

# customer manual

|                                                      |                          |    |
|------------------------------------------------------|--------------------------|----|
| <b>SAFETY PRECAUTIONS</b>                            | <b>READ THIS FIRST !</b> | 2  |
| <b>1. INTRODUCTION</b>                               |                          | 3  |
| <b>2. DESCRIPTION</b>                                |                          | 4  |
| 2.1. Power Unit                                      |                          | 5  |
| 2.2. Hand Actuated System                            |                          | 6  |
| <b>3. AIR LINE REQUIREMENTS AND SETUP</b>            |                          | 7  |
| <b>4. SYSTEM SETUP AND PREPARATION FOR OPERATION</b> |                          | 8  |
| 4.1. Air Supply                                      |                          | 8  |
| 4.2. Extending the Piston                            |                          | 8  |
| 4.3. Cam Tool Holder Assembly (Logic) Installation   |                          | 9  |
| 4.4. Crimp Head or Adapter Installation              |                          | 10 |
| <b>5. OPERATION</b>                                  |                          | 10 |
| <b>6. MAINTENANCE AND INSPECTION</b>                 |                          | 10 |
| 6.1. Inspection and Cleaning                         |                          | 10 |
| 6.2. Lubrication                                     |                          | 11 |
| <b>7. TROUBLESHOOTING</b>                            |                          | 12 |
| <b>8. OPTIONS AND ACCESSORIES</b>                    |                          | 12 |
| <b>9. REPLACEMENT AND REPAIR</b>                     |                          | 12 |
| 9.1. Replacement                                     |                          | 12 |
| 9.2. Stop Ring Replacement Procedure                 |                          | 12 |
| 9.3. Repair                                          |                          | 13 |
| <b>10. REVISION SUMMARY</b>                          |                          | 13 |



## ***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. For best results, application equipment must be operated in a dry, dust-free environment. 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 keep guard(s) in place during normal operation.
- ALWAYS insert power plug into a properly grounded receptacle to avoid electrical shock.
- ALWAYS turn off the main power switch and disconnect electrical cord from the power source when performing maintenance on the equipment.
- NEVER wear loose clothing or jewelry that may catch in moving parts of the application equipment.
- NEVER insert hands into installed application equipment.
- NEVER alter, modify, or misuse the application equipment.

## ***TOOLING ASSISTANCE CENTER***

***CALL TOLL FREE 1-800-722-1111 (CONTINENTAL UNITED STATES AND PUERTO RICO ONLY)***

The **Tooling Assistance Center** offers a means of providing technical assistance when required.

In addition, Field Service Specialists are available to provide assistance in the adjustment or repair of the application equipment when problems arise which your maintenance personnel are unable to correct.

