

POP[®]

POP NUT[™] Tool

PNT800A

Maintenance Manual



Introduction

The PNT800A is a small, lightweight tool for installing POP® brand POP NUT™ blind rivet nuts and other blind threaded inserts.

Table 1 lists the POP NUT™ blind rivet nuts that can be fastened using this tool. The Nosepiece and Mandrel must be changed to fit some sizes of POP NUT™. (See Table 5, *Mandrel and Nosepiece Requirements* table in the *Specification* section)

Table 1: POP NUT™ blind rivet nut range

| POP NUT Type | Material | Thread Size | | | | | |
|--------------|-----------|-------------|------|------------------|--------|---------|--------|
| | | M3 | M4 | M5 | M6 | M8 | M10 |
| | | 6-32 | 8-32 | 10-24 / 10-32 | 1/4-20 | 5/16-18 | 3/8-16 |
| Standard | Steel | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Aluminum | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Stainless | ✓ | ✓ | ✓ | ✓ | ✓ | / |
| Closed End | Steel | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Aluminum | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Stainless | ✓ | ✓ | ✓ | ✓ | ✓ | / |
| Hexagonal | Steel | ✓ | ✓ | ✓ | ✓ | ✓ | / |
| | Aluminum | / | ✓ | ✓ | ✓ | ✓ | / |
| Square | Steel | / | ✓ | ✓ | ✓ | ✓ | / |
| Knurled | Steel | / | ✓ | ✓ | ✓ | ✓ | / |



Safety Instructions



TO INSURE PROPER FUNCTIONING AND SAFE OPERATION READ THIS MANUAL CAREFULLY BEFORE SETTING UP OR OPERATING THE **POP NUT** SERIES TOOLS

DEFINITIONS:

- **CAUTION!** – Failure to observe this precaution could result in physical damage or minor injury.
- **WARNING!** – Failure to observe this precaution could result in physical damage, serious injury or even death.

CAUTION!

1. DO NOT use this tool in a manner other than that recommended by Emhart Teknologies.
2. DO NOT modify the tool in any way. Modification will void any applicable warranties and could result in damage to the tool or physical injury to the user.
3. Disconnect air supply when adjusting, servicing or removing any part of the tool.
4. Trained personnel must perform tool repair and/or maintenance at prescribed intervals.
5. Only use genuine Emhart Teknologies parts for tool maintenance and repair.
6. Do not operate the tool with the Nose Housing removed.
7. Keep fingers away from the front of the tool when connecting the air supply or using the tool.
8. Do not attempt to turn the Mandrel when the air supply is connected.
9. Keep hair, fingers and loose clothing away from moving parts of the tool.
10. Do not direct tool exhaust towards anyone. The tool uses lubricated air and may eject oil mist or debris.
11. Do not use organic solvents to clean the tool, this may damage the tool.
12. Wash hands thoroughly if exposed to hydraulic fluid or lubricant.

WARNING!

1. DO NOT exceed the maximum recommended air pressure of 0.6 MPa (87 psi / 6.0 bar).
2. DO NOT point the tool at anyone when in use.
3. Always wear safety rated eye protection when using or when near a tool in use.
4. Inspect the tool and connections for damage, worn or loose parts before connecting to the air supply. If damaged, stop use immediately and have the tool repaired or replaced.
5. This tool is not designed for use in explosive atmospheres.

Specifications

Table 2: Tool Specifications

| Feature | Specification |
|----------------------|--|
| Weight | 1.68 kg (3.7 lbs) |
| Overall length | 287 mm (11.3 in) |
| Overall height | 268 mm (10.55 in) |
| Tool Stroke | 1.3 – 6.3 mm (0.05 - 0.248 in) |
| Pulling Force | 23.1 kN @ 5.0 bar (5193 lbf @ 72.5 psi) |
| Air Supply | 0.5 - 0.6MPa (5 - 6 bar) (72.5 - 87 psi) |
| Hydraulic Oil | See Table 3, <i>Specified Hydraulic Oils</i> |
| Setting capacity | See Table 1, <i>POP NUT™ blind rivet nut range</i> |
| Tool Noise Level | $L_{Aeq,T} = 72.7$ dB(A), $L_{WA} = 77.6$ dB(A), $L_{Peak} = 106.3$ dB(C) |
| Tool Vibration Level | 0.42 m/s ² , Time to 2.5 m/s ² > 24hrs (EAV) |

