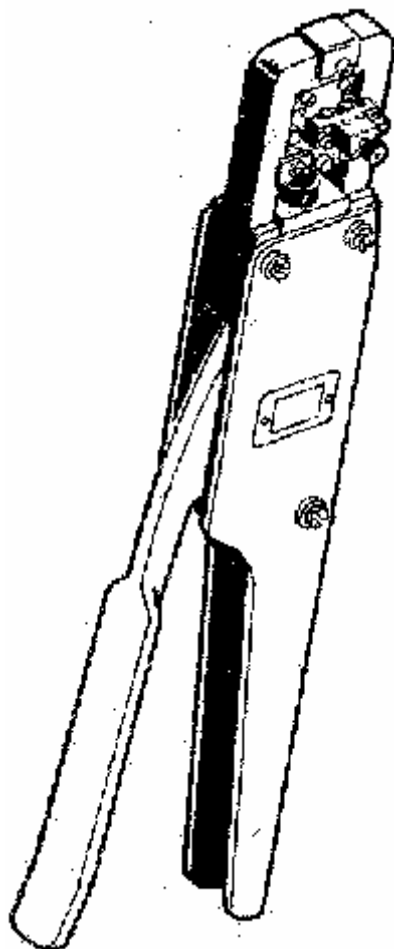


***HT95***  
**Handpistol mini PV**  
**AWG 22-32**  
**User's Guide**



**Föhrenbach®**  
Application Tooling

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## 1. INTRODUCTION

### 1.1. 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.

### 1.2. 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.

### 1.3. 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.

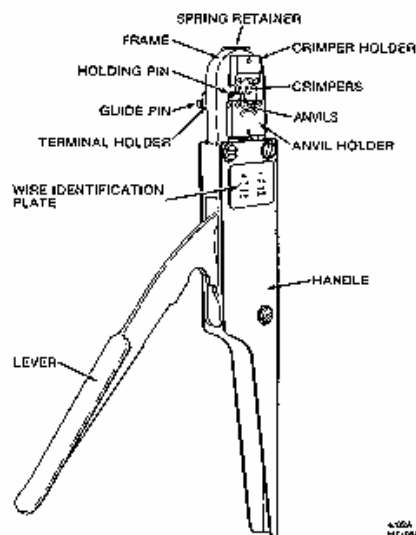


Figure 1. HT-95 Hand Tool

## 1.4. 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(28-32AWG)..0.71-1.37mm  
(0.028-0.054 in.) Dia.
- "B"Side(22-26AWG)..0.91-1.52mm  
(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. ....3.30-3.81 mm  
Applications.....(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 22-32AWG

### 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 HT95, check with your distributor or Föhrenbach Application Tooling NV to be sure that the new terminal number is compatible with your hand tool.

## 2. OPERATION

### 2.1 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.

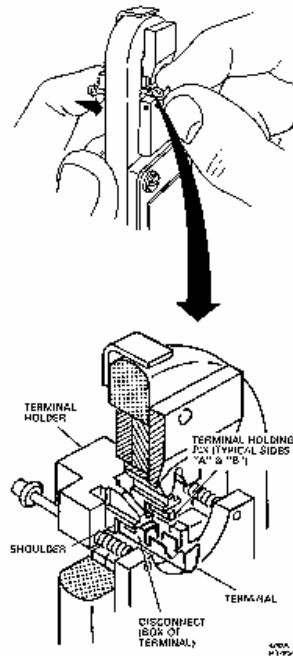


Figure 2. Positioning Terminal for Crimping

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).

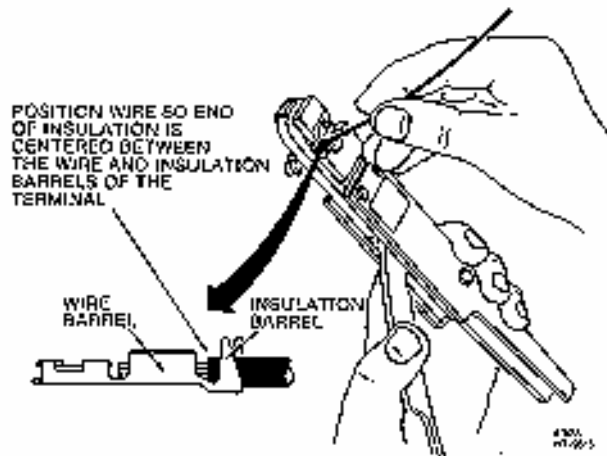


Figure 3. Crimping Terminal to Wire

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.

## 2.2 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 end of the wire insulation lies between the insulation and wire barrel.

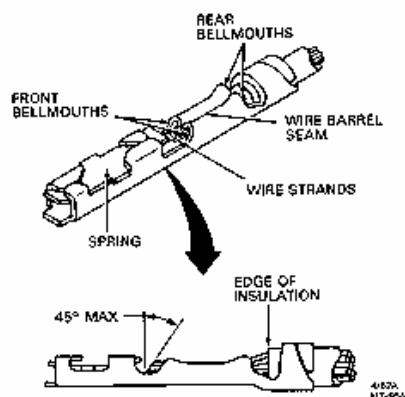


Figure 4. Correctly Crimped Terminal

- 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.