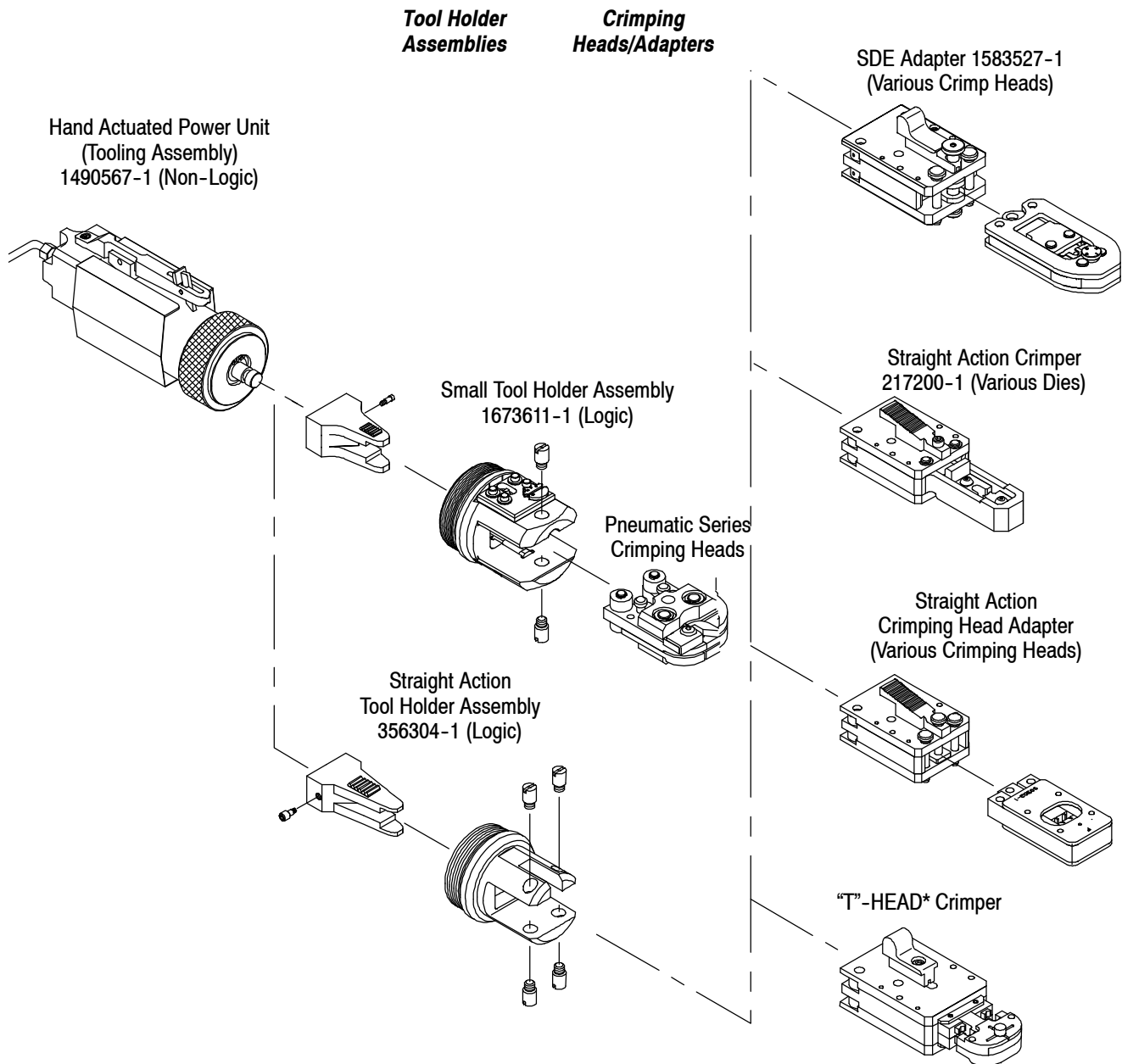
### ***INFORMATION REQUIRED WHEN CONTACTING THE TOOLING ASSISTANCE CENTER***

When calling the Tooling Assistance Center regarding service to equipment, it is suggested that a person familiar with the device be present with a copy of the manual (and drawings) to receive instructions. Many difficulties can be avoided in this manner.

When calling the Tooling Assistance Center, be ready with the following information:

1. Customer name
2. Customer address
3. Person to contact (name, title, telephone number, and extension)
4. Person calling
5. Equipment number (and serial number if applicable)
6. Product part number (and serial number if applicable)
7. Urgency of request
8. Nature of problem
9. Description of inoperative component(s)
10. Additional information/comments that may be helpful

**Note:** Basic “Micro” Pneumatic Tooling Systems consist of a power unit, a tool holder assembly or adapter, a crimping head or adapter, and if required, a die set.



*Figure 1*

## 1. INTRODUCTION

This manual provides information on the various configurations of the tooling assembly, available options, accessories, and upgrade capabilities for “Micro” Pneumatic Tooling Assembly 1490567-1. The manual also includes complete operation and maintenance information for the system. Since there is a wide variety of crimping heads that may be used with the tooling assembly, specific information concerning the individual crimping heads, such as wire preparation and crimping head installation and maintenance, is provided with the instructions packaged with the individual crimping heads. For a complete list of the available crimping heads (with associated adapters, if required), refer to Catalog 1654684.

Read this manual thoroughly before operating any of the pneumatic tools. The performance of these tools will depend largely upon the intelligent use of information contained in this manual. When reading this manual, pay particular attention to **DANGER**, **CAUTION**, **NOTE**, and **SAFETY** 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.*



**NOTE** *Measurements are in metric units [followed by U.S. customary units in brackets]. Illustrations are for identification only and are not drawn to scale.*



**DANGER** *This unit should only be operated by trained personnel.*



**DANGER** *If not using quick-disconnect fittings to connect the tool to the air supply, provide operators other means to easily disconnect the tool from the air supply.*



 *Read and understand the entire manual before using the tool.*

 *Always wear appropriate eye protection when using the tool.*

 *Always wear appropriate hearing protection when using the tool.*

 *Always disconnect the air and lockout the tool when not in use or when head or tool holder is detached.*

## 2. DESCRIPTION

The “Micro” Pneumatic Tooling System designed to accept a wide variety of crimping heads for crimping various types of terminals and splices onto wires ranging in size from 10 through 26 AWG.

The systems employ a unique modular design concept, wherein each system configuration contains the (same) identical power unit. System variations are then achieved by expansion of the power unit to obtain the

desired system functions. This system modularity permits the user to change from one system to another and retain the capabilities of the others without the expense of additional power units. It is feasible for the user to have the capabilities of the system with only a single power unit.

The hand actuated system has a hand switch assembly mounted directly on the power unit so that the operator can actuate the unit while holding it. The operator has complete control over the crimp cycle time. However, when actuating the hand switch, the operator must momentarily keep the switch closed to ensure that the crimping head jaws or dies bottom. Also, the operator must time the release of the switch so as not to overstress the crimping head.

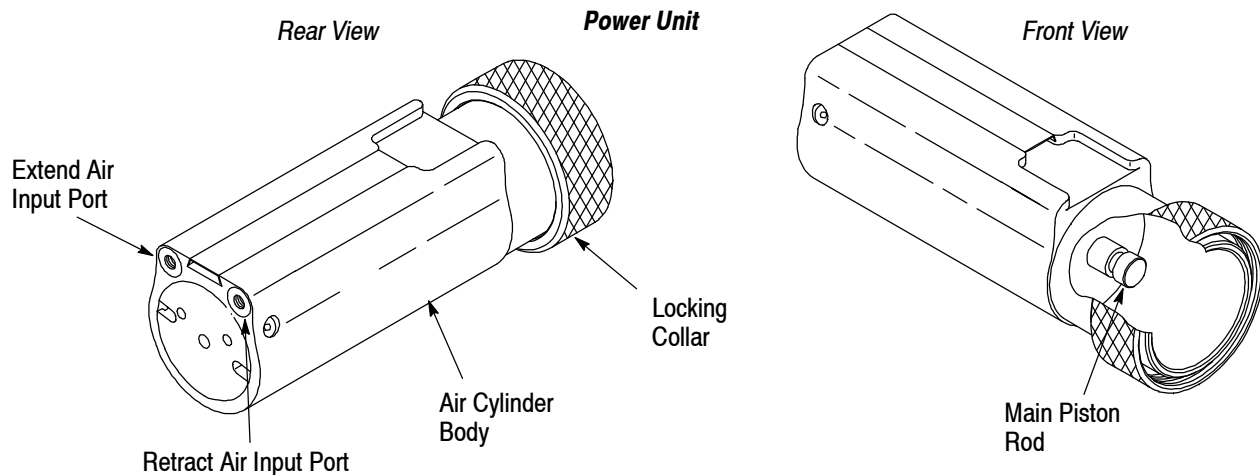
All of the tool holder assemblies (shown in Figure 1) are compatible with the power unit. Thus, the system has the capability of using any of the associated crimping heads or adapters—the system can therefore be used to crimp terminals and splices onto the full range of wire sizes. The tool holder assemblies are interchangeable, providing flexibility of choice and future add-on capabilities for the user.