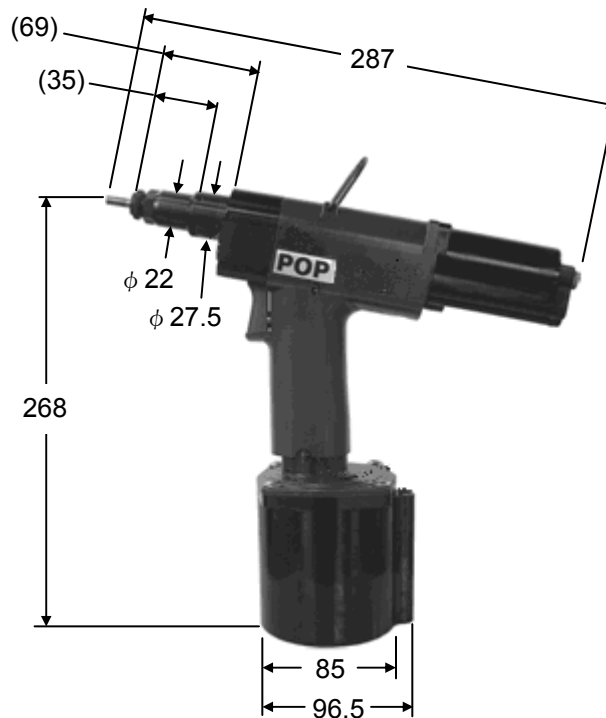


Figure 1: Tool Dimensions (mm)

Hydraulic oil

Use only Emhart Teknologies specified hydraulic lubrication oils as shown in Table 3. Use of any other oil could reduce the tool performance or even damage the tool.

Table 3: Specified Hydraulic Oils

| Company name | Product name |
|--------------|-----------------------|
| Mobile | Mobile DTE26 |
| Shell | Shell Telus Oil C68 |
| Idemitsu | Daphne Hydro 68A |
| Cosmo | Cosmo Olpas 68 |
| Esso | Telesso 68 |
| Nisseki | FBK RO68 |
| Mitsubishi | Diamond Lube RO68 (N) |

