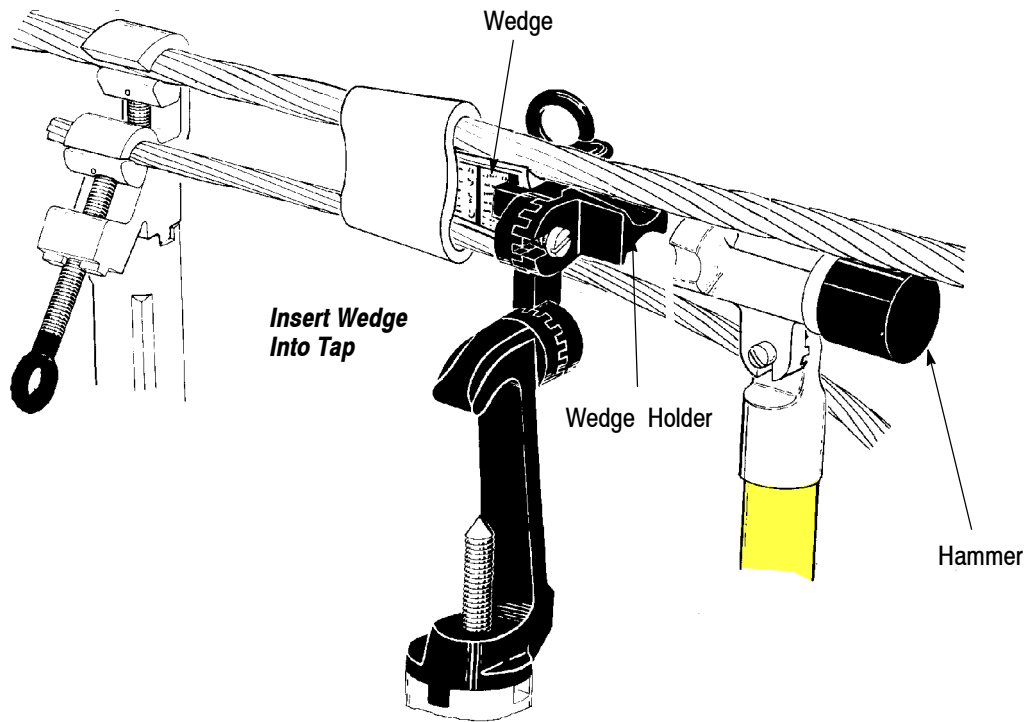


Figure 18

4.4. Tool Selection and Preparation

1. Observe the color-coded tap and select the appropriate tool and shell. See Figure 19.
2. When using red tap, install red platform on small tool. Hook platform over side of tool head and slide it forward until platform butts against front of tool; then tighten thumbscrew.
3. Unscrew the geared breech cap assembly and remove from the power unit.

NOTE Only the red taps use red platform No. 306814-3.

4. Hold ram in place with thumb, insert shell (colored to match color-coded tap) into breech, and replace and tighten geared breech cap assembly.

CAUTION Before tool is fired, make sure the geared breech cap assembly is fully tightened to prevent gas leakage. Failure to do so may result in a loud report, caused by release of gas under high pressure. Escaping gas also causes erosion of the piercer pin and piercer pin hole in the guide block.

COLOR-CODED TAP OR STIRRUP	SHELL	TOOL
Red	Red (No. 69338-2)	Small Tool No. 69437 with Red Platform No. 306814-3
White Type II and Copper Taps or Stirrups	White (No. 69338-5)	Small Tool No. 69437 without Red Platform
Blue	Blue No. 69338-1	
Yellow	Yellow No. 69338-4	Large Tool No. 69611

Figure 19

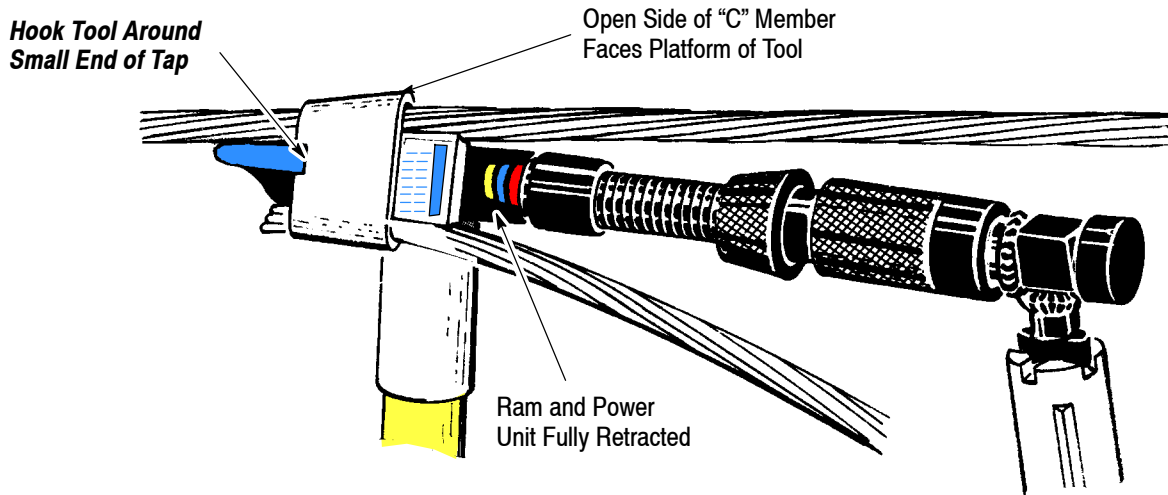


Figure 20

5. Turn shotgun stick counterclockwise to retract power unit, if it is not already fully retracted (Figure 9), to provide ample room for mounting tool overlap.

4.5. Mounting Tool on Tap

1. Mount the head of the tool over small end of tapered “C” member, with open side of “C” member facing tool platform. See Figure 20.
2. Position the “C” member in the correct notch in the tool head (Figure 21). Red tap must be positioned in lower (red) notch. White or blue tap must be positioned in outer (blue) notch. Yellow tap must be positioned under notch on large head. Correct positioning is necessary to ensure proper lancing of wedge and good connection. Turn shotgun stick clockwise to move power unit against back end of wedge (Figure 22). Tool is now ready for firing.

NOTE

When installing a yellow tap, check that the yellow band on the power unit is aligned with or advanced past the yellow guide mark on the head before firing the tool. If the wedge is not inserted far enough to permit this, check the wire and tap combination. If the wire/tap combination is correct, rap wedge (again) sharply with hammer.