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.

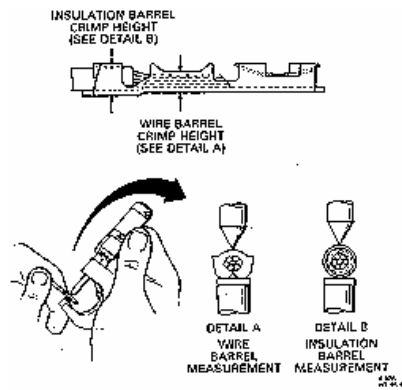

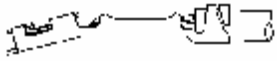
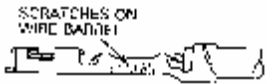





Figure 5. Measuring Crimp Height of Terminal

### 3. TROUBLESHOOTING

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

Troubleshooting Chart, PV™ Receptacles HT -95

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
<p>1. Bellmouth(s) is deformed or improperly positioned on wire barrel.</p> 	Terminal is not properly positioned 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.
<p>2. Disconnect (box) portion of terminal is bent down.</p> 	Terminal is sticking in wire barrel crimper. Tooling is broken or cracked.	Replace wire barrel crimper as described in Section 2, paragraph 2.
<p>3. The sides of the terminals wire barrel are scored or scratched.</p> 	Wire barrel crimper is defective.	Replace wire barrel crimper as described in Section 4, paragraph 2.
<p>4. Flashings formed on the bottom of the wire barrel are unequal or abnormal.</p> 	Anvil is worn or broken.	Replace anvil as described in Section 4, paragraph 1.
<p>5. Insulation bulges between wire and insulation barrels.</p> 	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.
<p>6. Insulation bulges around insulation barrel.</p> 	Wire size or insulation diameter is incorrect for the terminal being used.	Refer to Section 1, paragraph 4 (specifications) for correct insulation diameter requirements.



## 4. PARTS REPLACEMENT PROCEDURE

### **4.1 Anvil Replacement (see figure 6)**

#### NOTE

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

#### *4.1.1. Removal*

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

1. Loosen the two 2-56 setscrews (12) in the anvil holder (4) and remove terminal holder assembly (10).
2. Remove 4-40 cap screw (9) from the damaged anvil(s) (5) and (7), or (6) and (8).
3. Remove damaged anvil.

#### *4.1.2. Installation*

#### NOTE

When replacing tooling, be sure that the part number of the part being replaced is the same as the number of the part that was removed.

1. Loosely install the new anvil(s) to the anvil holder (4) with the 4-40 cap screw (9).
2. Close hand tool completely; this aligns anvil to the crimper. Tighten the 4-40 cap screw (9), and release the lever.
3. Re-install terminal holder (10) to the anvil holder (4) and tighten the two 2-56 setscrews (12).
4. Crimp a terminal to a proper-sized wire, and inspect the terminal as described in Section II, paragraph B.

## 4.2. Wire and Insulation Barrel Crimpers and Jonker Replacement

(see figure 6)

### 4.2.1. 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 tonker springs (19) 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 crimpers to the crimper holder (1).
5. Remove 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).

### 4.2.2. 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.

### 4.3. Holding Pin Replacement (see figure 6)

#### NOTE

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

#### 4.3.1. 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 pins.

#### 4.3.2. 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.

## 5. CRIMP HEIGHT ADJUSTMENT (see figure 6)

1. Loosen the two 2-56 setscrews (12) in the anvil holder (4). Remove 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 6-40 cap screw (13) which secures the anvil holder (4) to the adjustable tool holder (11). Remove the anvil holder with anvils attached.
3. Insert a 3/32-inch Allen wrench into the hole in the adjustable tool holder (11) and into the socket head setscrew. Turn screw to the right 1/4 turn to unlock the adjusting collar.
4. Insert the turned-down end of the 3/32-inch Allen wrench (supplied with hand tool) or a pin approximately 1/16-inch in diameter into one of the four holes in the adjusting collar. Rotate the adjusting collar about 5 degrees to the right to increase the crimp height by 0.002 inch, or to the left to decrease crimp height by 0.002 inch.
5. Re-install anvil holder (4) with anvils and loosely tighten the 6-40 cap screw (13).
6. Close hand tool completely so that the anvils align themselves to the crimpers. While in the closed position, tighten the cap screw (13) to lock anvils into position. Open the hand tool.
7. Re-install terminal holder assembly to the anvil holder (4) and tighten the two 2-56 setscrews (12) against the flats on the guide pins (15).
8. Crimp a terminal to a wire and recheck the wire barrel crimp height.
  - a. If crimp height meets specifications, remove terminal holder assembly and anvil holder (4), then lock the adjusting collar by tightening the setscrew in the adjustable tool holder (11). Reinstall terminal holder assembly and anvil holder as described in steps 5 through 7 above.

- b. If crimp height does not meet specifications, close the hand tool one click (so that the adjusting collar is visible) and rotate the adjusting collar as described in step 4. When correct crimp height is attained, lock the adjusting collar by tightening the setscrew in the adjustable tool holder (11). Reinstall terminal holder assembly and anvil holder as described in steps 5 through 7 above.

