HT-0095
Mini PV Receptacles 22-32 AWG Crimping Hand Tool

Tool P/N HT-0095

FCI MANUAL P/N 415988-001

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HT-0095

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Hand Tool Function

The HT-0095 is a manually operated hand tool designed for crimping loose piece (individual) Mini PV™ terminals to various sizes of wire.

Physical Description

The major components, which make up the HT-0095, are identified in Figure 1. These components include a frame, lever, tooling and tooling holders, and terminal holding pins. The heart of the hand tool is the tooling. The tooling performs the crimping operation and is divided into top and bottom component groups. The top group consists of those parts, which remain stationary with the frame. The bottom group contains those parts, which move with the lever. The HT-0095 is equipped with tooling for crimping two different ranges of wire sizes. These are identified as "A" and "B" on a plate affixed to the hand tool frame. The "A" side tooling is for crimping terminals to wire sizes ranging from 28-32 AWG. The "B" side tooling is used for wire sizes from 22-26 AWG.
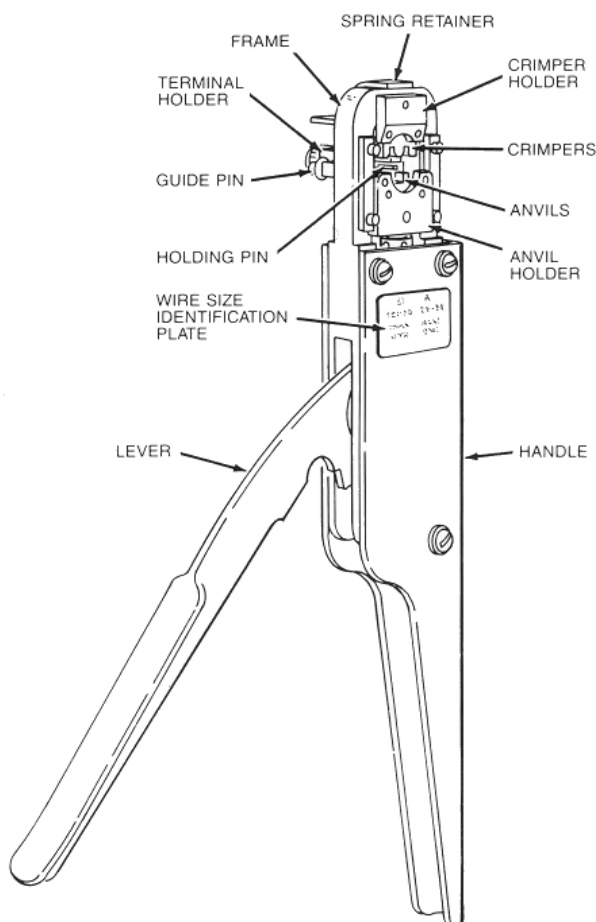
Figure 1

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Principles of Operation

The lever attaches to the lower tooling and provides the mechanical advantage to generate the necessary crimping pressure. As the lever is closed, a ratchet mechanism engages to prevent the lever from opening until the crimping cycle is complete. When the lever is pulled closed, the lower tooling and terminal are pushed up against the upper tooling. The crimp is formed between the wire and insulation barrel anvils and the wire and insulation crimpers. Once closed, the ratchet releases and allows a spring to pull the lever open.

Specifications
(See TA-75, TA-146)
When crimping the Mini PV™ to wires, the following parameters must be met.

Wire Length Requirements:
- Minimum …………………………………..19.05 mm (0.75 in.)
- Maximum ………………………………….As Required

Insulation Diameters of Wires:
- "A" Side (28-32 AWG) ………………………0.71-1.37 mm (0.028-0.054 in.) Dia.
- "B" Side (22-26 AWG) ………………………0.91-1.52 mm (0.036-0.060 in.) Dia.

Strip Length of Insulation:
- Discrete and Latch
  Housing Applications ……………………….3.81-4.31 mm (0. 150- 0.170 in.)
- Rod Housing
  Applications ……………………………….3.30-3.81 mm (0. 130-0.150 in.)

Wire Barrel Crimp Height:
 (For All Applications)
- Single Wire 22-26 AWG or
  Two Wires 26-28 AWG ……………………..0.81-0.86 mm (0.032-0.034 in.)
- Single Wire 28-32 AWG or
  Two Wires 30-32 AWG ……………………..0.66-0.71 mm (0.026-0.028 in.)

Insulation Barrel Crimp Height:
- Discrete Application ………………………..2.84 mm (0. 112 in.) Max.
- Latch and Rod Housing
  Applications ……………………………….1.75 mm (0.069 in.) Max.

