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OWG. H

HTES

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THANKS

John D

X7120

DU PONT CONNECTOR SYSTEMS

OPERATIONS AND REPAIR INSTRUCTIONS

HT-95 HAND TOOL

FOR USE WITH MINI PV™ RECEPTACLES 22-32 AWG

I. INTRODUCTION

A. Hand Tool Function

The HT-95 is a manually operated hand tool designed for crimping loose piece (individual) Mini PV™ terminals to various sizes of wire.

B. Physical Description

The major components which make up the HT-95 are identified in figure 1. These 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-95 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.

C. 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.

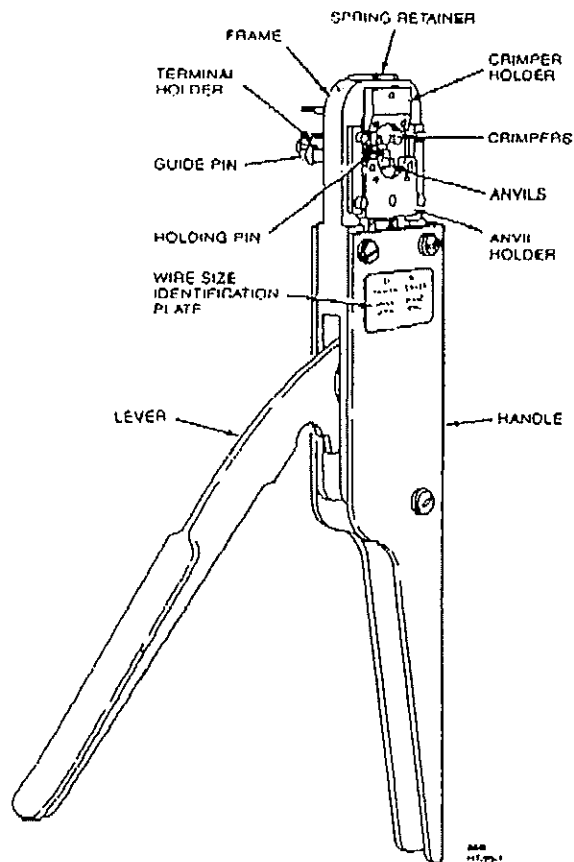


Figure 1. HT-95 Hand Tool

D. Specifications

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.

IV. PARTS REPLACEMENT PROCEDURE

A. Anvil Replacement

NOTE

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

a. Removal

1. Using the 3/32-inch Allen wrench (supplied with hand tool), loosen the attaching cap screw(s) for the defective anvil(s). See figure 6.

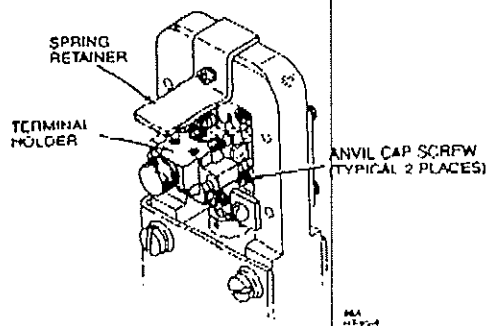


Figure 6

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.

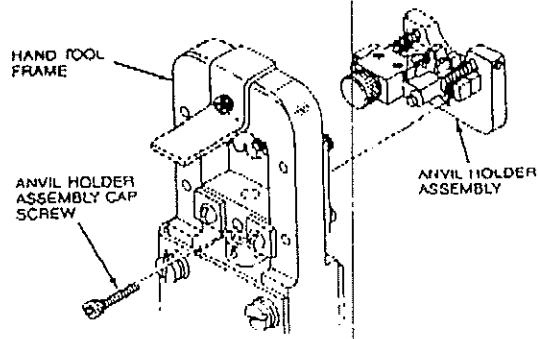


Figure 7

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

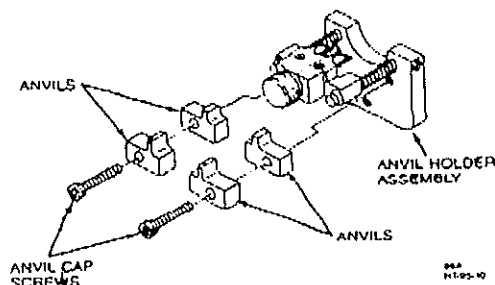


Figure 8

b. 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.