The logic control feature of the tool holder assembly assures consistent and repeatable crimping cycles, providing fully crimped products and essentially eliminating the possibility of partial crimps. In effect, once the hand-actuated actuation device is depressed, the operator must hold the actuation device closed momentarily to ensure the tool performs a complete crimping cycle.

The date code is marked on the body of the tool. The date code is in the format YYWW, where YY represents the year of the manufacture, and WW represents the week of manufacture. For example, if the date code marked on a tool is 0642, the tool was made in the 42nd week of 2006.

## 2.1. Power Unit

The power unit (shown in Figure 2) has two air input ports (rear of unit) used to extend and retract the power unit pistons. With air activation, two internal piston stages extend or retract the main piston rod at the front of the unit. A locking collar on the front end of the power unit is used to attach any one of the tool holder assemblies.



### Specifications

|                   |                          |
|-------------------|--------------------------|
| Weight .....      | 0.36 kg [.78 lbs]        |
| Dimensions:       |                          |
| Length .....      | 114 mm [4.5 in.]         |
| Diameter .....    | 51 mm [2 in.]            |
| Air Supply .....  | 620-690 kPa [90-100 psi] |
| Noise (Max) ..... | 90-95 dBA                |
| Vibration .....   | <2.5 m/s <sup>2</sup>    |

Figure 2

Figure 3 shows a typical tool holder assembly and its associated crimping head being attached to the power unit. Each tool holder assembly has a unique cam that attaches directly to the piston rod of the power unit. Once the cam is attached to the piston rod and secured by means of a setscrew, the associated tool holder assembly is placed over the cam onto the front of the power unit. The locking collar is then threaded onto the threads on the base of the tool holder assembly, securing the tool holder to the power unit. The associated crimping head or adapter is then attached to the tool holder assembly. When properly assembled, the power unit head, with cam and tool holder assembly, should be free to swivel in either direction. This swivel feature permits the crimping head or adapter to move freely when the operator positions the terminal or splice and wire into the crimping head or adapter.

## 2.2. Hand Actuated System (Non-Logic)

### **DANGER**

*Air pressure must be removed from the unit while head or tool holder is detached.*



The hand actuated system (shown in Figure 4) has a hand switch assembly mounted on the rear of the power unit. The hand switch assembly contains a manually operated four-way valve with one input port (connects to main air supply) and two output ports that mate with the input ports of the power unit. The hand switch assembly, therefore, controls the application of air to either extend or retract the pistons of the power unit. When the switch lever is pressed inward toward the cylinder body of the power unit, extension occurs. When released, the spring-loaded switch lever returns to its normal position, causing retraction. As previously described, any of the tool holder assemblies (with associated crimping head or adapter) can be attached to the power unit, as shown in Figure 3.