 Mini PV™ Receptacles:
- Loose Piece ………………………………..22-32 AWG

NOTE: Loose piece terminals have different part numbers than reeled terminals.

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If the terminal and the tooling are not compatible, damage to the tooling could result. If you wish to use a terminal with a part number other than the one that was ordered for the HT-0095, check with your distributor or with FCI Electronics to be sure that the new terminal number is compatible with your hand tool.

OPERATION

Operating Procedures

To prevent hand injury, keep fingers from between the upper and lower tooling and from between the lever and handle when closing hand tool.

1. Hold the hand tool so that the lever is on the left. With your index finger, push and hold the terminal holder in its forward position (see Figure 2).

2. Insert the disconnect (box) portion of the terminal, with "U" shaped barrels up, onto the holding pin and against the pin shoulder. While holding the terminal against the shoulder, release the terminal holder. This ensures that the terminal remains in proper position while moving over the anvil.
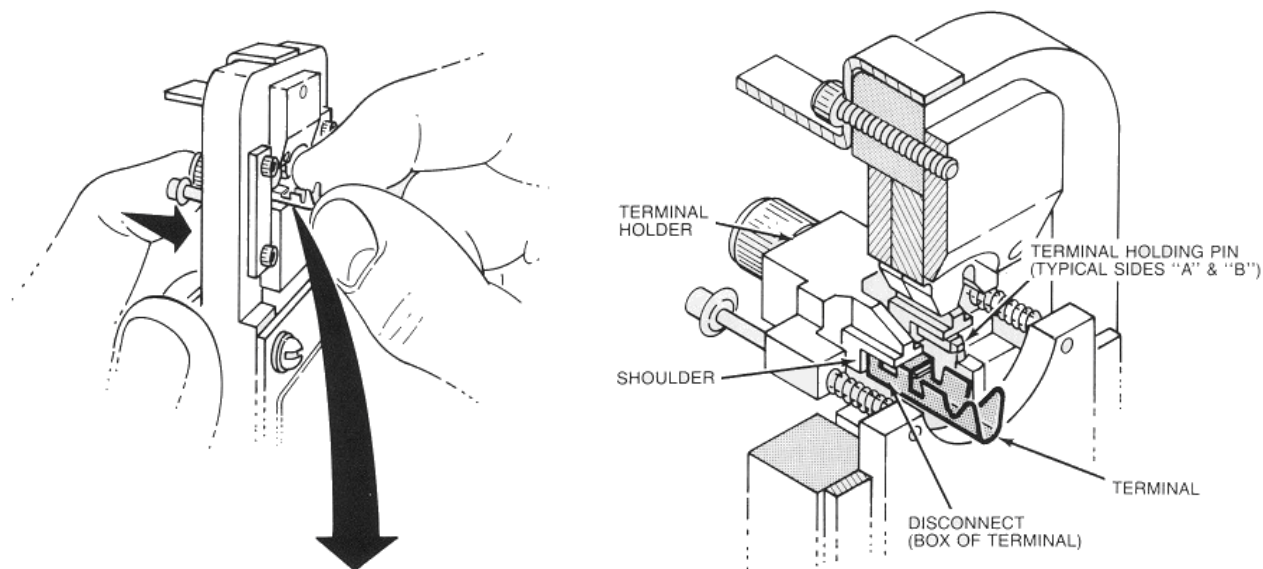
Figure 2. Positioning Terminal

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3. While grasping the lever and the handle portion of the frame, insert a wire so that the end of the insulation is centered between the wire barrel and the insulation barrel of the terminal (see Figure 3), and then close the hand tool lever completely. This will crimp the terminal to the wire(s).
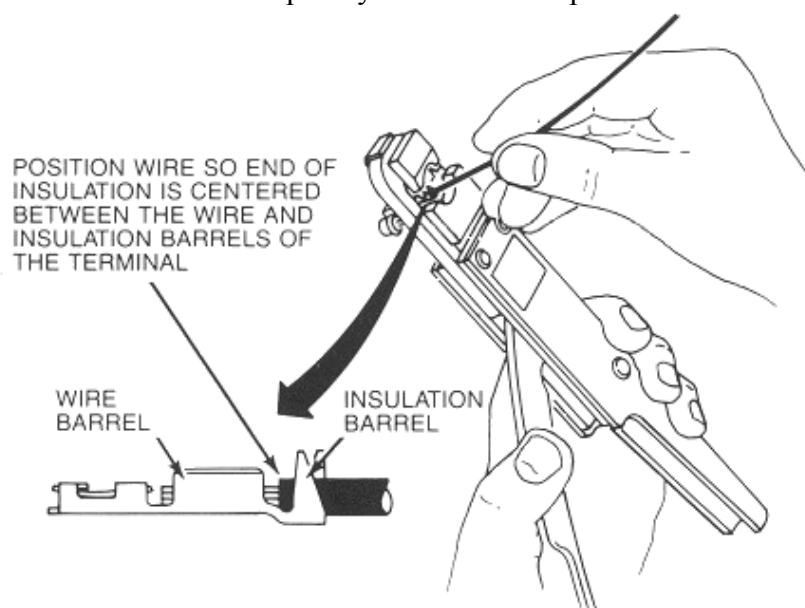

Figure 3. Crimping Terminal to Wire

4. Release the lever to open the hand tool and remove the crimped terminal from the holding pin by lightly pulling straight out on the wire.