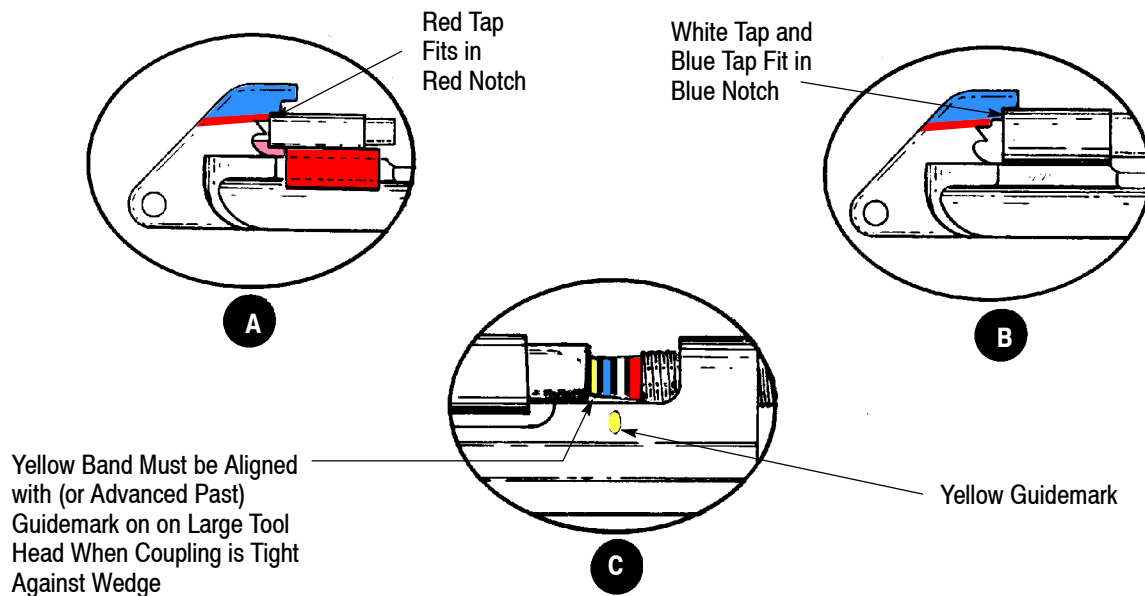


Figure 21

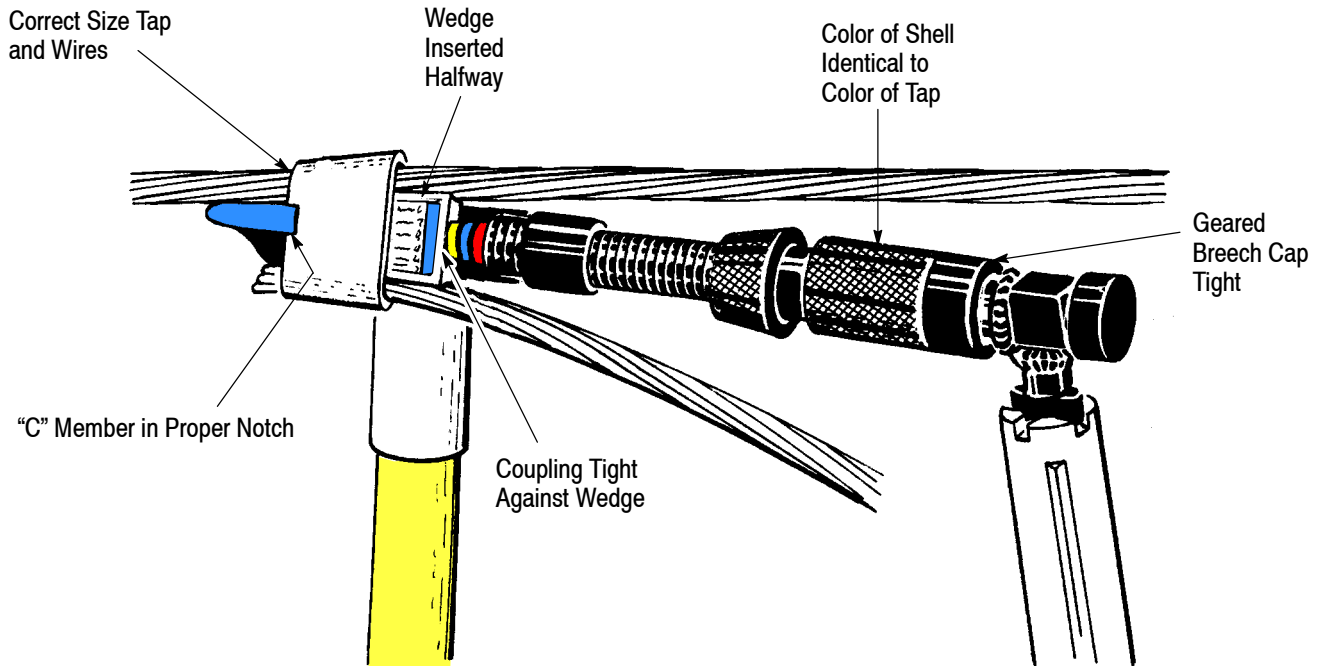


Figure 22

4.6. Firing Tool

Using rubber hammer on the end of hot stick, sharply strike the end of the geared breech cap assembly to fire the tool. See Figure 23.



Keep hands away from take-off clip during tap or stirrup removal. TAKE-OFF CLIP MOVES WHEN TOOL IS FIRED AND MAY CUT OPERATOR'S HAND OR GLOVE. Always grasp tool at knurled breech cap assembly.

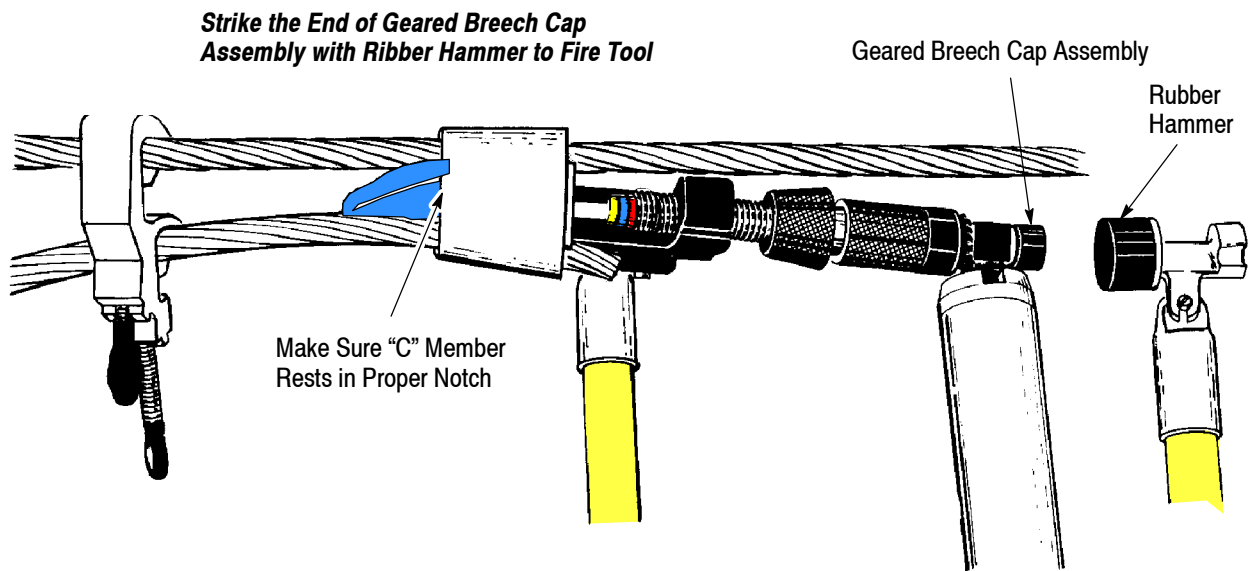


Figure 23

NOTE

If tool does not fire, strike the end of the geared breech cap assembly more solidly a second time. If tool still does not function, remove the tool from the tap and reload with a new shell. When using yellow shells, wait at least ten seconds after firing before proceeding to allow gas to cool. This prevents carbon and plastic deposits from forming at base of piercer pin.

CAUTION

Whenever firing of the tool results in an unusually loud report or "bang," ensure that the gas release knob was fully and securely tightened. If necessary, firmly and securely tighten the gas release knob, then check the piercer pin length as described in Paragraph 8.3 before using the tool again. If the gas release knob was tightened and the piercer pin length is correct and the tool continues to issue an unusually loud report when fired, the tool should be taken out of service immediately and then returned for repairs.

4.7. Removing the Tool

1. Remove the tool from the tap after firing by turning the shotgun stick counterclockwise. This permits gas to escape from the tool. In addition, continuing to turn the shotgun stick counterclockwise allows the power unit to loosen and the tool is cleared from the tap.
2. If standard tap application method was used (Paragraph 4.2) cut off excess wire extending from the tap.
3. Remove the piggyback clamp from the line.
4. Hold the tool so that the open end of the breech faces the ground and unscrew the breech cap assembly.

DANGER

Always eject the empty shell toward the ground and away from yourself and other personnel.

5. Pull the ejector sleeve to eject the shell. See Figure 24.

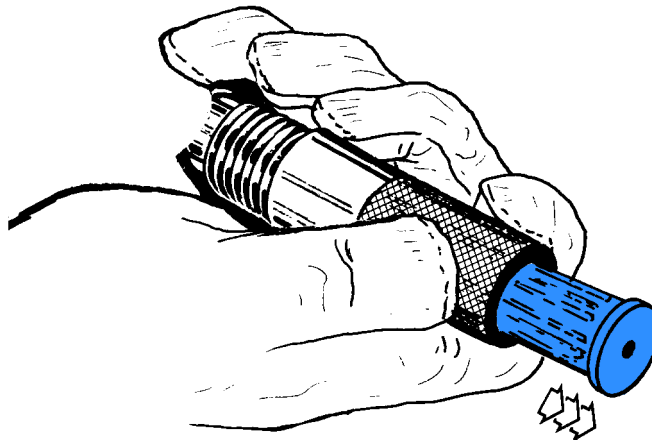
Eject Shell Away From Body

Figure 24

6. If gas has not released properly, considerable gas pressure may remain in the shell and the shell may stick in the breech. In the event that the shell sticks in the breech, point the open end of the breech away from yourself, place the end of a screwdriver between the end of the ejector sleeve and the threaded portion of the breech, and turn the screwdriver to eject the shell. See Figure 25.

DANGER

Excess gas pressure may eject the shell with sufficient pressure to cause injury. NEVER attempt to remove the shell by prying under the lip of the shell or by using pliers.

Insert Screwdriver Between Ejector Sleeve and Threads. Then Turn Screwdriver to Eject the Shell.

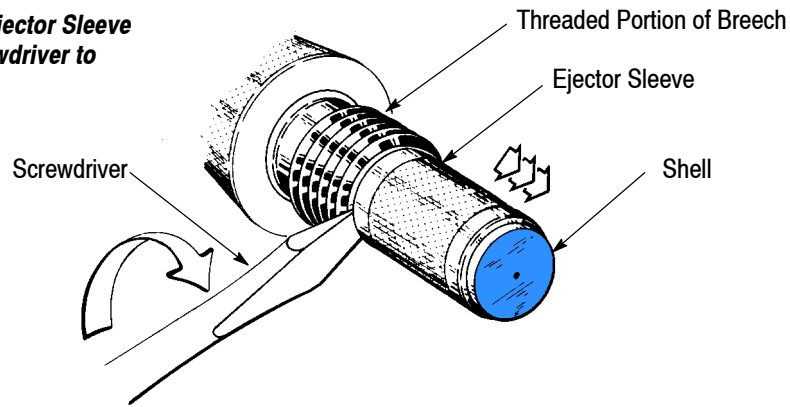


Figure 25

7. Replace geared breech cap assembly on tool. Do NOT load shell in tool.

NOTE



Red, white, blue, and yellow shells have the proper charge for each color-coded tap or stirrup. If the wedge is not driven far enough, check to be sure that the proper shell was used and that the wedge grooves of the tap used match the wire sizes. If incorrect tap was made, remove the tap as described in Section 6, REMOVAL OF TAP OR STIRRUP, and install proper tap.