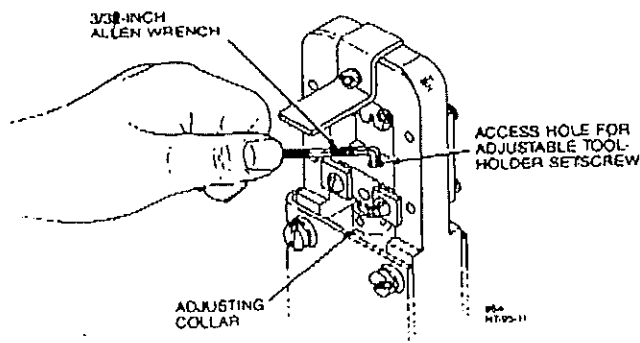


Figure 9

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.

HT-95

D. Specifications (continued)**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 PVT[™] Receptacles:

- Loose Piece 22-32 AWG

NOTE

Loose piece terminals have different part numbers than reeled terminals.

CAUTION

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-95, check with your distributor or DuPont Connector Systems to be sure that the new terminal number is compatible with your hand tool.

II. OPERATION**A. Operating Procedures****WARNING**

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.

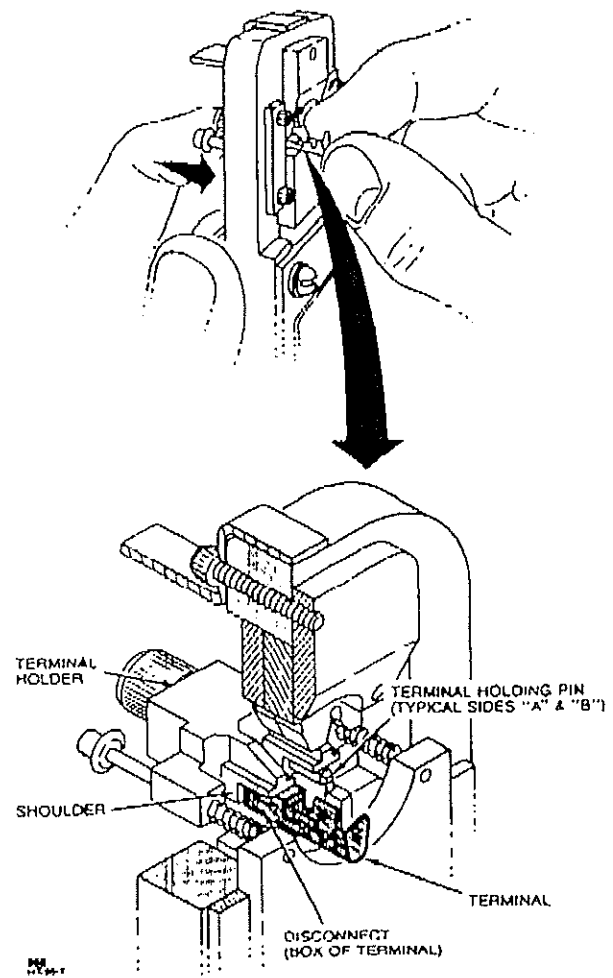


Figure 2. Positioning Terminal

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), then close the hand tool lever completely. This will crimp the terminal to the wire(s).

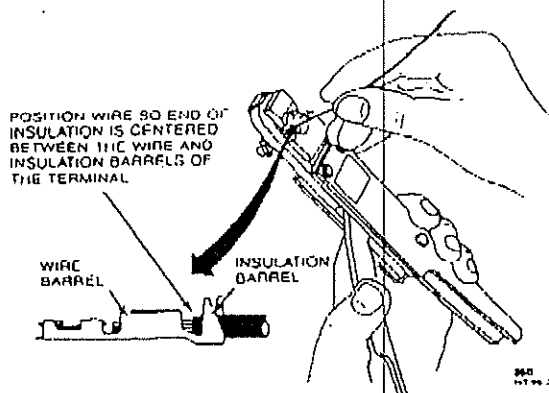


Figure 3. Crimping Terminal to Wire

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.