CAUTION

The crimp height for this hand tool was factory adjusted. Any random changes to this adjustment could cause a defective crimp or damage to the tooling.

Terminal Inspection

The crimped terminal should be inspected to ensure that the tooling is correctly aligned and that the wire was correctly inserted. Make the following visual checks (see Figure 4).

NOTE: If inspection of the crimped terminal reveals any defects, the terminal has not been properly crimped and should be discarded.

•   Check that all wire strands were crimped within the wire barrel.

•   Check that the edge of the wire insulation lies between the insulation and wire barrel.

•   Check that the bell mouth(s) were formed correctly.

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- Check that the spring was not dislodged from the disconnect (box) portion of the terminal.

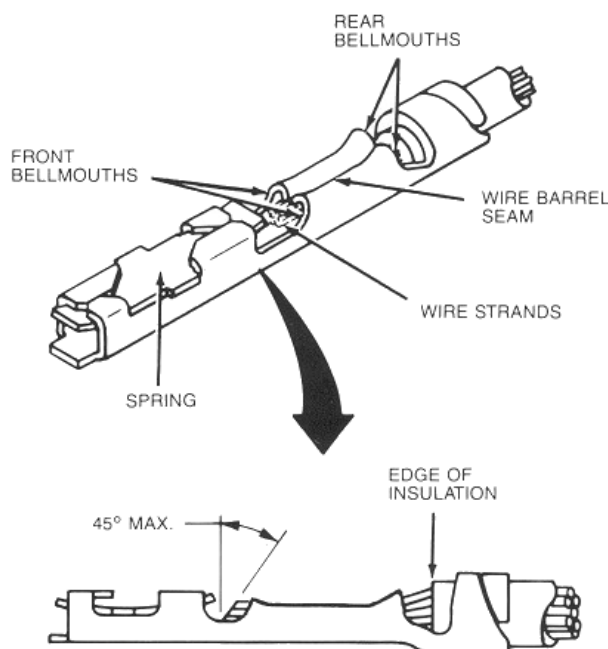- Check that the wire barrel seam is even and tightly closed.

Figure 4. Correctly Crimped Terminal

Next, obtain a crimp height micrometer and measure the areas of the terminal shown in Figure 5. If the crimp heights do not meet the specifications listed in "Specifications" on page 5, refer to the section for proper adjustment procedures of crimp height on page 15.
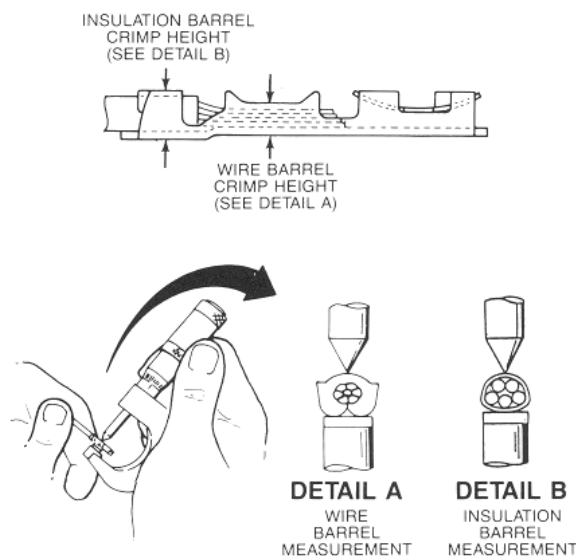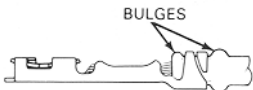
Figure 5. Measuring Crimp Height of Terminal

TROUBLESHOOTING

The troubleshooting information provided in the following chart will help to isolate and identify crimping problems.