**Parts List for Figure 6. HT-95 Hand Tool Parts**

<u>Index No.</u>	<u>Part No</u>	<u>Description</u>	<u>Qty Per</u>
1	A-857 -5	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-A	Insulation barrel anvil, 28-32 gauge wire	1
6*	104914-B	Insulation barrel anvil, 22-26 awg wire	1
7*	104960-A	Wire barrel anvil, 28-32 gauge wire	1
8*	104960-B	Wire barrel anvil, 22-26 gauge Wire	1
9		Screw, cap, socket Hd, 4-40 NF x 0.37 in. lg.	4
10	104961-1	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	Tanker	2
19	A-1153	Spring tanker	2
20	A-11 55	Spring guide	2
21	104963-1	Spring retainer	1

\* Recommended Spare Parts

## 6. PARTS

### **6.1 Spare Parts**

These are parts which F.A.Tooling NV 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 6.

### **6.2 Parts Ordering Information**

To obtain replacement parts, contact F.A.Tooling NV, Krijgsbaan 128, 2640 Mortsel, Belgium. Provide the description of the part, part number (if specified), quantity desired, and also the hand tool model and serial number.

### **6.3. Hand Tool Repair Policy**

The repair cost is according to expenses.

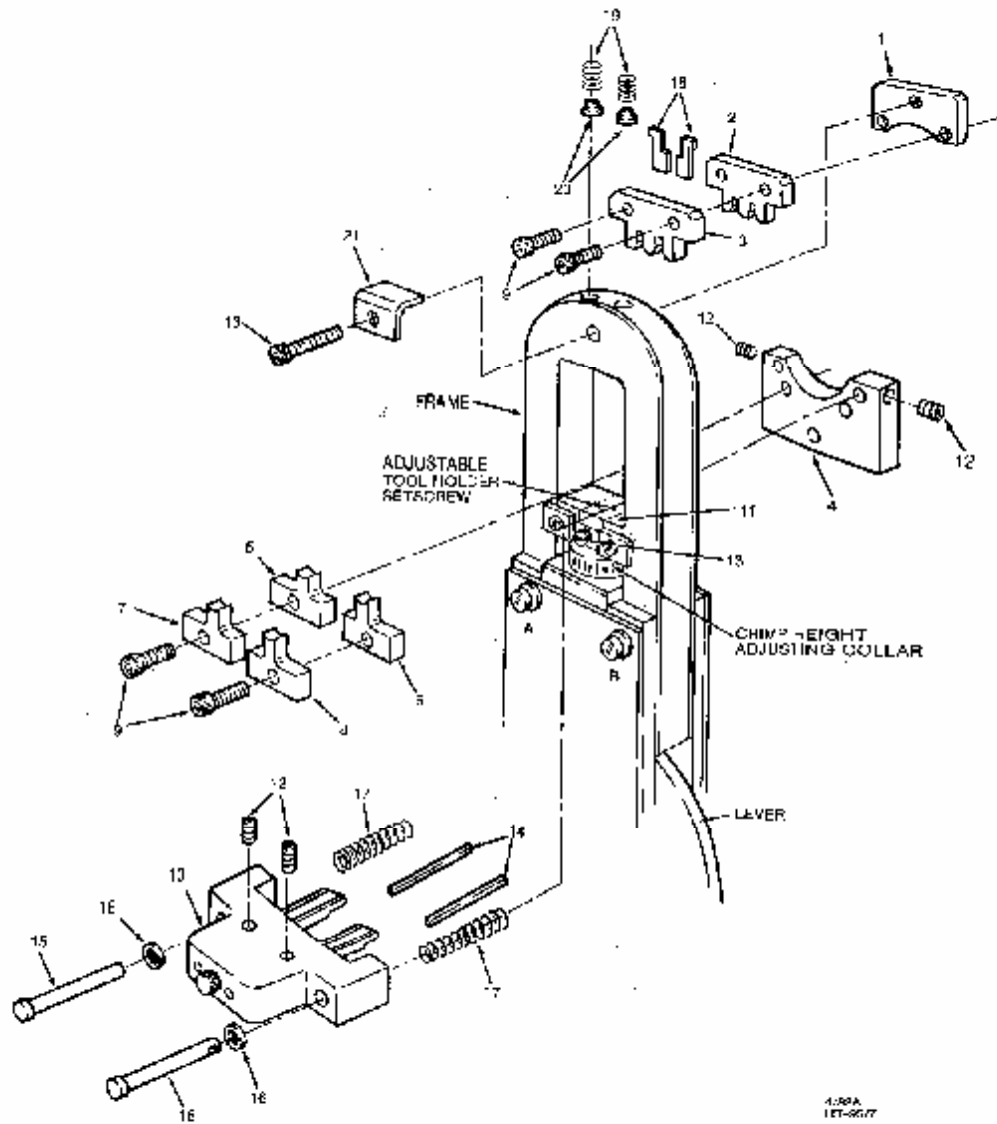


Figure 5. HT-95 Hand Tool Parts

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