5. APPLICATION OF AMPACT STIRRUP

5.1. AMPACT Stirrups.

The AMPACT stirrup consists of a “C” member, with a tin-plated copper wire bail permanently attached. Installation of AMPACT stirrups is very similar to application of AMPACT taps, as described in Section 4. Check the size and type of wire on which the stirrup is to be installed, and select the proper stirrup for the application. Refer to the appropriate product specification.

5.2. Stirrup Application

1. Thoroughly clean the through-line with the wire brush portion of the universal hot stick. Refer to Paragraph 4.2, Wire Preparation.
2. Pick up bail of stirrup in the shotgun stick (Figure 26).

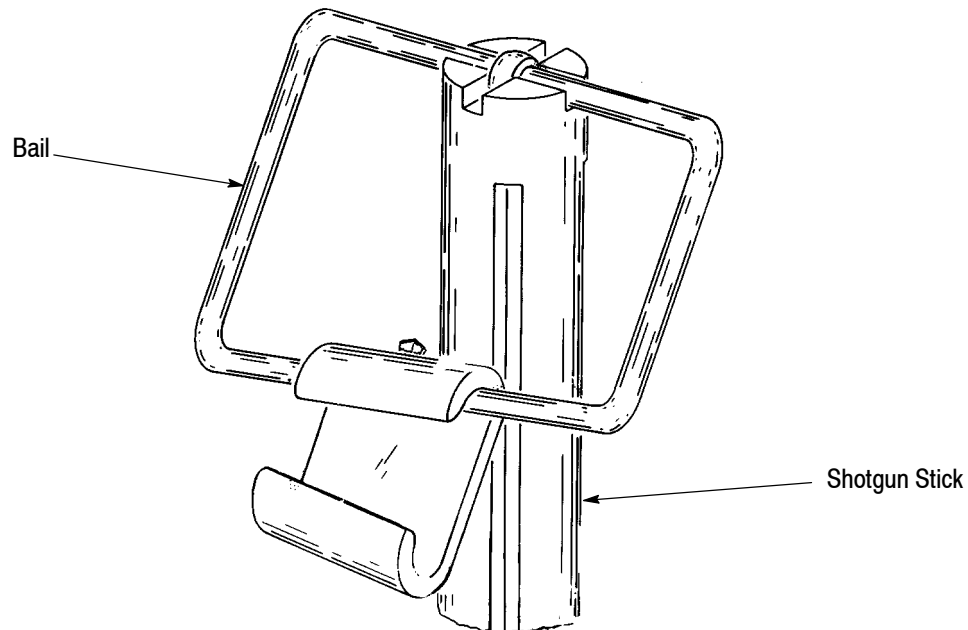


Figure 26

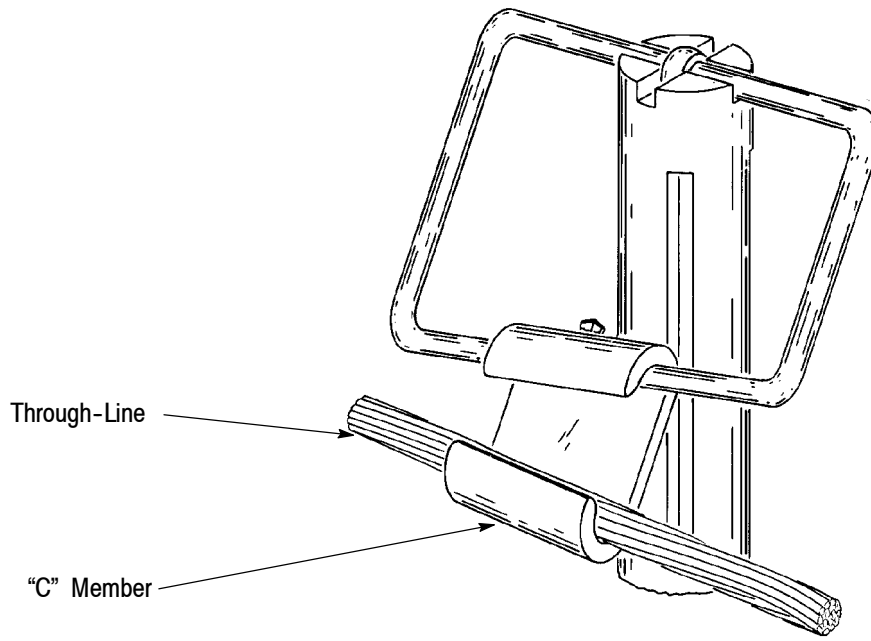


Figure 27

3. Hook "C" member on the through-line.
4. Insert wedge into "C" member. See Figure 28.

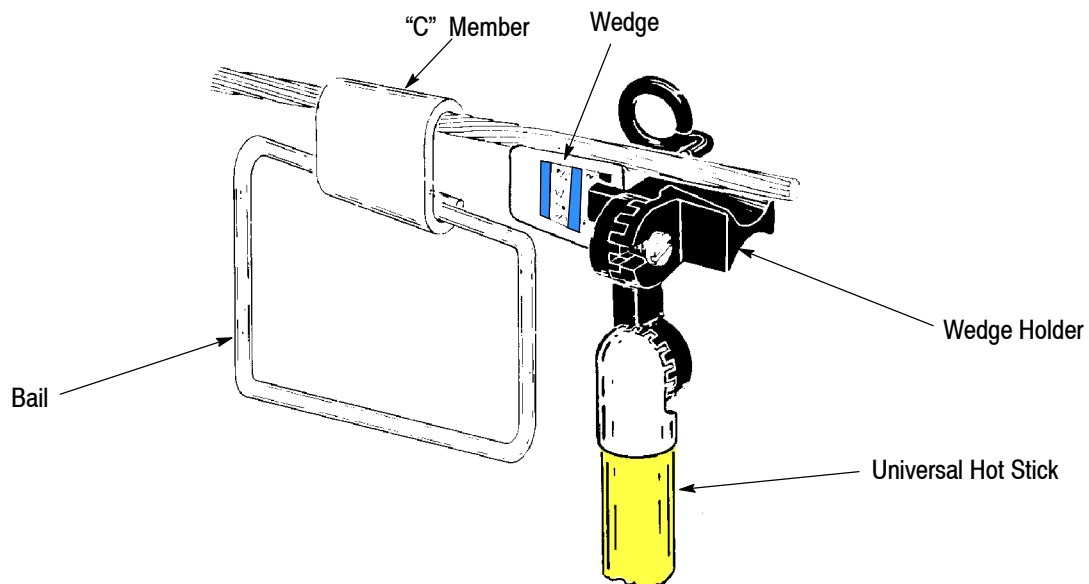


Figure 28

5. Use hammer to tap "C" member onto wedge. See Figure 29.
6. Use rubber end of hammer to loosen wedge holder and remove universal hot stick, leaving the wedge in position, as shown for the tap in Figure 15.
7. Follow the Steps 4.5 through 4.8 to install a stirrup or tap.

NOTE

Color-coding for stirrups is identical to color-coding for taps. Be careful to use shells of the proper colors to install or remove stirrups.

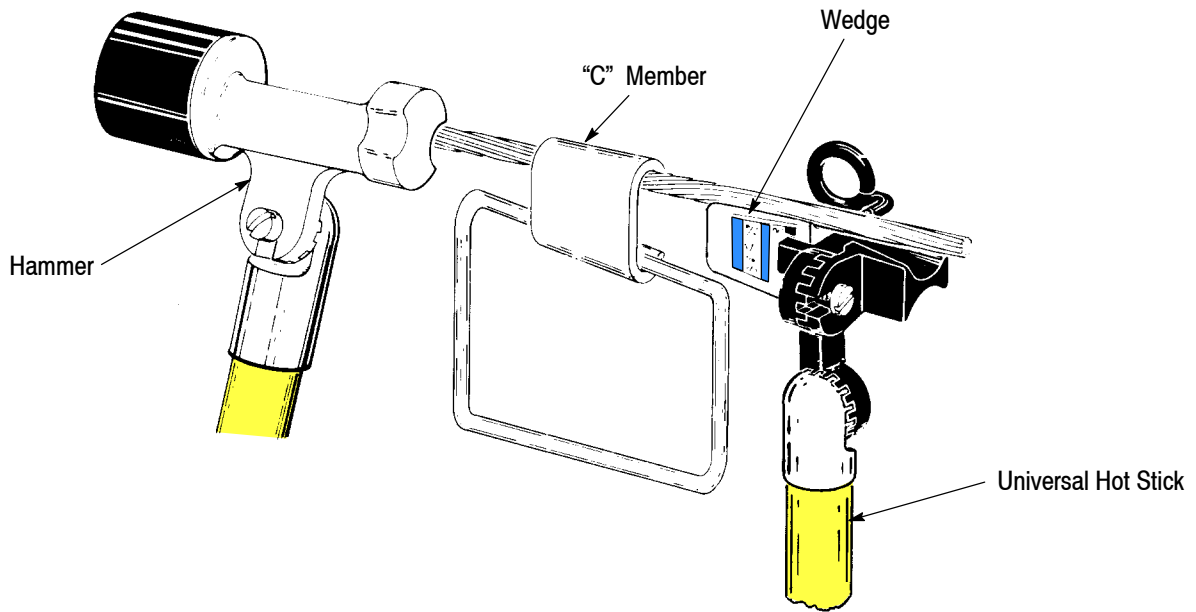


Figure 29

6. REMOVAL OF TAP OR STIRRUP

6.1. Selecting and Installing Take- Off Clip

1. Select the proper tool, take-off clip, and shell for tap or stirrup removal. Refer to Figure 30.



Be sure the tool isn't loaded with a shell when installing a take-off clip.