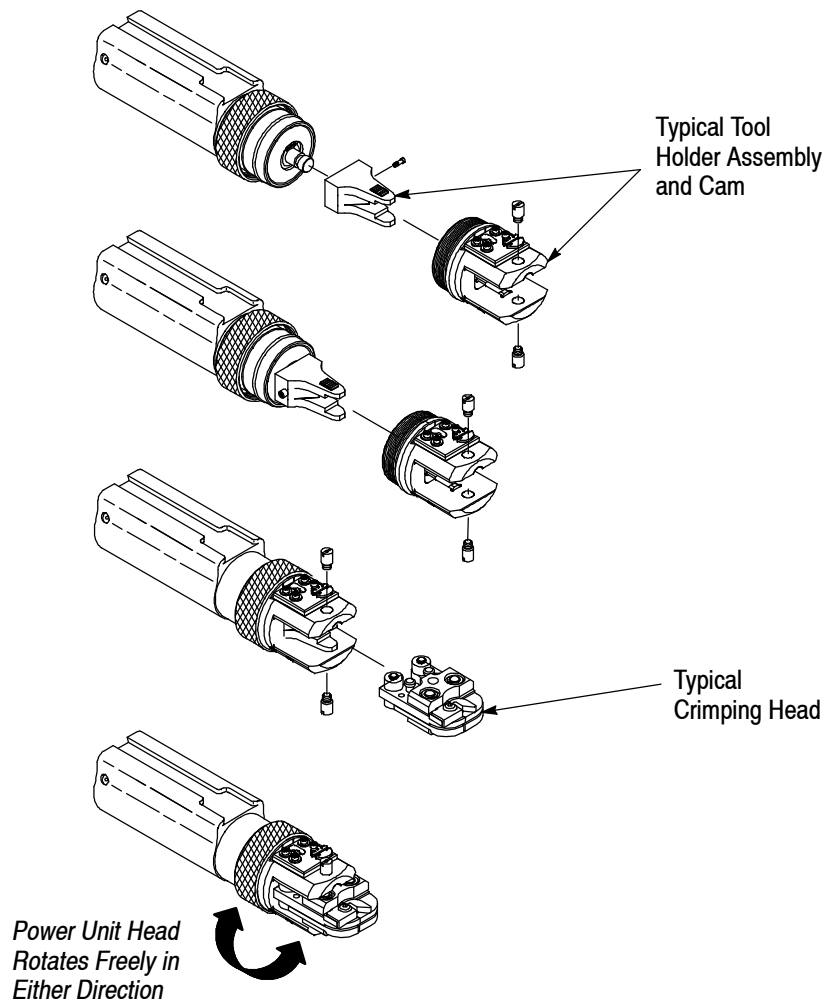


Figure 3

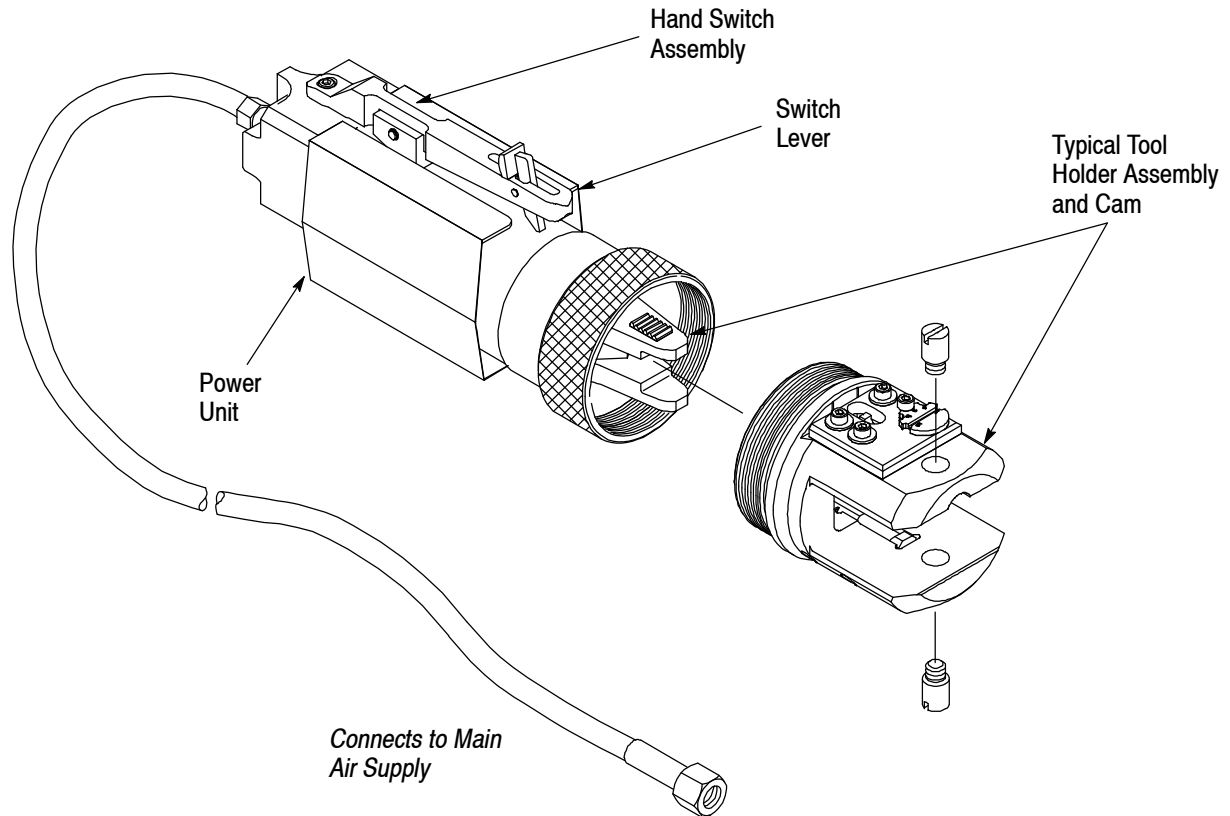


Figure 4

### 3. AIR LINE REQUIREMENTS AND SETUP

#### **DANGER**



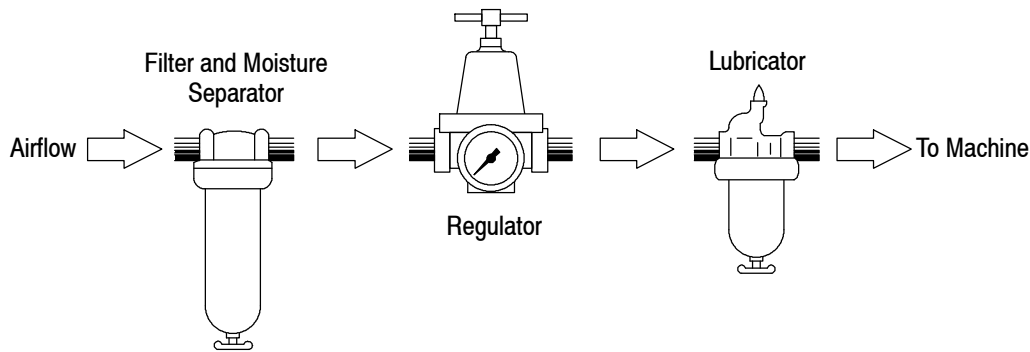
*Air pressure must be removed from the unit while head or tool holder is detached.*

For proper operation, the power unit (pneumatic tooling assembly) requires an adequate air supply to maintain between 620 and 690 kPa [90 and 100 psi] constant air pressure. Pressure less than 620 kPa [90 psi] will be insufficient for proper crimp operation. Pressure over 690 kPa [100 psi] may cause damage to the tooling system.

A filter and moisture separator, regulator, and lubricator must be used with the tooling assembly to ensure dependable performance and long life. It is recommended that quick-disconnect fittings are used to connect the tool to the air supply. If not using quick-disconnect fittings, provide a pneumatic lock-out on the air line that bleeds air after it is turned off. These items are customer supplied.

It is strongly recommended that these items be installed *at each tool station* in the order shown in Figure 5. Mount the items as close as possible to the tooling assembly, preferably where the tool hose is connected to the air system. Be sure the items are checked after every 40 hours of use by the tool operator or maintenance personnel.