Tool Parts

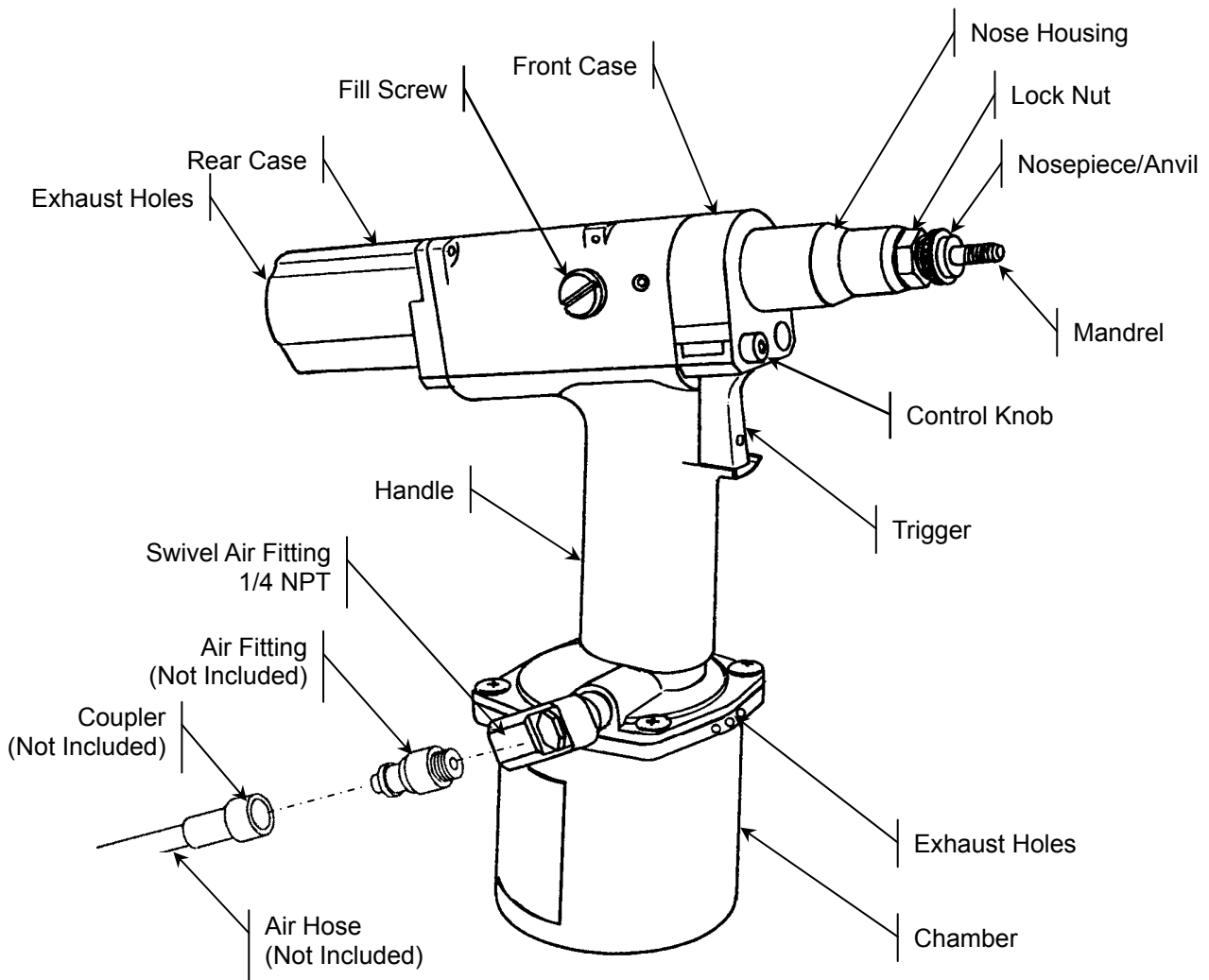


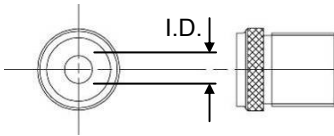
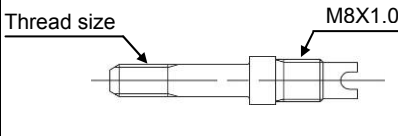
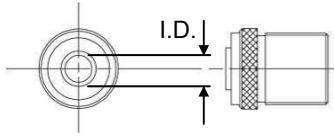
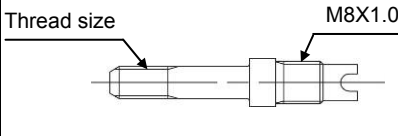
Figure 2: Tool Parts Diagram