2. Fully retract the power unit as shown in Figure 9.
3. Attach take-off clip to tool by hooking one side of the clip over edge of tool and snapping in place. See Figure 31. Push clip back against the coupling.
4. Remove the geared breech cap assembly. Insert shell of proper color; replace and tighten geared breech cap assembly

COLOR-CODED TAP OR STIRRUP	TOOL	TAKE- OFF CLIP	SHELL COLOR
Red	Small 69437	69684	Red
Blue	Small 69437	69685-1	Red
White (Copper Tap)			
White (Type II)	Small 69437	69847	Red
Yellow	Large 69611	69847	Blue

Figure 30

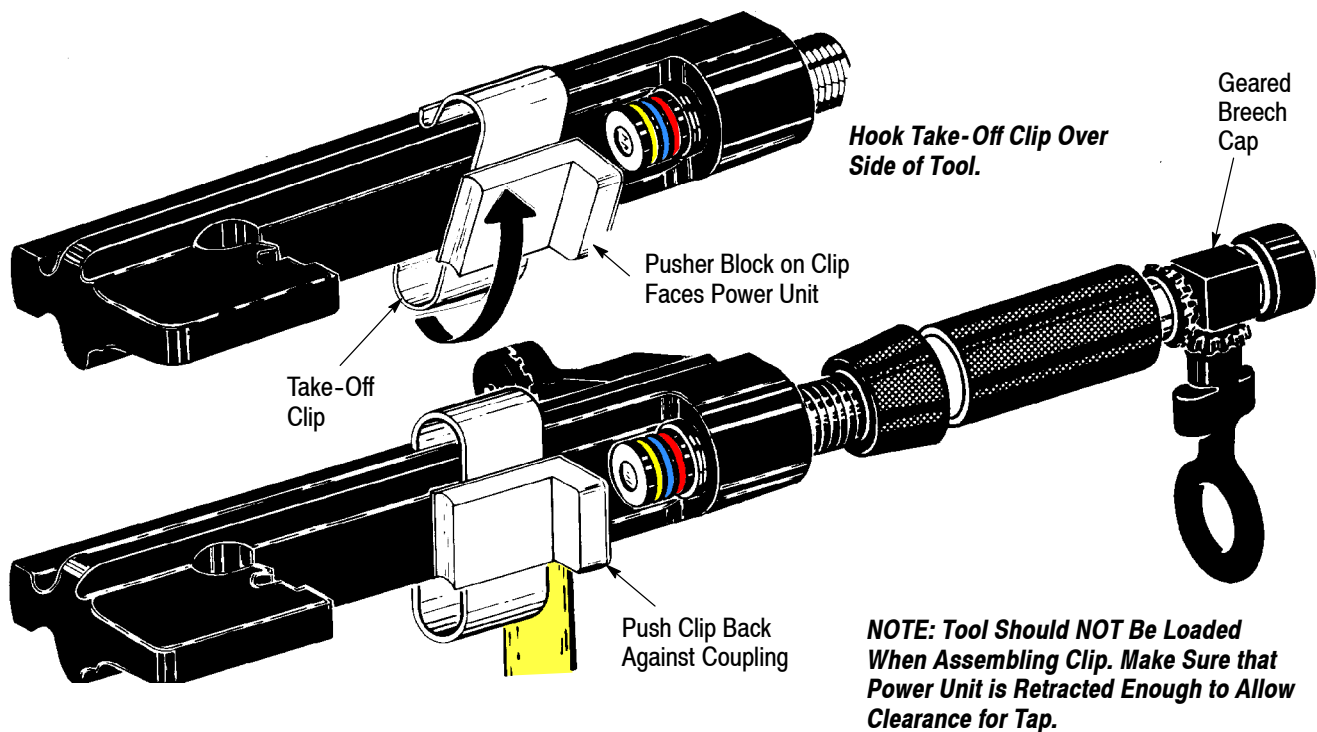


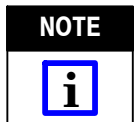
Figure 31



Use **only** red shells to remove red, white and blue color-coded taps. Use **only** blue shells to remove yellow-coded taps. **NEVER USE A YELLOW SHELL TO REMOVE A TAP.** Yellow shells are too powerful for tap removal.

6.2. Installing Piggyback Clamp

Use the shotgun stick to install piggyback clamp.



Make sure that both clamp bolts are tight.

The piggyback clamp provides safe removal of tap line.

6.3. Mounting Tool on Tap or Stirrup

1. Assemble tool holder and 90° adapter on the universal hot stick. Fasten AMPACT tool into holder, facing it in proper position to accomplish next step. Refer to Figure 6.
2. Attach the shotgun stick to geared breech cap assembly and turn shotgun stick clockwise to clamp power unit against pusher block of take-off clip.
3. Hook head of tool over small end of tapered “C” member of tap or stirrup, with OPEN SIDE OF “C” MEMBER FACING AWAY FROM TOOL PLATFORM. See Figures 32 through 35. Ensure that narrow end of wedge fits under correct notch in tool and that pusher block of take-off clip is properly positioned as follows:

Red-Coded Taps -- Be sure narrow end of wedge fits under the lower (red) notch of the small tool. Be sure the pusher block butts against the “C” member. See Figure 32.

Blue-Coded or White-Coded Copper Taps -- Be sure narrow end of wedge fits under the outermost (blue) notch of small tool and pusher block butts against “C” member. See Figure 33.

White-Coded Type II Taps -- Be sure narrow end of wedge fits under the lower (red) notch of the small tool. Be sure the lower stop of pusher block butts against the “C” member. See Figure 34.

Yellow-Coded Taps -- Be sure narrow end of wedge fits under the notch of the large tool and that the curved portion of the pusher block butts against the “C” member. See Figure 35.