Figure 5 lists the suggested manufacturers and benefits of using this equipment.



| DRAIN REGULARLY                                                                                                                                                                                                                        | CHECK AIR PRESSURE REGULARLY<br>(620 kPa [90 psi] Min—690 kPa [100 psi] Max)                                                                 | CHECK OIL LEVEL REGULARLY<br>(Adjust to Very Fine Mist—Approximately<br>1 Drop per 15-20 Tool Cycles)                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Minimizes clogging and excessive wear</li> <li>Minimizes rust and corrosion</li> <li>Prevents water from washing away lubricants</li> <li>Prevents water emission from exhaust ports</li> </ul> | <ul style="list-style-type: none"> <li>Promotes smooth, consistent performance</li> <li>Protects hoses and components from damage</li> </ul> | <ul style="list-style-type: none"> <li>Eliminates sluggish or sticking valves and pistons</li> <li>Provides protective film for highly polished or close tolerance surfaces</li> <li>Provides seal in close tolerance areas</li> <li>Extends life of pistons, cylinders, and valves</li> </ul> |
| SUGGESTED MANUFACTURERS                                                                                                                                                                                                                |                                                                                                                                              |                                                                                                                                                                                                                                                                                                |
| Filter/Moisture Separator, Regulator, Lubricator                                                                                                                                                                                       | Lubricator Oil<br>(Use Only Good Quality, Non-Synthetic Air Lubricant)                                                                       |                                                                                                                                                                                                                                                                                                |
| C.A. Norgen Co., Littleton, CO<br>Chicago Pneumatic Tool Co., New York, NY                                                                                                                                                             | (C.P. Airoilene SAE 10)<br>Chicago Pneumatic Tool Co., New York, NY                                                                          |                                                                                                                                                                                                                                                                                                |

Figure 5

#### 4. SYSTEM SETUP AND PREPARATION FOR OPERATION

As delivered, the system has all required air lines installed with the main air supply line ready for connection to the main air supply. Perform the steps in this section for initial setup and any time a different cam and/or tool holder assembly is to be used.

System setup includes the following general steps:

1. Making sure the power unit is not connected to the main air supply.
2. Assembling the proper cam to the power unit.
3. Assembling the tool holder assembly to the power unit, ensuring that the cam and tool holder assembly are properly aligned.
4. Connecting the main air supply.

##### 4.1. Air Supply

If the tool is connected to an air supply, disconnect the tool and make sure there is no residual pressure in the tool.

##### 4.2. Extending the Piston

If the piston is not extended, grasp the piston with the piston pliers and pull away from the body of the tool.

### 4.3. Cam and Tool Holder Assembly (Logic) Installation (Figure 6)

A strip of adhesive-backed safety labels, printed in various languages, is packaged with the tool holder assembly. Remove the appropriate label from the strip and attach it to the safety sleeve (which is supplied with the small and large tool holder assemblies), as shown in Figure 6; or directly to the adapter (which does not require the safety sleeve).

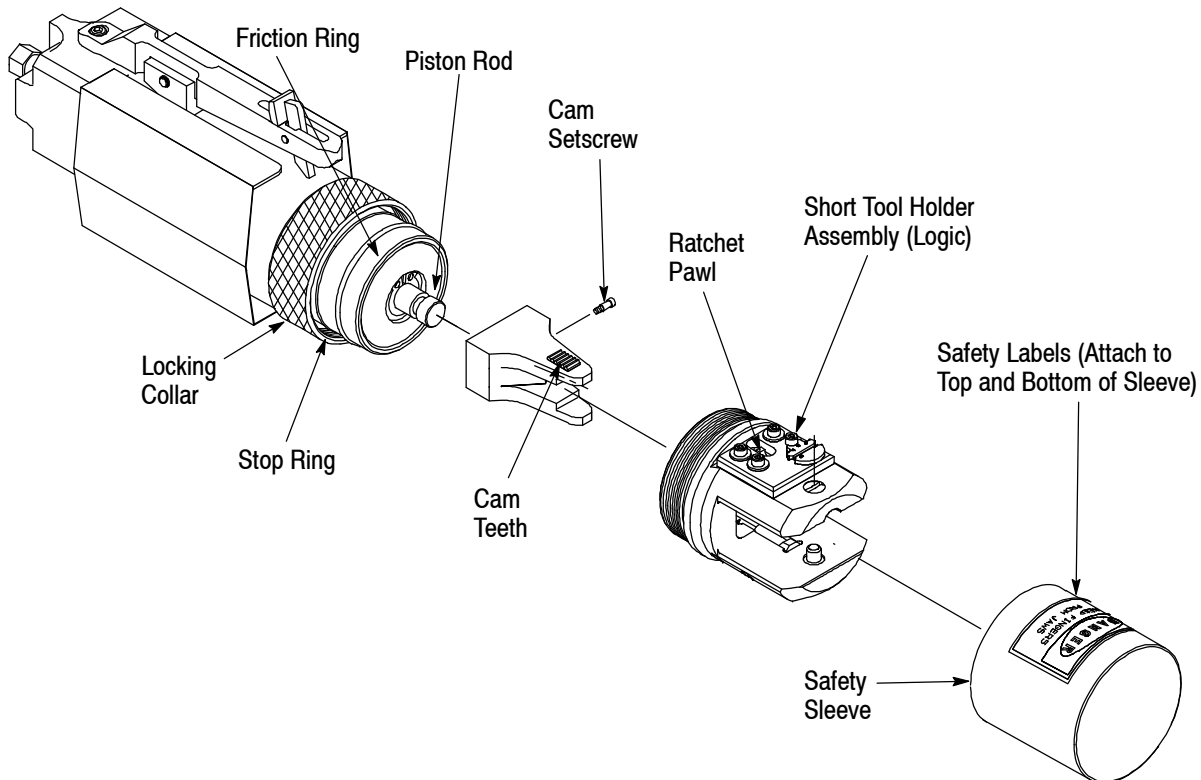


Figure 6

#### NOTE



Previously installed cams and tool holder assemblies must be removed before installing different ones. Removal is the reverse of installation.

Select the appropriate cam for the tool holder assembly to be used, then proceed as follows:

#### CAUTION



Be sure to select the correct combination of tool holder assembly and cam. If incorrect combination is used, the system will not operate properly.

1. If cam setscrew is not installed in cam, thread setscrew into cam two to three turns.
2. Place cam (with setscrew) onto piston rod, as shown in Figure 6. Cam should butt against the piston rod face. If not, turn the cam setscrew *counterclockwise* until cam fits on piston rod properly.