Troubleshooting Chart, PV™ Receptacles

Problem	Possible Cause	Corrective Action
1. Bellmouth(s) is deformed or improperly positioned on wire barrel. DEFORMED BELLMOUTH	Terminal is not properly position in crimping area.	Loosen the two 2-56 setscrews on the side of the anvil holder and reposition guide pins until proper bellmouth(s) is achieved.
2. Disconnect (box) portion of terminal is bent down.	Terminal is sticking in wire barrel crimper	Replace wire barrel crimpers
3. The sides of the terminal's wire barrel are bent down. SCRATCHES ON WIRE BARREL	Wire barrel crimper is defective.	Replace wire barrel crimpers
4. Flashings formed on the bottom of the wire barrel are unequal or abnormal. ABNORMAL FLASHINGS	Anvil is worn or broken.	Replace anvil
5. Insulation bulges between wire and insulation barrels. BULGE	Wire is inserted too far into terminal.	Position the end of the insulation so that it lies midway between the ends of the wire barrel and the insulation barrel.
6. Insulation bulges around insulation barrel. BULGES	Wire size or insulation diameter is incorrect for the terminal being used.	Refer to section "Specifications" for correct insulation diameter requirements.

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PARTS REPLACEMENT PROCEDURE

Anvil Removal

NOTE: Replace anvils when they show excessive wear or become cracked or chipped.

1. Using a 3/32-inch Allen wrench loosen the attaching cap screw(s) for the defective anvil(s). See Figure 6.

Figure 6

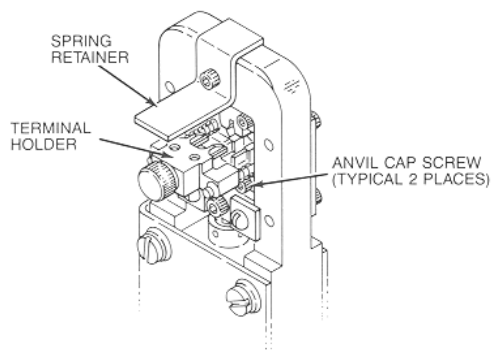2. Using a 7/64-inch Allen wrench, remove the cap screw securing the anvil holder assembly to the hand tool (see Figure 7). Then remove the anvil holder assembly.
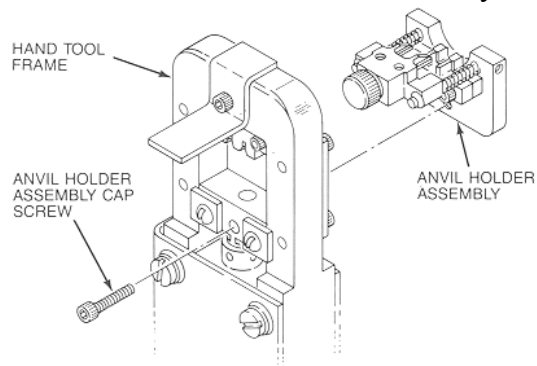

Figure 7

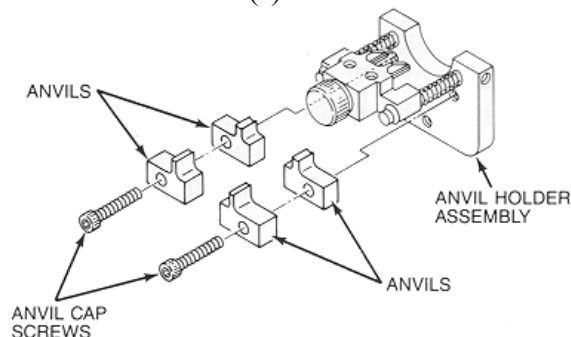3. Remove the cap screw(s) and defective anvil(s) from the anvil holder assembly (see Figure 8).

Figure 8

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Anvil Installation

NOTE: When replacing the anvils, be sure that the part numbers for the new anvils are the same as those being replaced.

1. Insert the 3/32-inch Allen wrench through the access hole in the adjustable tool holder and into the socket-head setscrew (see Figure 9). Then turn the setscrew 1/4-turn counterclockwise to unlock the adjusting collar.
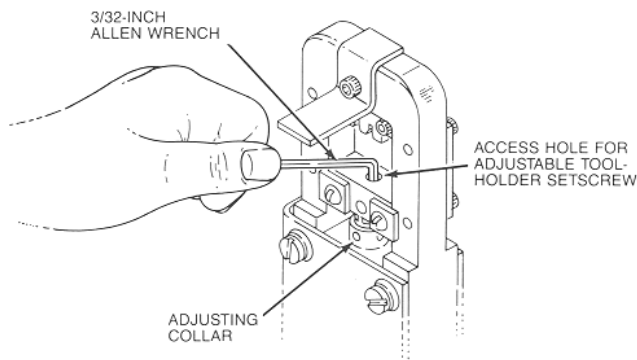
Figure 9

2. Insert the turned-down end of the 3/32-inch Allen wrench or a pin, approximately 1/16-inch in diameter, into one of the holes in the adjusting collar (see Figure 10). Then rotate the collar about 1/2-turn counterclockwise.