B. 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 bellmouth(s) were formed correctly.
- Check that the spring was not dislodged from the disconnect (box) portion of the terminal.

- Check that the ends of the wire strands form an angle not exceeding approximately 45°.
- Check that the wire barrel seam is even and tightly closed.

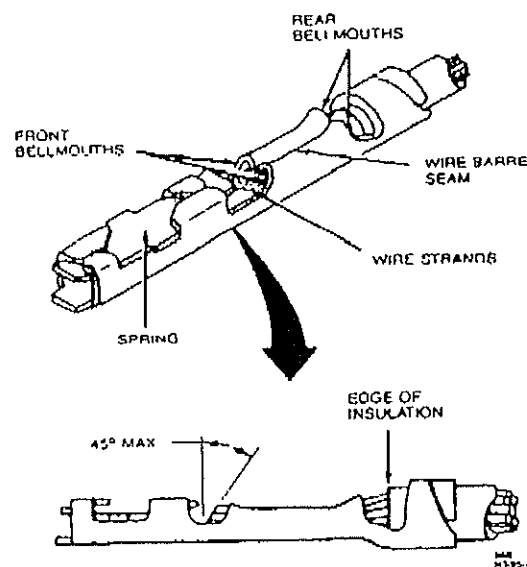


Figure 4. Correctly Crimped Terminal

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 Section I, paragraph D, refer to Section V for proper adjustment procedures.

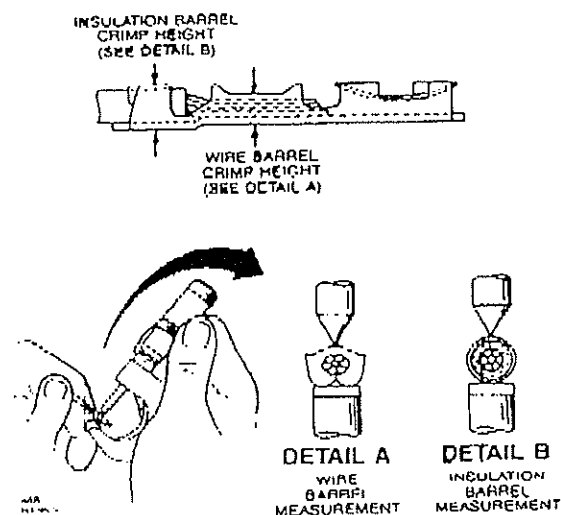



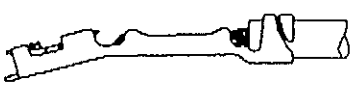

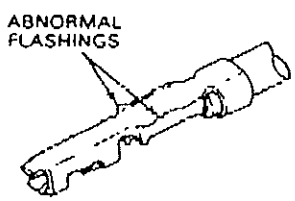
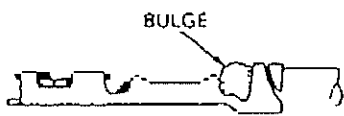

Figure 5. Measuring Crimp Height of Terminal

RT-95

III. TROUBLESHOOTING

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

Troubleshooting Chart, PV™ Receptacles

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
<p>1. Bellmouth(s) is deformed or improperly positioned on wire barrel.</p> 	<p>Terminal is not properly positioned in crimping area.</p>	<p>Loosen the two 2-56 setscrews on the side of the anvil holder and reposition guide pins until proper bellmouth(a) is achieved.</p>
<p>2. Disconnect (box) portion of terminal is bent down.</p> 	<p>Terminal is sticking in wire barrel crimper.</p> <p>Tooling is broken or cracked.</p>	<p>Replace wire barrel crimper as described in Section IV, paragraph B.</p>
<p>3. The sides of the terminal's wire barrel are scored or scratched.</p> 	<p>Wire barrel crimper is defective.</p>	<p>Replace wire barrel crimper as described in Section IV, paragraph B.</p>
<p>4. Flashings formed on the bottom of the wire barrel are unequal or abnormal.</p> 	<p>Anvil is worn or broken.</p>	<p>Replace anvil as described in Section IV, paragraph A.</p>
<p>5. Insulation bulges between wire and insulation barrels.</p> 	<p>Wire is inserted too far into terminal.</p>	<p>Position the end of the insulation so that it lies midway between the ends of the wire barrel and the insulation barrel.</p>
<p>6. Insulation bulges around insulation barrel.</p> 	<p>Wire size or insulation diameter is incorrect for the terminal being used.</p>	<p>Refer to Section 1, paragraph D (specifications) for correct insulation diameter requirements.</p>