#### CAUTION



Overtightening the cam setscrew may damage the setscrew or cam.

3. Tighten cam setscrew, then pull on cam to ensure that it is firmly attached.
4. Properly align tool holder assembly ratchet pawl with the cam teeth and push tool holder assembly onto power unit so that it passes over the friction ring on the power unit piston.

#### CAUTION



After installation, ensure that the cam and tool holder assembly are properly aligned before operation of system. If the cam and tool holder assembly are misaligned while the power unit is operating, damage can occur to the system.

5. Slide power unit locking collar toward tool holder assembly until it butts against the stop ring on the power unit piston. Then turn locking collar *clockwise* to engage threads on the bottom of the tool holder assembly. Tighten locking collar to fully secure the tool holder.

**NOTE**



*When tool holder is properly installed, the locking collar should be butted against the stop ring and threads of the tool holder should not be visible. If not properly installed, check that correct combination of cam and tool holder assembly was used and that they are aligned properly.*

6. Rotate the tool holder assembly one full turn in each direction and note that the power unit locking collar rotates with the holder.

**DANGER**



*To avoid personal injury, periodically check that locking collar is tightly securing the tool holder assembly.*

#### 4.4. Crimping Head or Adapter Installation

**DANGER**



*When the power unit is connected to the main air supply, the power unit piston will retract. To avoid personal injury, keep hands and fingers away from front of power unit.*

Installation and removal procedures are contained in the instruction sheet packaged with the appropriate crimping head or adapter. Figure 3 shows installation of a typical crimping head onto a typical tool holder assembly. After the appropriate crimping head or adapter has been installed, the power unit may be reconnected to the main air supply.

### 5. OPERATION

The procedures contained in this section describes the required operating steps for actuating the power unit. For information concerning wire preparation, terminal or splice placement in crimping head or adapter, and wire insertion, refer to the instructions packaged with the specific crimping head or adapter being used.

**DANGER**



*To avoid personal injury, ALWAYS keep fingers clear of crimping area when operating the power unit. Never place anything within the crimping area except terminals or splices.*

After the terminal or splice and wire have been properly positioned in the crimping head or adapter, depress and momentarily *hold* the hand switch until the power unit extends and the crimping head jaws or crimping dies have fully bottomed. When the jaws or dies have fully bottomed, release the hand switch. The power unit piston should retract and the crimped product may be removed.

### 6. MAINTENANCE AND INSPECTION

It is recommended that a maintenance and inspection program be performed periodically to ensure dependable operation. Frequency of inspections should be adjusted to suit your requirements through experience. Frequency of inspection depends on:

- the care, amount of use, and handling of the system
- the degree of operator skill
- the presence of abnormal amounts of dust and dirt
- your own established standards

#### 6.1. Inspection and Cleaning

At a minimum, the power unit should be inspected and cleaned after every eight hours of operation. To perform this servicing, proceed as follows:

**DANGER**

*Air pressure must be removed from the unit while head or tool holder is detached.*



1. Disconnect the system from the main air supply.
2. Remove tool holder assembly (with crimping head or adapter in place).
3. Firmly grasp the cam with the piston pliers and pull the cam away from the body of the tool so that it is fully extended.
4. Inspect the stop ring, locking collar, and friction ring for wear. Replace, if necessary.
5. Inspect the stop ring, locking collar, and friction ring for wear. Replace, if necessary.

**DANGER**

*To avoid personal injury, replace the stop ring every 250,000 cycles (refer to Paragraph 9.2 for replacement procedure) and replace the locking collar when any sign of wear is evident.*



6. Inspect piston, cylinder wall, and cam for wear and remove dust, moisture, and other contaminants with a clean, soft brush or lint-free cloth.
7. Apply a THIN coat of any good grade SAE 20 motor oil to the cam. Remove any excess oil.
8. Check that cam setscrew is securely holding cam onto piston rod. Tighten setscrew, if necessary.
9. Check crimping head or adapter in accordance with the instructions packaged with the specific crimping head or adapter being used.

**DANGER**

*To avoid personal injury and damage to the tool, make sure that quick pins securing the crimping head or adapter to the tool holder assembly are fully tightened. It is recommended that Loctite 242 be used to remove threadlock, or equivalent, to prevent the quick pins from loosening.*



10. Re-assemble tool holder assembly (with crimping head or adapter in place).

**DANGER**

*To avoid personal injury, check that the locking collar is tightly securing the tool holder assembly before operating power unit.*



11. Reconnect the power unit to main air supply.

**DANGER**

*When power unit is connected to main air supply, power unit piston will retract. To avoid personal injury, keep hands and fingers away from front of power unit.*



## 6.2. Lubrication

It is recommended that the user provide lubricated air for the main air supply input. However, if the power unit has been or is being used with dry (unlubricated) air, lubricate the power unit as follows after every eight hours of use:

1. Disconnect main air supply.
2. Disconnect the air line(s) from the rear of the power unit.
3. Apply one or two drops of SAE 10 *air cylinder* oil into the inlet fitting(s).
4. Reconnect air line(s) and main air supply.