Packaged Accessories

Table 4: Packaged Accessories

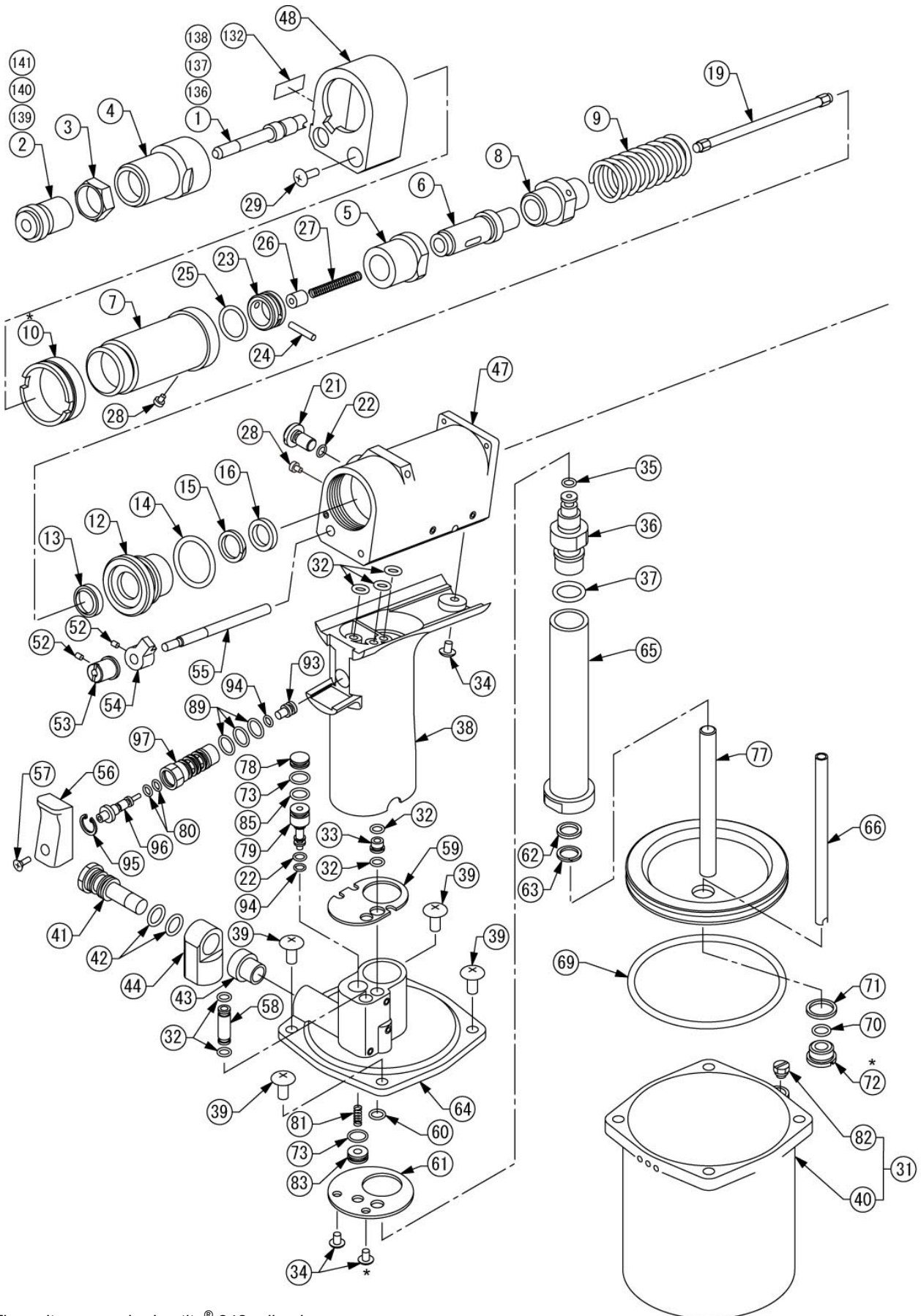
| Part No. | Item | Qty |
|------------|--------------------------|-----|
| PNT800A-T | PNT800A-POP NUT™ Tool | 1 |
| PNT600-132 | Hook | 1 |
| PNT600-133 | Hex wrench 1.5 mm | 1 |
| DPN907-006 | Cap screw M4 X 20 | 1 |
| DPN277-179 | POP NUT™ Mandrel Release | 1 |
| FG2245 | Operating Instructions | 1 |
| FG2244 | Maintenance Manual | 1 |
| FG2222 | Warranty Card | 1 |