Figure 10

3. Reinstall the anvil holder onto the hand and tighten the attaching cap screw.

CAUTION

To prevent the anvils from being damaged during alignment, place a piece of paper, plastic bag material, or cellophane over the anvils.

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4. Cut out two strips of protective material. Then fold the strips in half and place them over the anvils (see Figure 11).

Figure 11

WARNING

A pinch point exists between the hand tool's spring retainer and terminal holder (see Figure 6). To prevent injury, always keep your fingers clear of this area when operating the hand tool.

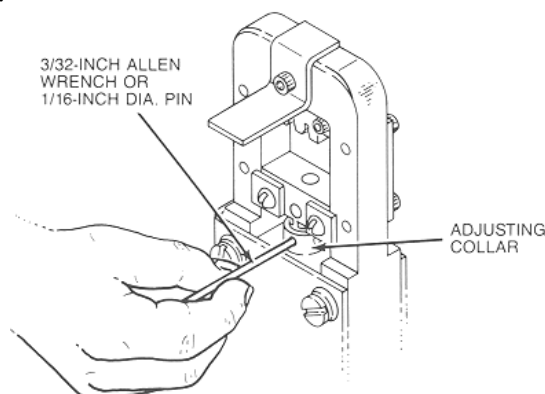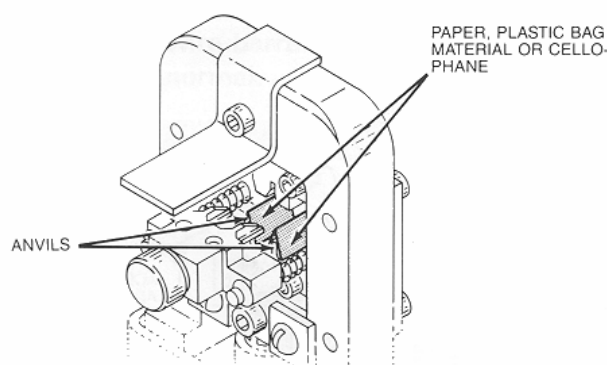4. Slowly close the hand tool all the way. Next, using the 3/32-inch Allen wrench or a 1/16-inch diameter pin, rotate the adjusting collar clockwise until the anvils just make contact with the crimpers. Then tighten the anvil cap screw(s).

5. Open the hand tool and remove the protective covering from the anvils.

NOTE: The adjusting collar remains unlocked for further adjustment of the crimp height.

6. Crimp a terminal to the proper size wire. Then inspect the terminal and measure the wire barrel crimp height as described in Section II, paragraph B.

Wire and Insulation Barrel Crimpers and Tonker Removal (See Figure 15)

1. Loosen but do not remove at this time, the two 4-40 cap screws (9) that secure the crimpers to the crimper holder (1).
2. Remove the 6-40 cap screw (13) from the crimper holder (1). Then remove the spring retainer (21) and the crimper holder (1) with crimpers attached.

3. Remove the two-tonker spring's (19) and the two springs guide's (20) from the hand tool frame. This can be accomplished by tilting the hand tool down.

4. Remove the two 4-40 cap screws (9) that secure the crimper holder (1).

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5. Remover the crimpers (2 and 3) and tonkers (18) from the crimper holder.

6. Remove the damaged crimper(s) (2 or-3). The top crimper is the wire barrel crimper (3).

Wire and Insulation Barrel Crimpers and Tonker Installation

NOTE: When replacing tooling, always be sure that the part number on the part(s) being replaced is the same as the number of the part that was removed.

1. Place the insulation crimper (2) onto the flat side of the crimper holder (1). Place the wire barrel crimper (3) on the insulation crimper (2) and install two 4-40 cap screws (9) and loosely tighten.

2. Insert tonkers (18), with the top tabs facing outward, into the slots between the wire and insulation crimpers.

3. Place and hold the crimper assembly into the hand tool on the same side as the anvil holder (4). Make sure that the tonkers (18) go into the holes in the top of the hand tool frame.

4. Place spring guides (20) into the holes in the top of the hand tool frame, then insert the springs (19) into the holes so that the springs slip over the shoulder of the spring guides.

5. Place spring retainer (21) over tonker springs (19). Make sure springs are fully compressed, then loosely attach the spring retainer (21) and the crimper holder (1) to the hand tool with a 6-40 cap screw (13).

6. To align the tooling, close hand tool completely and hold it in its closed position. Tighten the two 4-40 cap screws (9) to secure the crimpers to their holder. Then tighten the 6-40 cap screw (13), which secures the crimper holder to the hand tool frame.