**DANGER**

*When power unit is connected to main air supply, power unit piston will retract. To avoid personal injury, keep hands and fingers away from front of power unit.*



## 7. TROUBLESHOOTING

Figure 7 provides a troubleshooting chart which lists some abnormal conditions along with the probable cause and remedy for the condition. If the condition cannot be isolated, refer to Paragraph 9.3 for information on obtaining further evaluation and repair.

| ABNORMAL CONDITION                               | PROBABLE CAUSE                                       | REMEDY                                                                                                              |
|--------------------------------------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Hand Actuated Systems</b>                     |                                                      |                                                                                                                     |
| Power unit piston will not extend when actuated. | Power unit not connected to main air supply.         | Connect power unit to main air supply.                                                                              |
|                                                  | Faulty hand switch assembly or foot switch assembly. | Replace switch assembly.                                                                                            |
| Loss of power.                                   | Improper lubrication.                                | Check operation of lubricator in main air supply. If dry air is being used, lubricate in accordance with Section 6. |
|                                                  | Power unit internal seals worn or damaged.           | Replace seals or, for information on obtaining evaluation and repair, refer to Paragraph 9.3.                       |

Figure 7

## 8. OPTIONS AND ACCESSORIES

Options and accessories may be ordered through your Tyco Electronics Representative, or call 1-800-526-5142, or send a facsimile of your purchase order to 717-986-7605, or write to:

CUSTOMER SERVICE (38-35)  
TYCO ELECTRONICS CORPORATION  
PO BOX 3608  
HARRISBURG PA 17105-3608

## 9. REPLACEMENT AND REPAIR

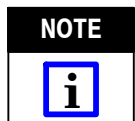


*To avoid personal injury, ALWAYS disconnect the tooling assembly from main air supply and electrical power source before replacing any parts.*

### 9.1. Replacement

Replacement parts and recommended spares are identified and listed in Figure 9 and 10. The recommended spares should be stocked for immediate replacement. Order replacement parts through your Tyco Electronics Representative, or call 1-800-526-5142, or send a facsimile of your purchase order to 717-986-7605, or write to:

CUSTOMER SERVICE (38-35)  
TYCO ELECTRONICS CORPORATION  
PO BOX 3608  
HARRISBURG PA 17105-3608



*For replacement parts for crimping heads, adapters, and crimping dies, refer to the instruction sheets packaged with the specific head, adapter, or dies.*

### 9.2. Stop Ring Replacement Procedure

#### A. Removal

1. Disconnect the unit from the main air supply.
2. Remove the tool holder (and cam) from the air cylinder body. Remove the friction ring.

3. Remove the stop ring by inserting the end of a flat blade screwdriver under the removal notch and prying outward. Slide the stop ring off the front of the air cylinder.



*Be careful when removing parts to prevent scarring on the outside surface of the cylinder.*

4. Slide the locking collar off the front of the air cylinder.
5. Inspect the stop ring groove for wear or permanent deformation. If excessive wear or damage is evident, refer to Paragraph 9.3 for information on obtaining customer repair service.

## B. Installation

1. Using a caliper, measure the width of the stop ring groove. See Figure 8. Using this dimension, refer to Figure 9 for the proper stop ring to be used.
2. Slide the locking collar onto the front of the air cylinder.
3. Slide the stop ring onto the front of the air cylinder and *carefully* seat the ring into the stop ring groove. Do not deform the ring.
4. Install the friction ring.
5. Visually inspect the tooling assembly to assure that the locking collar, stop ring, and friction ring are installed properly.
6. Using a caliper, measure the diameter of the stop ring. See Figure 8. Take measurements at several different locations around the ring. If the measurements are within the tolerance (for the stop ring being used) provided in Figure 9, the tooling assembly is considered dimensionally correct. If any of the measurements are not within the tolerance, refer to Paragraph 9.3 for information on obtaining further evaluation and repair.

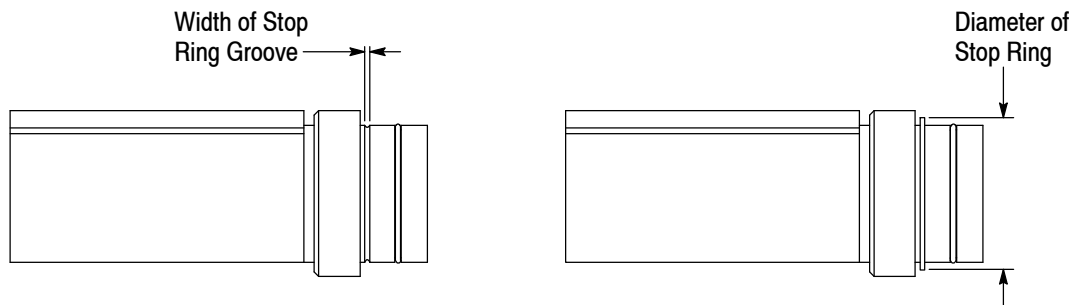


Figure 8

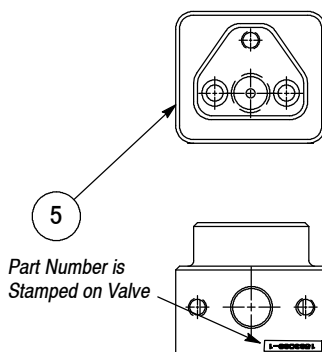
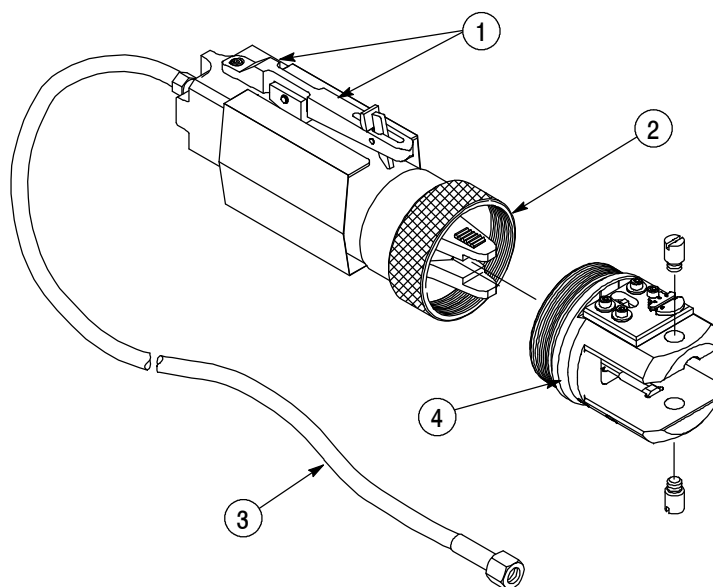
## 9.3. Repair

For customer repair service, please contact a Tyco Electronics Representative at 1-800-526-5136.