HT-05

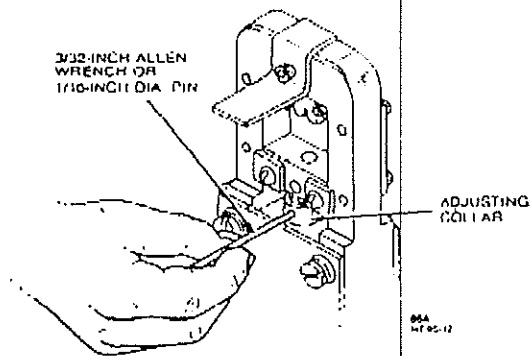


Figure 10

3. Reinstall the anvil holder onto the hand tool 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.

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

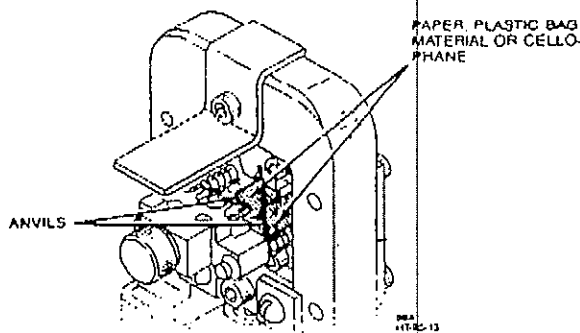


Figure 11

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.

5. Slowly close the hand tool all the way. Next, using the 3/32-inch Allen wrench or a 1/16-inch diam-

eter pin, rotate the adjusting collar clockwise until the anvils just make contact with the crimpers. Then tighten the anvil cap screw(s).

6. 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.

7. 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.

B. Wire and Insulation Barrel Crimpers and Tonkor Replacement (see figure 15)

a. Removal

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 tonkor springs (18) and the two spring guides (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).

5. Remove the crimpers (2 and 3) and tonkors (18) from the crimper holder.

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

b. 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 II, paragraph B.

C. Holding Pin Replacement (see figure 15)

NOTE

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

a. Removal

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).

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), "O" rings (16), holding springs (17), and holding pins (14) attached.

2. Remove the two holding springs (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).

b. Installation

CAUTION

Overtightening 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), "O" rings (16), and the two holding springs (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.

HY-05

V. 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.

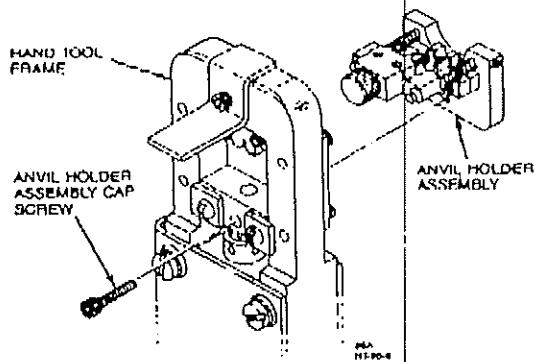


Figure 12

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.

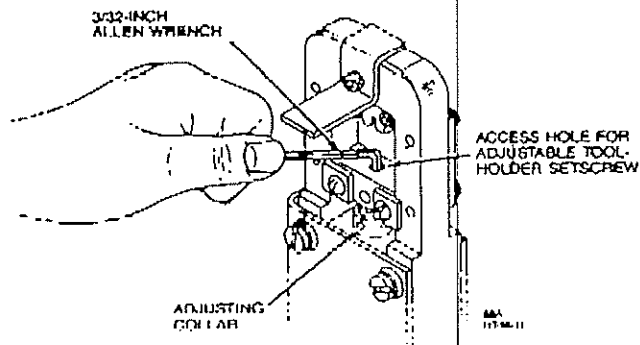


Figure 13

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.