7. Crimp a terminal to a proper-sized wire, and inspect the terminal as described in Section 11, paragraph B.

Holding Pin Removal (See Figure 15)

NOTE: When holding pins (14) become bent, it is necessary to replace them.

NOTE: When removing the holding pin, the terminal holder (10) and guide pins (15) must also be removed. Prior to removal, note the position of the guide pins (15) in the anvil holder, so that they can be repositioned as they were before removal: the flat on the guide pin must face the setscrew (12) in the anvil holder (4).

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1. Loosen the two 2-56 setscrews (12) in the anvil holder (4). Then remove the terminal holder assembly, which includes the terminal holder (10), guide pins (15), "0" rings (16), holding spring's (17), and holding pins (14) attached.

2. Remove the two holding spring's (17) and the guide pins (15) from the terminal holder.

3. Loosen the two 2-56 setscrews (12) in the top of the terminal holder (10), which secure the holding pins (14).

4. Using needle-nose pliers, remove both holding pins (14) by pulling straight out from terminal holder (10). Discard the damaged holding pin(s).

<u>Holding Pin Installation</u>

CAUTION

Over tightening the two 2-56 setscrews (12) in the top of the terminal holder (10) can flatten the holding pins (14), making them extremely difficult to remove.

1. Install two new holding pins (14) (0.025 in. square BergPin™ material 0.430 in. long) into terminal holder (10) until pins are flush with the extended supports. Be sure that a flat side of each pin is at right angles to the two 2-56 setscrew holes on top of the terminal holder (10).

2. Lightly tighten the two 2-56 setscrews (12) into the terminal holder (10) to secure the holding pins (14).

3. Re-install the two guides pins (15), "0" rings (16), and the two holding spring's (17).

4. Re-install the terminal holder (10) to the anvil holder (4), and tighten the two 2-56 setscrews (12) in the anvil holder (4) onto the flats of the guide pins (15).

5. Crimp a terminal to a proper-sized wire, and inspect the terminal as described in Section II, paragraph B.

CRIMP HEIGHT ADJUSTMENT

1. Using the 7/64-inch Allen wrench, remove the cap screw securing the anvil holder assembly to the hand tool (see Figure 12). Then remove the anvil holder assembly.
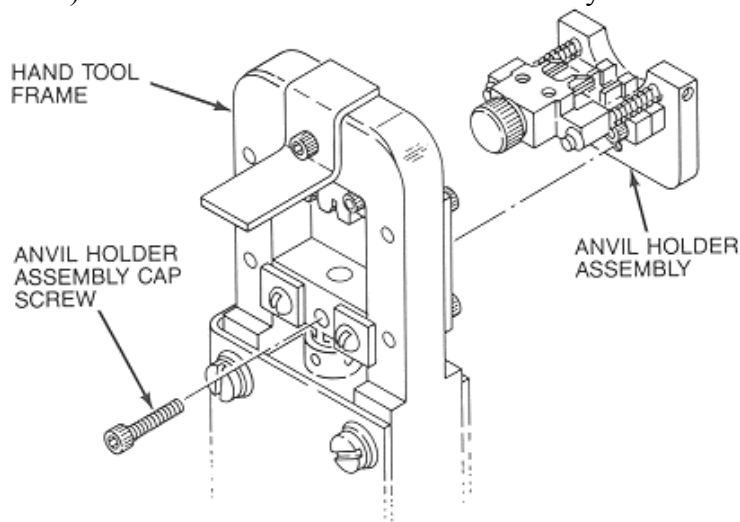

Figure 12

2. Insert the 3/32-inch Allen wrench (supplied with hand tool) through the access hole in the adjustable tool holder and into the socket-head setscrew (see Figure 13). Turn the setscrew 1/4-turn counterclockwise to unlock the adjusting collar.
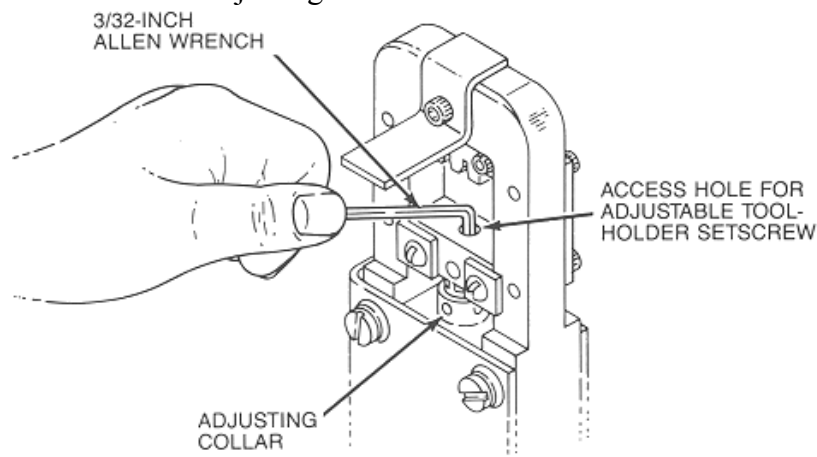