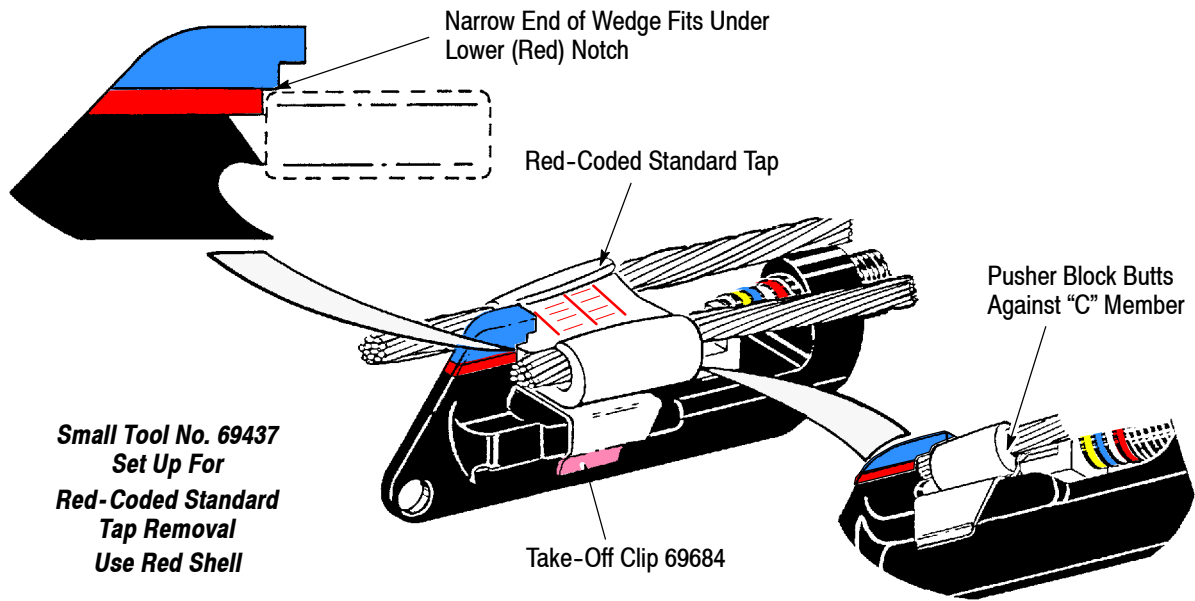


Figure 32

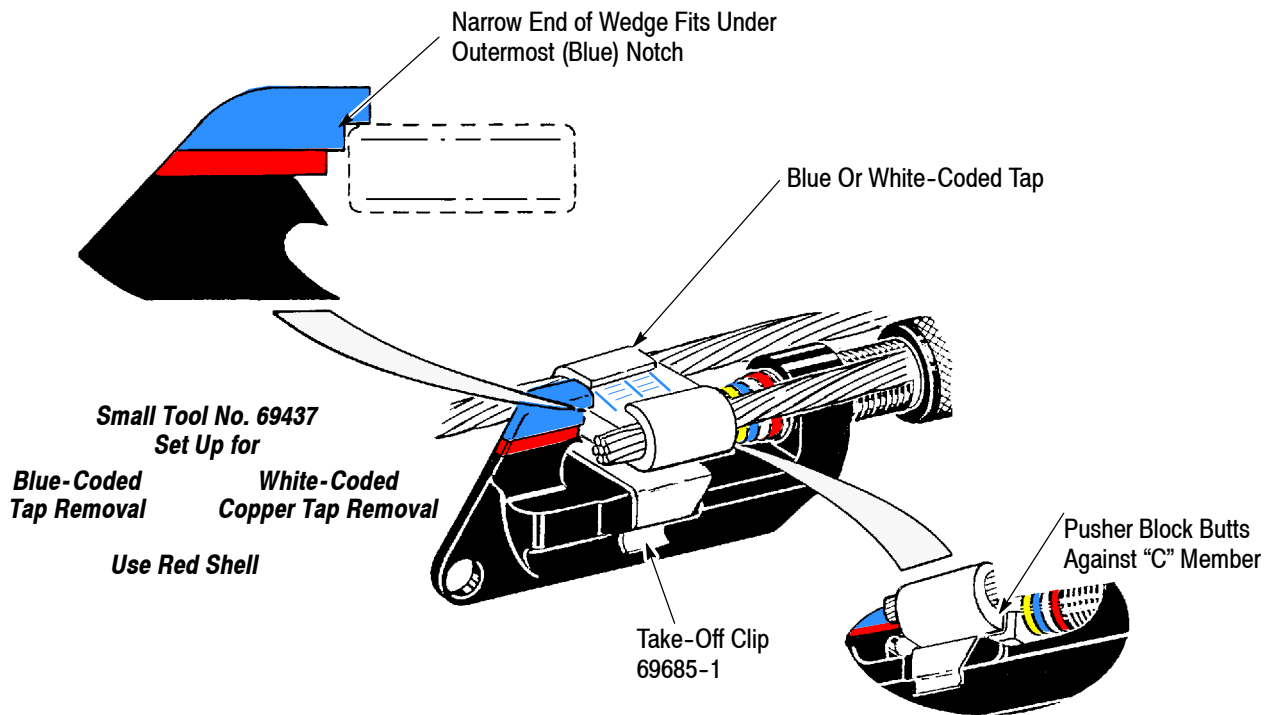


Figure 33

4. turn shotgun stick clockwise to tighten the face of the coupling and ram firmly against the pusher block take-off clip, making sure that "C" Member stays in the proper notch. The tool is self supporting and now ready for firing.

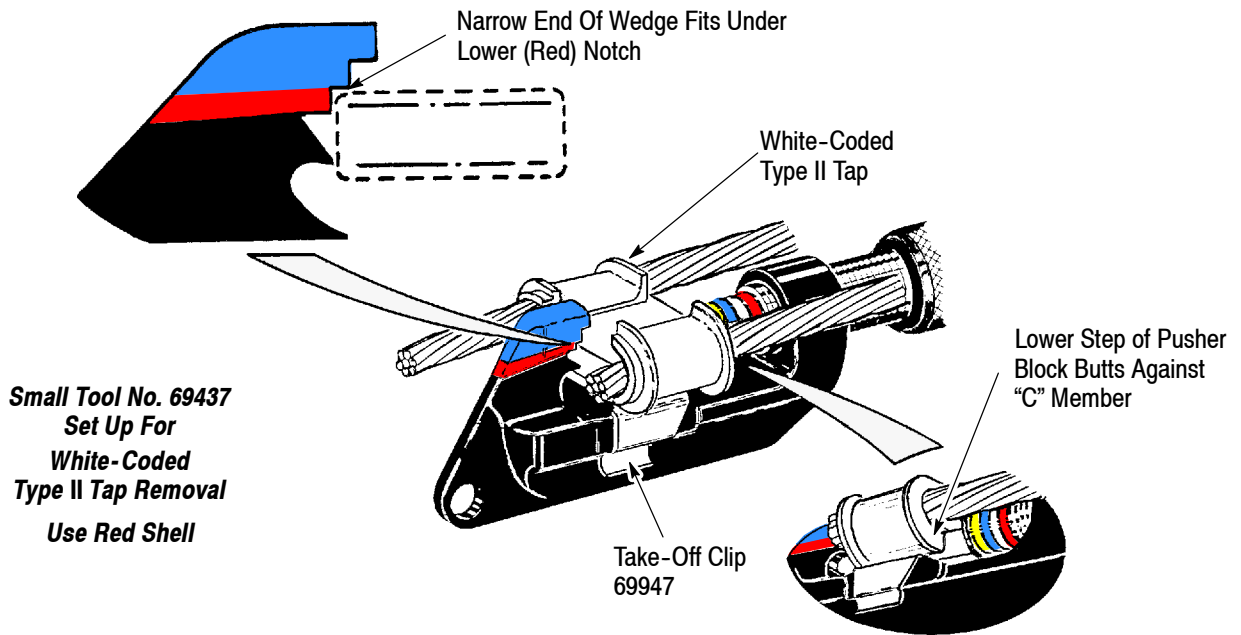


Figure 34

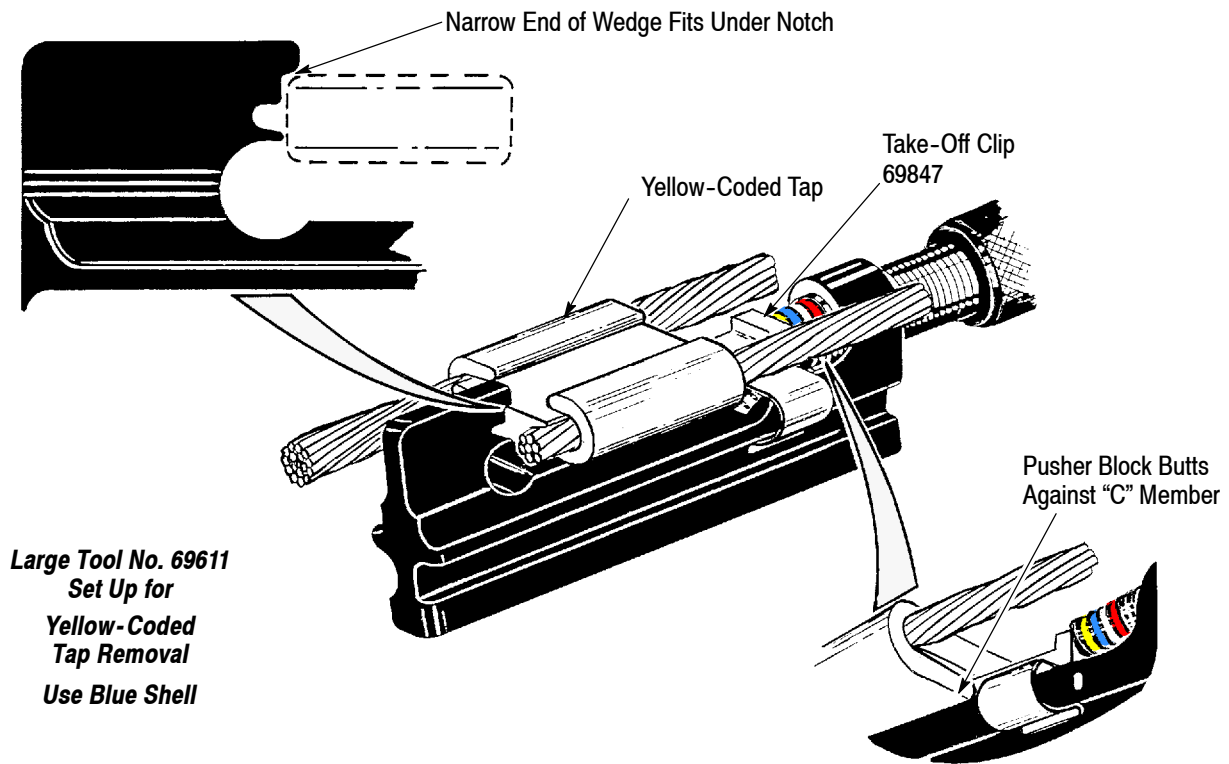


Figure 35

6.4. Firing the Tool

Fire the tool by striking the end of the geared breech cap assembly sharply with the with the rubber hammer (Figure 36). Remove the tool after firing by turning shotgun stick counterclockwise. Refer to Paragraph 4.7.

7. TOOL MAINTENANCE

7.1. Maintaining the AMPACT Tool

With regular inspection and minor maintenance, the AMPACT tool will provide years of continuous, safe operation. Refer to customer manual 409-2106, supplied with AMPACT tools, for detailed information concerning required daily and weekly serving of the AMPACT tool. Clean and check the geared breech cap assembly periodically, depending on the amount of use.