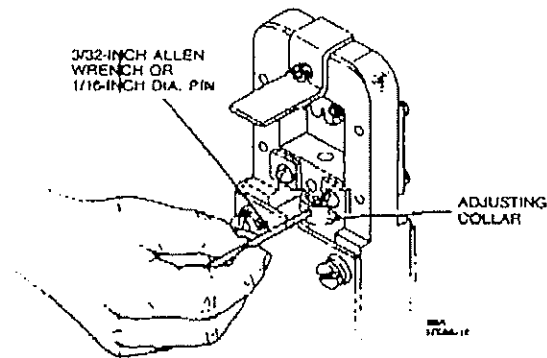


Figure 14

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.

VI. PARTS

A. Spare Parts

These are parts which DuPont 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.

B. Parts Ordering Information

To obtain replacement parts, contact DuPont Connector Systems, 30 Hunter Lane, Camp Hill, PA 17011. Phone Toll Free 1-800-233-1451. Provide the description of the part, DuPont part number (if specified), quantity desired, and also the hand tool model and serial number.

C. Hand Tool Repair Policy

DuPont charges a standard rate to repair any hand tool not under warranty. Phone Toll Free 1-800-233-1453 to obtain a Return Material Authorization number (RMA), shipping instructions and the current cost of repair. DuPont 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	1
6*	104914-2	INSULATION BARREL ANVIL, 22-26 AWG Wire	1
7*	104960-1	WIRE BARREL ANVIL, 28-32 Gauge Wire	1
8*	104960-2	WIRE BARREL ANVIL, 22-26 Gauge Wire	1
9	—	SCREW, Cap, Socket Hd, 4-40 NF x 0.37 in. lg.	8
10	102467-5	TERMINAL HOLDER	1
11	A-856-1	TOOL HOLDER, Adjustable	
12	—	SETSCREW, Socket Hd. 2-56 NF x 0.12 in. lg.	4
13	—	SCREW, Cap, Socket Hd. 6-40 NF x 0.50 in. lg.	2
14*	104756-1	HOLDING PIN (0.025" sq. BergPin™ Material 0.430" lg.)	2
15	102468-1	GUIDE PIN	2
16	—	"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