## 10. REVISION SUMMARY

Revisions to this customer manual include:

- Added "Original Instructions" to page 1



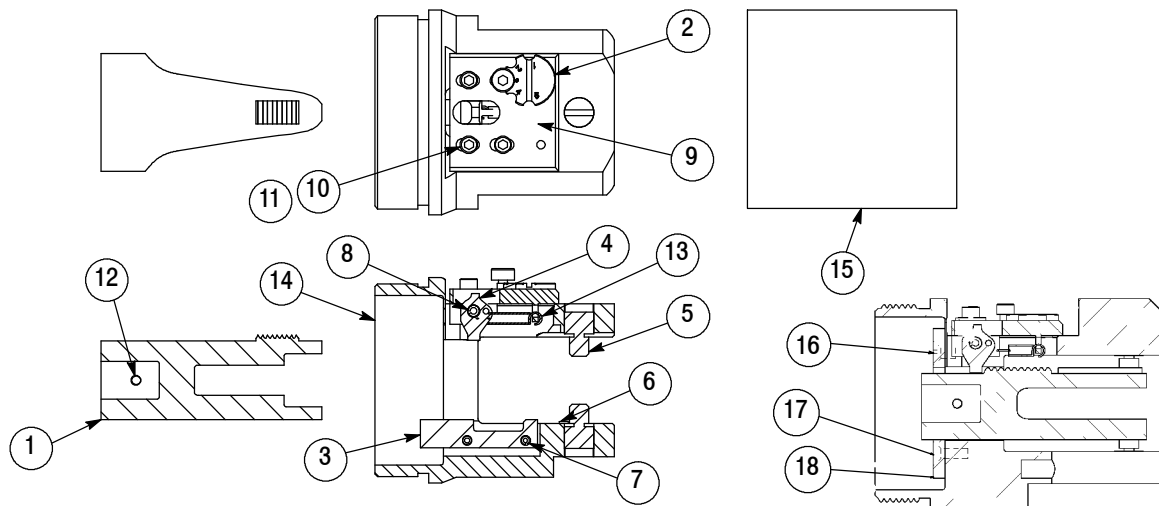
Type 3 Valve Uses Kit 1583089-1

**REPLACEMENT PARTS FOR HAND ACTUATED POWER UNIT 1490567-1 (Non-Logic)**

| ITEM      | PART NUMBER | DESCRIPTION                                                                  | QTY PER UNIT |
|-----------|-------------|------------------------------------------------------------------------------|--------------|
| 1         | 1583088-2   | VALVE ASSEMBLY, Pneumatic                                                    | 1            |
| 2         | 189848-1    | COLLAR, Locking                                                              | 1            |
| 3         | 38111       | HOSE, Air                                                                    | 1            |
| 4         | 904384-1    | RING, Stop— Groove Width 1.73 [.068] Approx<br>Ring Diameter 50.5 [1.99] Max | 1            |
| Not Shown | 217434-1 ■  | REPAIR KIT, Seals (O-rings and snap rings for power unit)                    | 1            |
| 5         | 1583089-1 ■ | REPAIR KIT, Spool (Seals, Spoolcap and Spring for Valve Body)                | 1            |

■ Recommended Spare Part

Figure 9



REPLACEMENT PARTS FOR TOOL HOLDER ASSEMBLY

| ITEM | PART NUMBER | DESCRIPTION                              | QTY PER TOOL HOLDER ASSEMBLY |                                      |
|------|-------------|------------------------------------------|------------------------------|--------------------------------------|
|      |             |                                          | 1673611-1<br>(Short Holder)  | 356304-1<br>(Straight Action Holder) |
| 1    | 1673602-1   | CAM, Short Logic                         | 1                            | --                                   |
|      | 356623-1    | CAM, Straight Action                     | --                           | 1                                    |
| 2    | 356439-1    | ECCENTRIC                                | 1                            | 1                                    |
| 3    | 356440-2    | INSERT, 626 Ratchet                      | 1                            | --                                   |
| 4    | 356441-1    | PAWL                                     | 1                            | 1                                    |
| 5    | 354425-1 ■  | PIN, Pivot                               | 2                            | 4                                    |
| 6    | 3-21028-5   | PIN, Slotted Spring, .09 X 438           | 2                            | --                                   |
| 7    | 4-21028-4   | PIN, Slotted Spring .09 X X 1.00         | 2                            | --                                   |
| 8    | 4-21028-9   | PIN, Slotted Spring, .125 X 375          | 1                            | 1                                    |
| 9    | 356437-1    | PLATE, Eccentric Adjustment              | 1                            | 1                                    |
| 10   | 1-2100-5    | SCREW, Socket Hd Cap, 4-40 X .50         | 4                            | --                                   |
|      | 1-2100-4    | SCREW, Socket Hd Cap, 4-40 X .38         | --                           | 4                                    |
| 11   | 21055-4     | WASHER, Flat, Regular, Number 4          | 3                            | 3                                    |
| 12   | 189765-1 ■  | SETSCREW, Special                        | 1                            | 1                                    |
| 13   | 37887       | SPRING                                   | 1                            | 1                                    |
| 14   | --          | TOOL HOLDER, Small                       | 1                            | --                                   |
|      | 356624-1    | TOOL HOLDER, Straight Action             | --                           | --                                   |
| 15   | 356022-1 ■  | SLEEVE, Safety                           | 1                            | --                                   |
| 16   | 1-21003-3   | SCREW, Flat Socket Hd Cap, 4-40 X .25    | --                           | 1                                    |
| 17   | 1-21003-4   | SCREW, Flat Socket Hd Cap, 4-40 X .38    | --                           | 2                                    |
| 18   | 1673691-1   | GUIDE PLATE, Straight Action Tool Holder | --                           | 1                                    |

■ Recommended Spare Part

Figure 10