7.2. Cleaning and Lubrication

Tyco Electronics recommends Hoppe's No. 9 Solvent and Browning Gun Oil, or equivalent solvent and lubricant, for the following procedures:

- Use solvent to remove dirt and grit from all threaded areas, coupling, breech, and gas release knob.
- Coat and lubricate threads, ram, and inside of breech.
- Clean outside of tool with solvent, before storing.

7.3. Maintaining the Geared Breech Cap Assembly

Carbons and plastic deposits caused by "blow-by" collect inside the geared breech cap assembly. The deposits, if allowed to build up, prevent gas release from seating and the piercer pin from puncturing the shell properly. This may prevent release of the gas after firing and leave a spent shell (under pressure) in the breech. To prevent this, clean the breech cap assembly as follows:

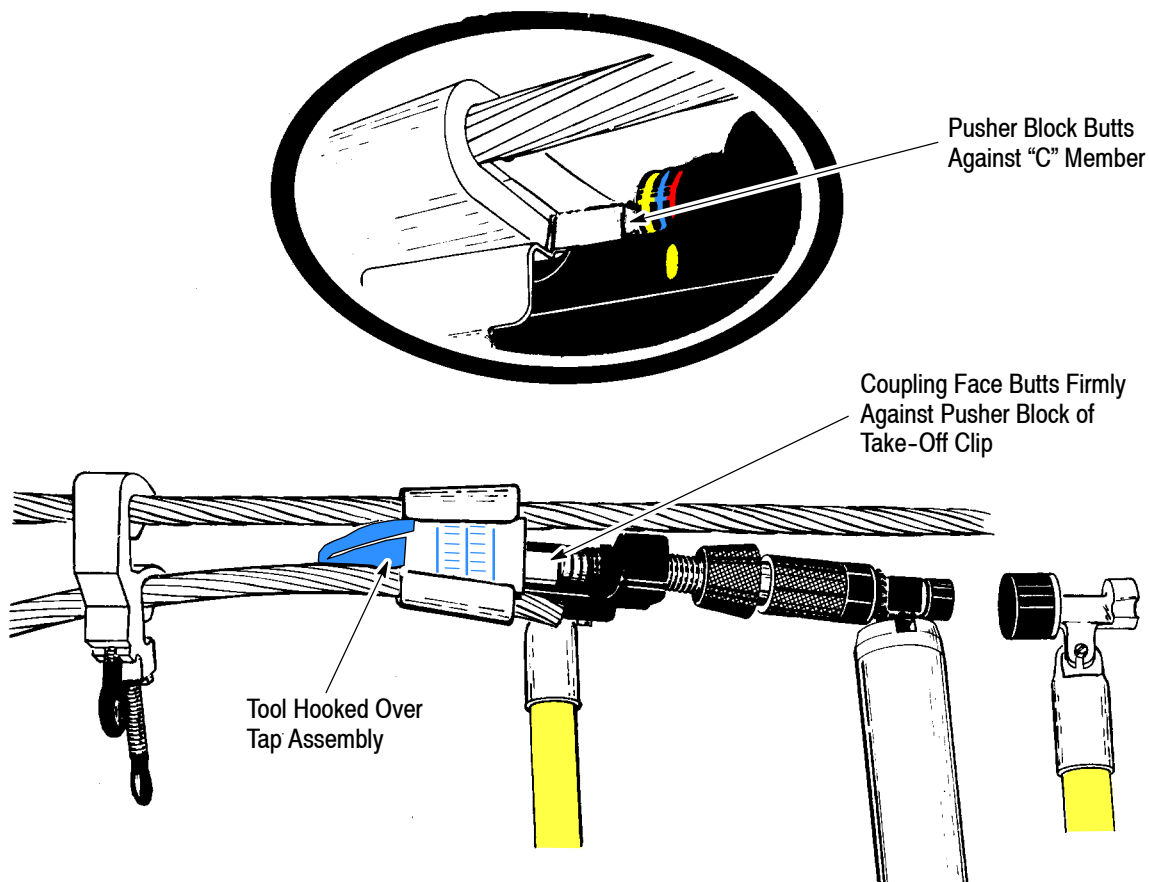


Figure 36

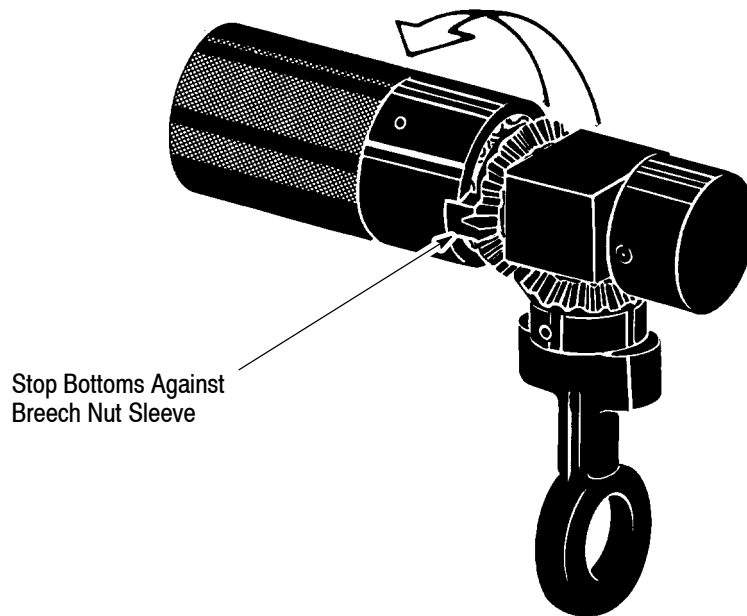


Figure 37

1. Remove the geared breech cap assembly from the power unit.
2. Hold the geared portion of geared breech cap assembly and turn the breech nut sleeve counterclockwise until the stop bottoms against breech nut sleeve. Refer to Figure 37.
3. Clamp end of geared breech cap assembly in vise. Use retaining ring pliers (TRUARC No. 0309, or equivalent) to compress retaining ring, as shown in Figure 38. Hold the retaining ring compressed and unscrew the breech nut sleeve.

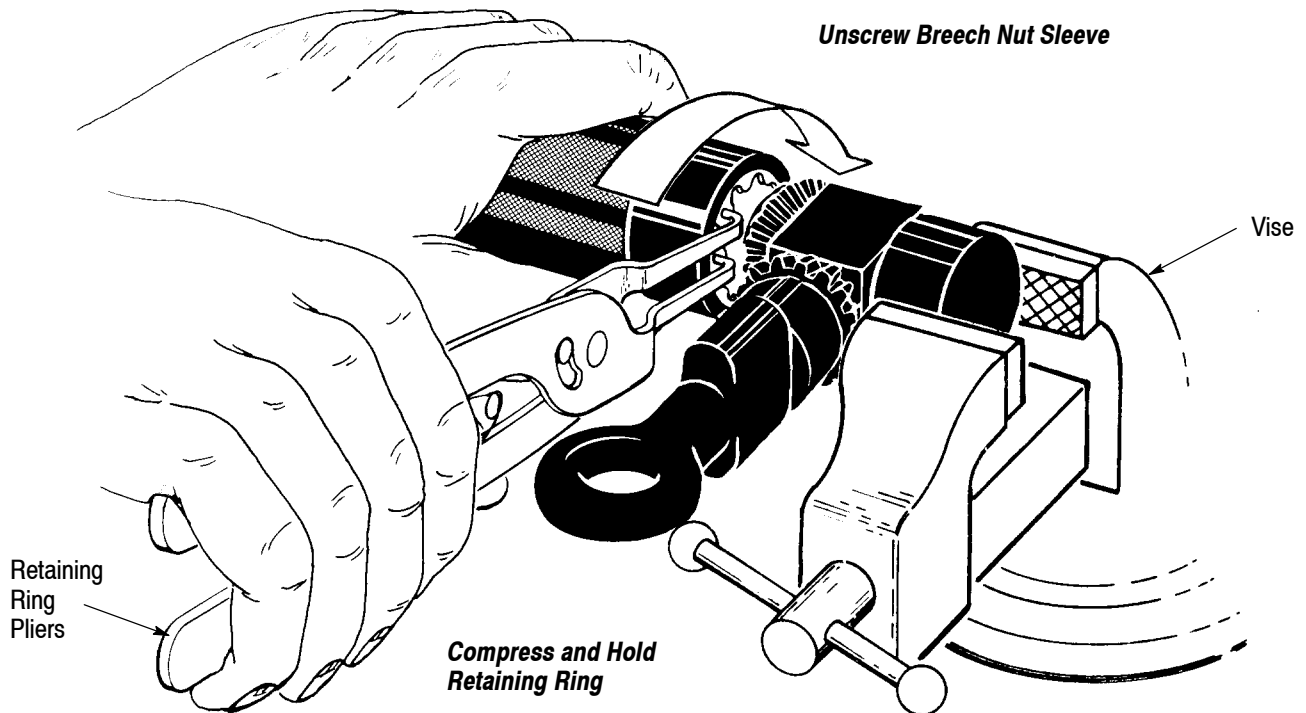


Figure 38

4. Clean the carbon deposits from face of gas release and inside of breech nut sleeve using HOPPE'S No. 9 (or equivalent) cleaning solvent and AMPACT Breech Cleaning Tool.
 - a. Place cleaning tool on gas release, with cutting blades against face of gas release (Figure 39) and rotate cleaning tool.
 - b. Clean shoulder of piercer pin and use gage portion of cleaning tool to check length of piercer pin, as shown in Figure 40. If pin passes through the slot in the gage, the geared breech cap assembly must be returned to the factory for repair or replacement, as described in Section 8, RETURN OR REPLACEMENT.