Figure 13

3. Insert the turned-down end of the 3/32-inch Allen wrench or a pin, approximately 1/16-inch in diameter, into one of the holes in the adjusting collar (see Figure 14). Then rotate the collar about 5 degrees counterclockwise to increase crimp height or clockwise to decrease crimp height.

NOTE: A 5-degree rotation of the adjusting collar will change the crimp height 0.002-inch.
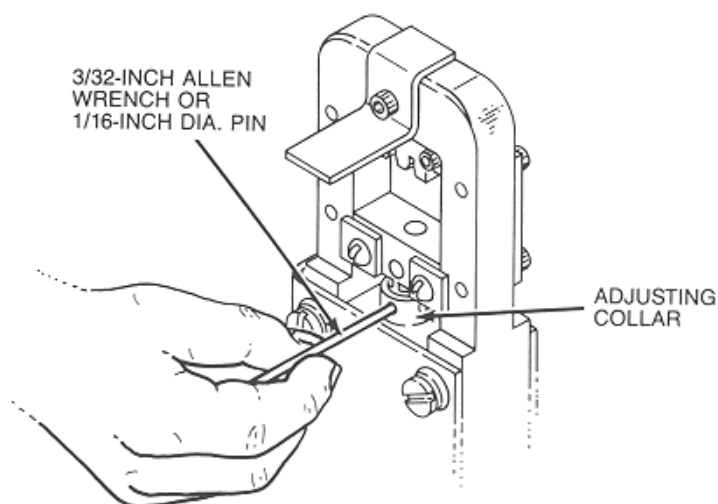
Figure 14

4. Reinstall the anvil holder assembly onto the hand tool and loosely tighten the attaching cap screw. Then slowly close the hand tool all the way and tighten the cap screw.

5. Crimp a terminal to the proper size wire and check the wire barrel crimp height of the crimped terminal. If crimp height is not as specified, turn the adjusting collar an additional 5 degrees. Continue adjusting the collar in this same manner until the proper crimp height is achieved.

6. Remove the anvil holder assembly from the hand tool. Next, tighten the setscrew in the adjustable tool holder to lock the adjusting collar. Then reinstall the anvil holder assembly and tighten the attaching cap screw.

PARTS

Spare Parts

These are parts that FCI considers practical for the user to stock for replacement. Recommended spare parts for the hand tool are specified in bold type in the parts list for
Figure 15.

Parts Ordering Information

To obtain replacement parts, contact:
FCI Electronics
825 Old Trail Road
Etters, PA. 17319-9769
Phone Toll Free 1-800-237-2374
Please provide the description of the part, FCI part number (if specified), and quantity desired, and also the hand tool model and serial number.

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Hand Tool Repair Policy

FCI Electronics charges a standard rate to repair any hand tool not under warranty. Phone Toll Free 1-800-237-2374 to obtain a Return Material Authorization number (RMA), shipping instructions and the current cost of repair. FCI will repair the hand tool and return it to you by the fastest means possible.

Parts List for Figure 15. HT-95 Hand Tool Parts

Index No.	Part No.	Description	Qty Per
1	155089-001	CRIMPER HOLDER	1
2*	**104958-1**	**INSULATION BARREL CRIMPER, 22-26 and 28-32 Gauge Wire**	**1**
3*	**104959-1**	**WIRE BARREL CRIMPER, 22-26 AND 28-32 Gauge Wire**	**1**
4	102466-1	ANVIL HOLDER	1
5*	**104914-1**	**INSULATION BARREL ANVIL, 28-32 Gauge Wire (A SIDE)**	**1**
6*	**104914-2**	**INSULATION BARREL ANVIL, 22-26 AWG Wire (B SIDE)**	**1**
7*	**104960-1**	**WIRE BARREL ANVIL, 28-32 Gauge Wire (A SIDE)**	**1**
8*	**104960-2**	**WIRE BARREL ANVIL, 22-26 AWG Wire (B SIDE)**	**1**
9	915305-224	SCREW, Cap, Socket Hd, 4-40 NF x 3/8" lg.	8
10	102467-5	TERMINAL HOLDER	1
11	A-856-1	TOOL HOLDER, Adjustable	
12	915305-559	SETSCREW, Socket Hd. 2-56 NF x 1/8" lg.	4
13	915305-205	SCREW, Cap, Socket Hd, 6-40 NF x ½" lg.	2
14*	**104756-1**	**HOLDING PIN (0.025" sq. BergPin™ Material 0.430" lg.)**	**2**
15	102468-1	GUIDE PIN	2
16	900066-001	"O" RING, 01-004	2
17	102470-1	HOLDING SPRING	2
18	104964-1	TONKER	2
19	A-1153	SPRING TONKER	2
20	A-1155	SPRING GUIDE	2
21	155014-001	SPRING RETAINER	1
22	144547-001	GUIDE RAIL	2
* Recommended Spare Parts			