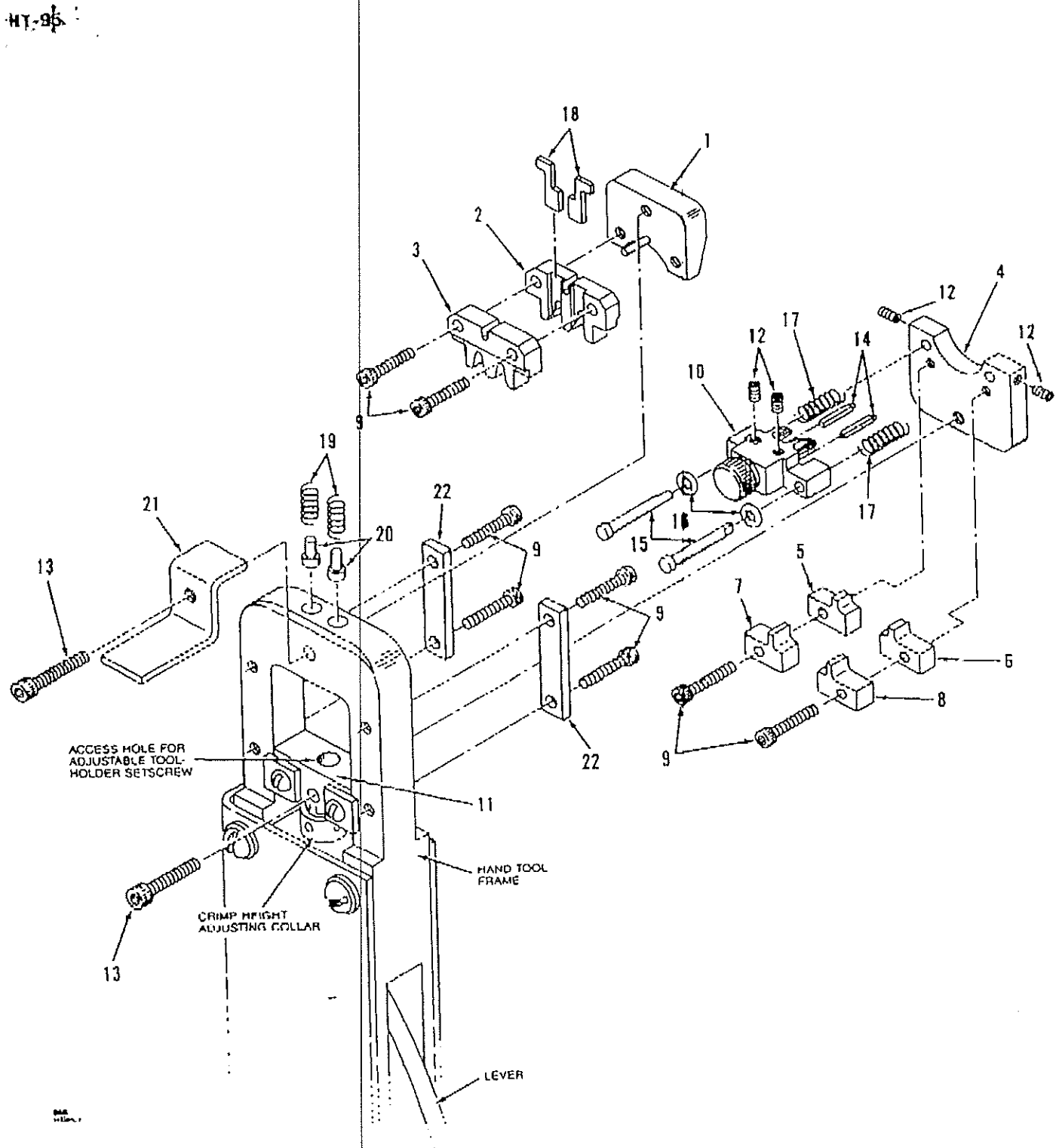


Figure 15. HT-95 Hand Tool Parts

RELATIONS			
REV	DESCRIPTION	BY	DATE
1	HEADING WAS WIRE SIZE 32-36 WAS 34-36, 18-20 WAS 18, 4 ADD	MM	10/5/82
2	BY NOTE		

TERMINAL DATA FOR USE WITH MINI LATCH HOUSINGS			
WIRE BARREL	CRIMP HEIGHT	INSULATION DIA.	
★ 18 AWG OR LARGER NOT RECOMMENDED			
★ 18-20	1.07-1.12 / .042-.044	1.07-1.52 / .042-.060	
22-26	0.81-0.86 / .032-.034	0.91-1.52 / .036-.060	
28-32	0.66-0.71 / .026-.028	0.71-1.37 / .028-.054	
32-36	0.56-0.61 / .022-.024	0.51-1.02 / .020-.040	

SEAM MUST BE CLOSED (WIRE STRANDS MUST NOT BE VISIBLE)

SECTION 2-2 - ALL TYPES TYPE II SHOWN

WIRE STRANDS MUST BE VISIBLE AT THIS END OF CRIMPED WIRE BARREL

WIRE INSULATION MUST EXTEND BEYOND INSULATION BARREL BUT NOT INTO WIRE BARREL

INSULATION DIA (SEE CHART)

PREFERRED TYPE II & III

INFORMATION SHOWN APPLIES TO PRODUCT OF TYPE II OR TYPE III ANVIL.

WIRE INSULATION MUST EXTEND BEYOND INSULATION BARREL BUT NOT INTO WIRE BARREL

INSULATION DIA (SEE CHART)

OPTIONAL TYPE I

INFORMATION SHOWN APPLIES TO PRODUCT OFF RADIUS TYPE ANVIL.

WIRE STRANDS MUST BE VISIBLE AT THIS END OF CRIMPED WIRE BARREL

WIRE STRIP LENGTH FOR BOTH STANDARDS :-

4.06

.16

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SCALE: 3:1 (ING. NO. TA - 75)
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DATE: 1-5-78
FINISH: 2/1/78
P. 2

DO NOT SCALE
DRAWING

USED ON: APPLICATION

WIRE STRIP LENGTH FOR BOTH STANDARDS :-

4.06

.16