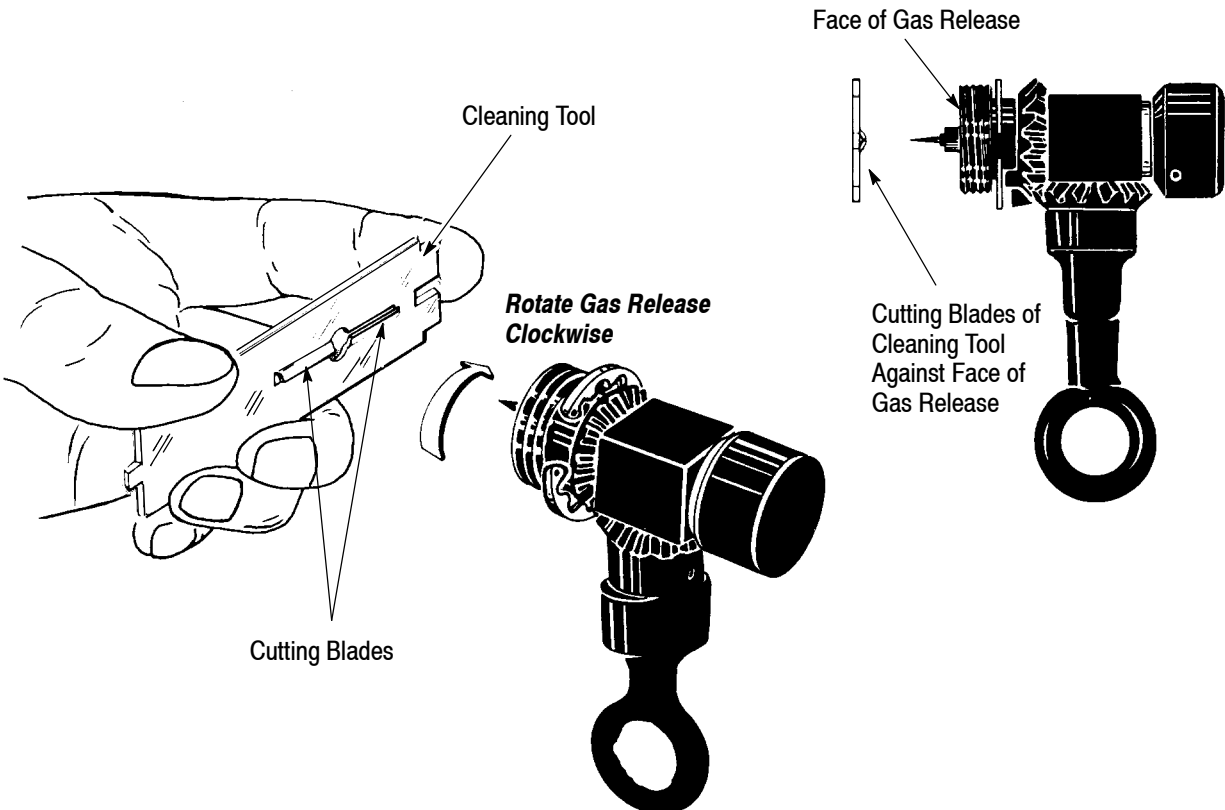


Figure 39

- c. Insert the cleaning tool into the back of the breech nut sleeve and rotate tool clockwise to clean piercer pin guide and gas release facing surface, as shown in Figure 41.
 - d. Check piercer pin guide hole. If the hole is worn or oval-shaped, install a new breech nut sleeve.
 - e. Insert the cleaning tool into the front of breech nut sleeve and rotate tool clockwise to remove carbon deposits and plastic "blow-by." See Figure 42.
 - f. Clean the threads with solvent and coat all cleaned surfaces and threads with solvent.
5. Clamp end of geared breech cap assembly in vise. Then with retaining ring compressed, screw the breech nut sleeve onto the gas release assembly. Release the retaining ring into the groove in breech nut sleeve. See Figure 43.
 6. Ensure that retaining ring is properly located in breech nut sleeve groove. Then turn the gas release assembly clockwise until it bottoms against retaining ring to make sure that the retaining ring acts as a positive stop (Figure 44).
 7. Clean gears and external surfaces with solvent.

The assembly is now ready for service.