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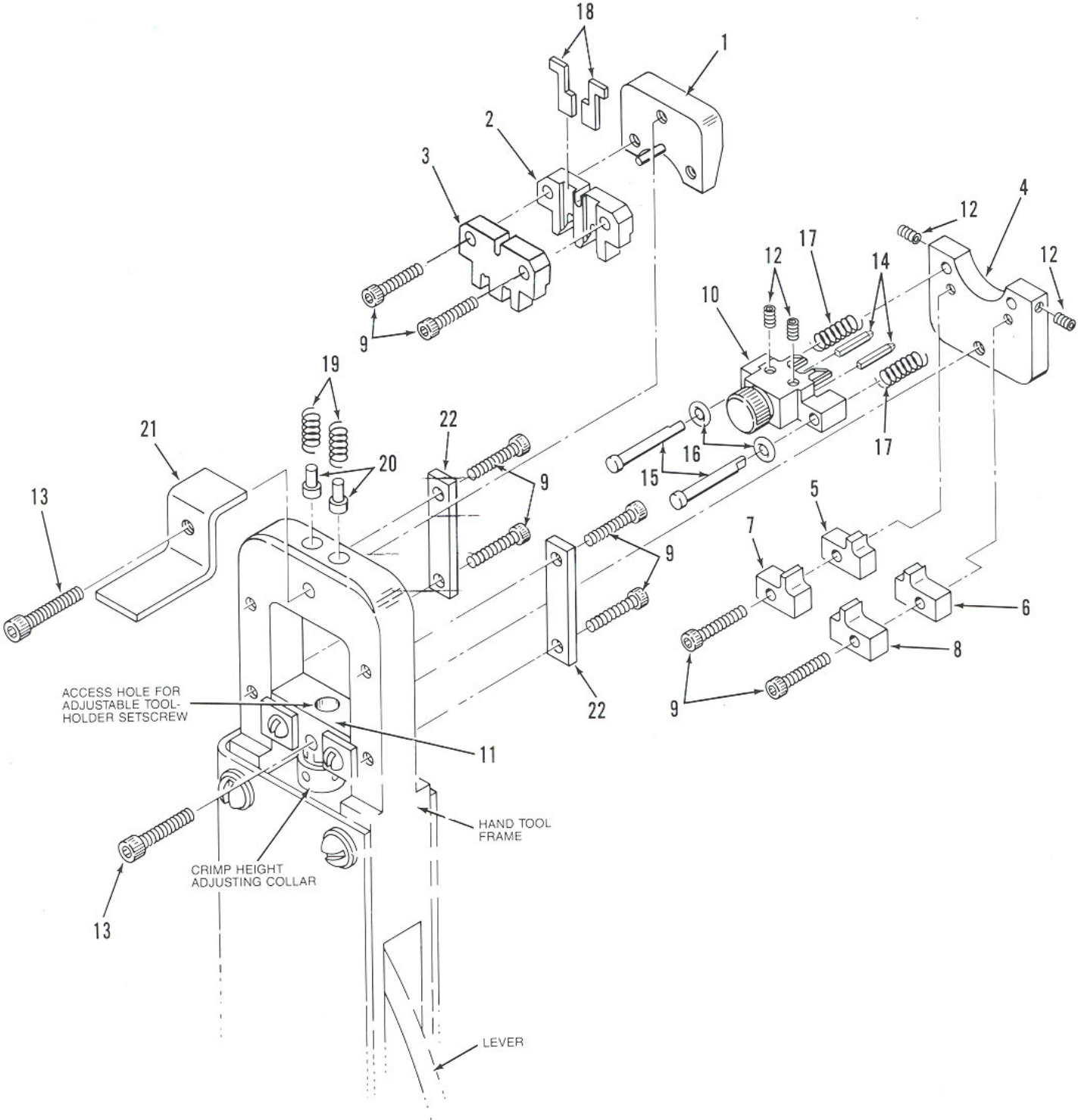Issued: (03/12/99)
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Figure 15. HT-95 Hand Tool Parts