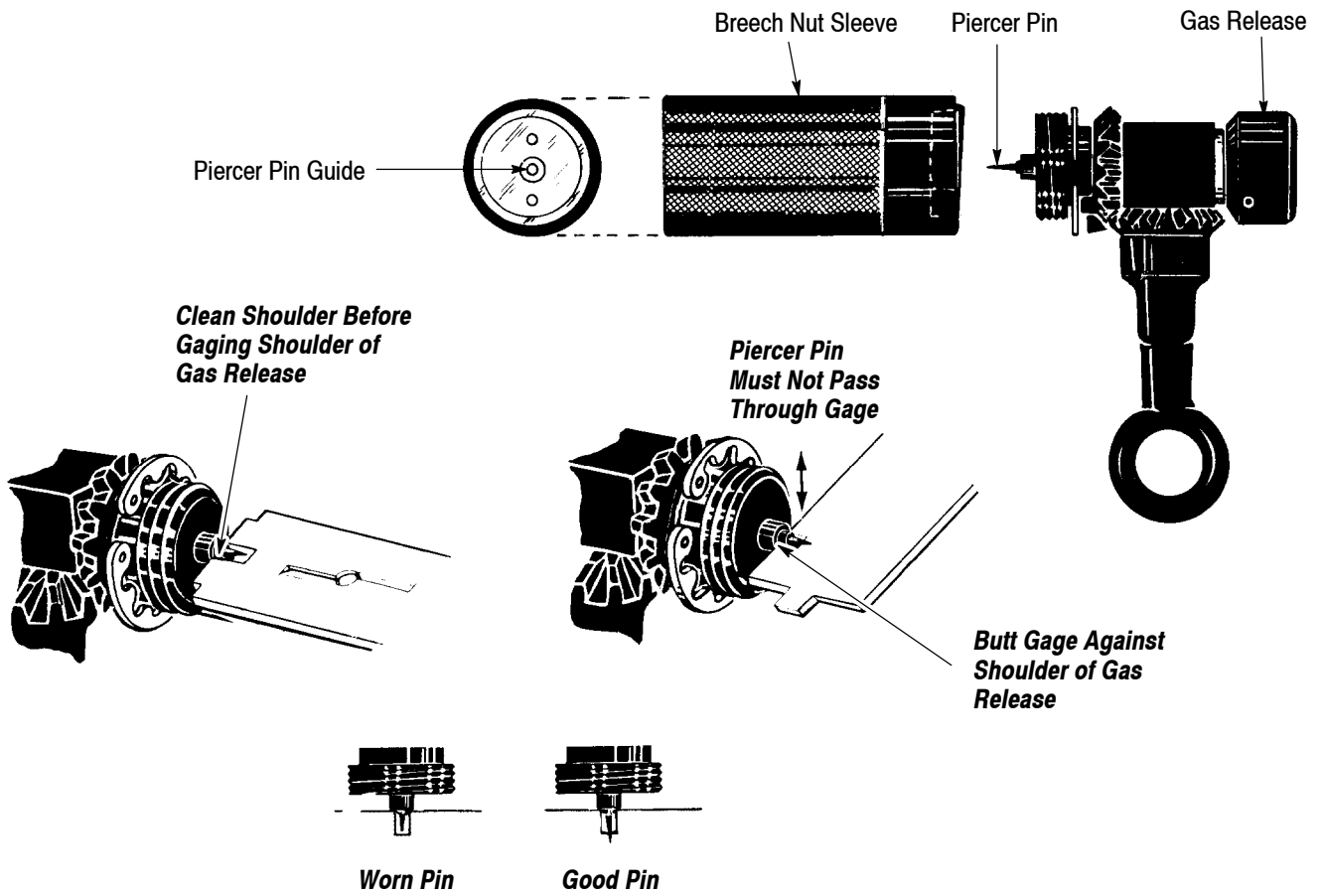


Figure 40

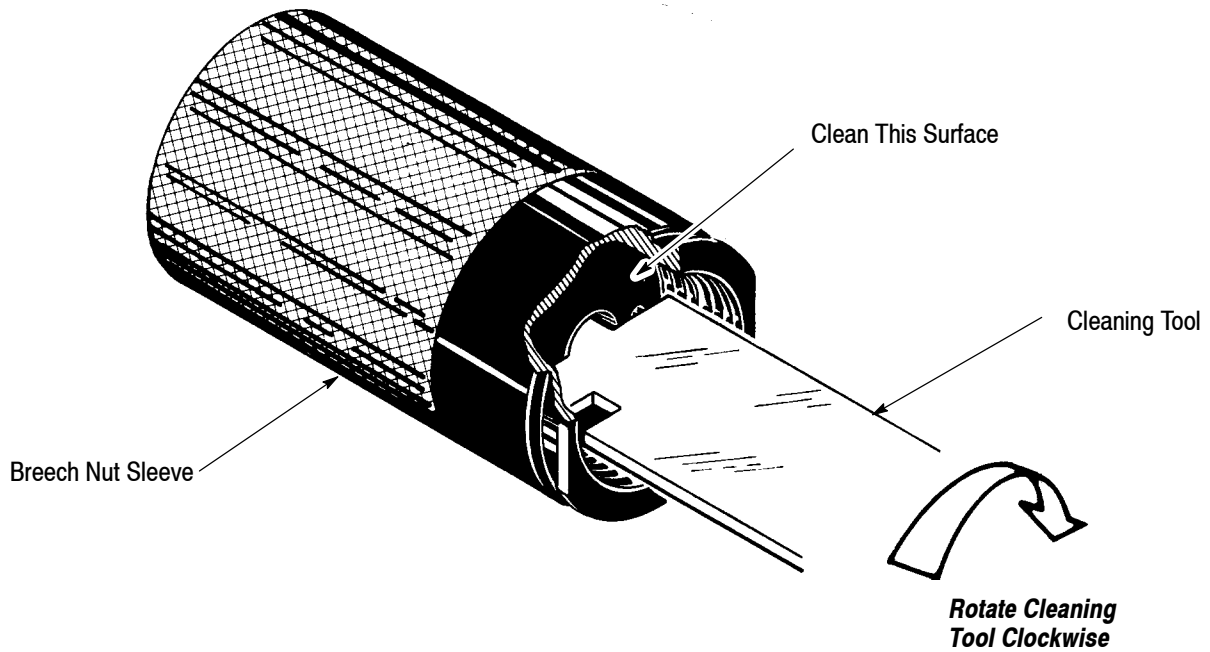


Figure 41

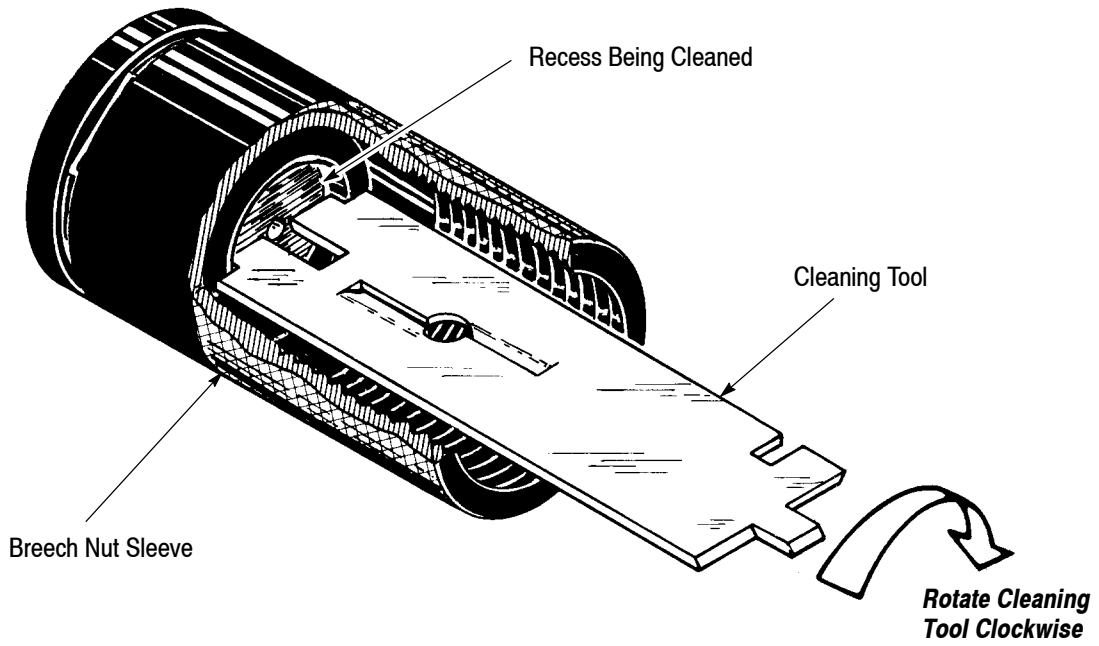


Figure 42

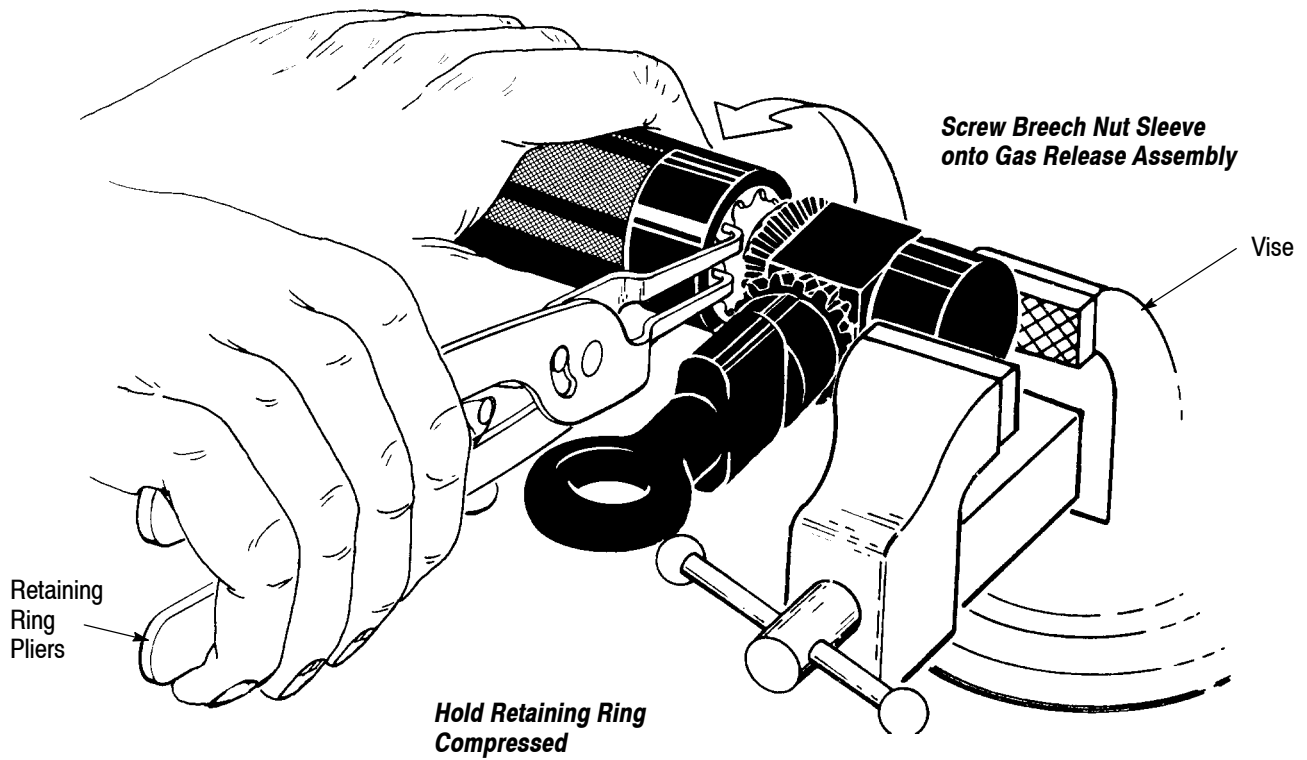


Figure 43

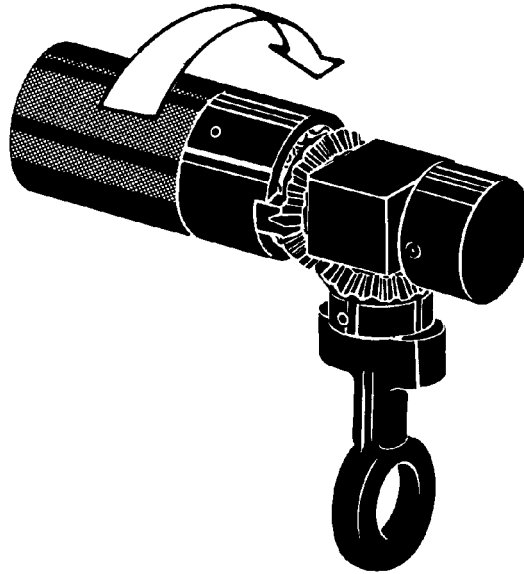


Figure 44

8. RETURN OR REPLACEMENT

In the U.S., return tools to:

TYCO ELECTRONICS
ENERGY DIVISION
8009 PURFOY ROAD
FUQUAY-VARINA, NC 27526
ATTN: AMPACT TOOL REPAIR

In Canada, return tools to:

TYCO ELECTRONICS CANADA LTD
20 ESNA PARK DRIVE
MARKHAM ONTARIO
CANADA L3R 1E1
ATTN: AMPACT TOOL REPAIR, ENERGY DIVISION, BUILDING 1

For telephone assistance, call the Energy Division Customer Service Center: 1-800-327-6966.

9. REVISION SUMMARY

Revisions to this customer manual include:

- Updated format;
- Applied the TE logo;
- Tyco Electronics contact phone numbers have been changed/deleted.