Table 5: Mandrel and Nosepiece requirements

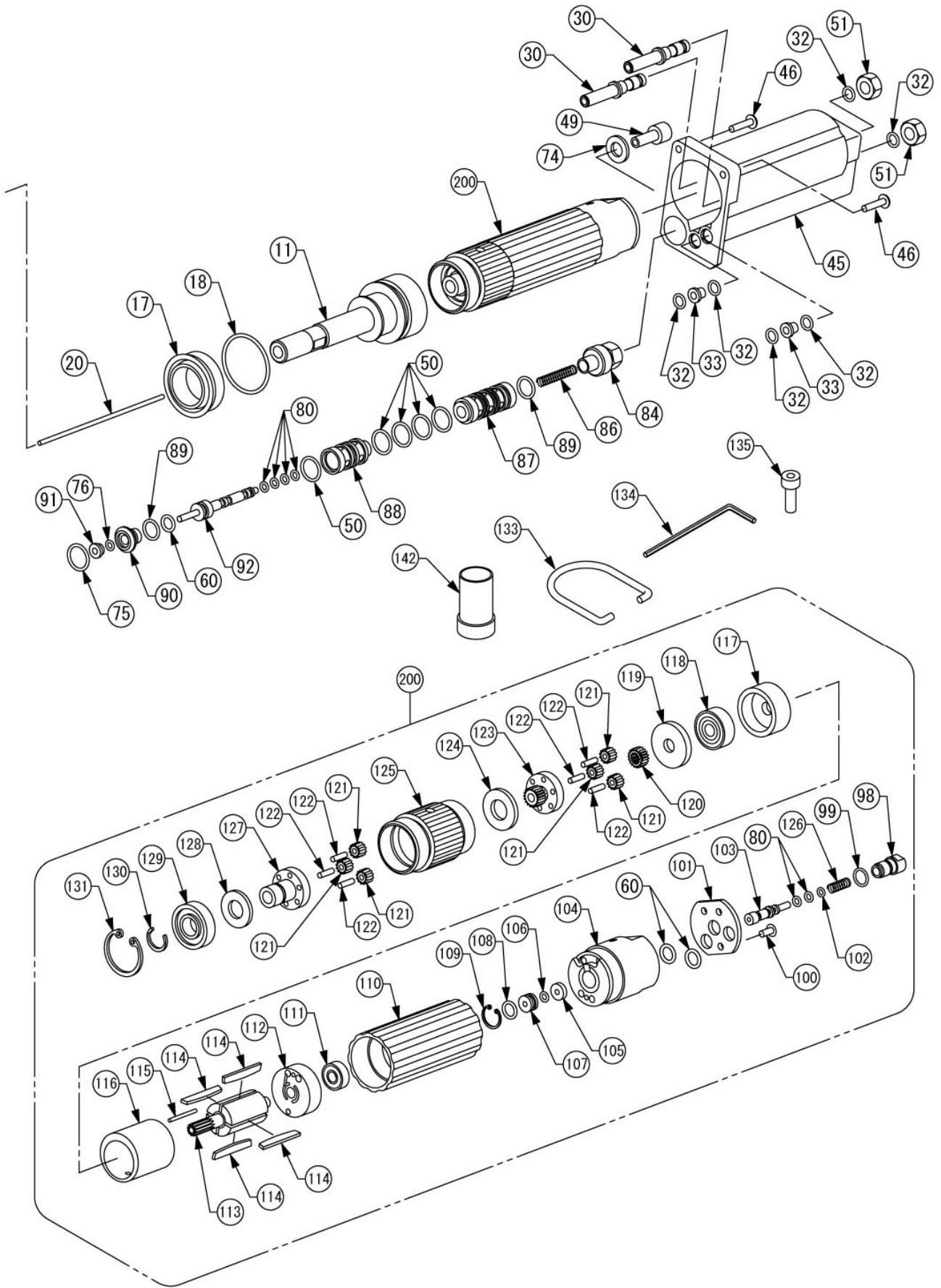
| Thick Wall (Std & ST) POP NUT Thread size | POP NUT Tool Part No. | Flat Nosepiece | | Mandrel | |
|--|--------------------------|---|-------|--|-------------|
| | |  | |  | |
| | | Part No. | I.D. | Part No. | Thread size |
| M3X0.5 | PNT800A-3 | PNT600-02-3 | φ4.0 | PNT600-01-3 | M3X0.5 |
| M4X0.7 | PNT800A-4 | PNT600-02-4 | φ4.5 | PNT600-01-4 | M4X0.7 |
| M5X0.8 | PNT800A-5 | PNT600-02-5 | φ5.1 | PNT600-01-5P | M5X0.8 |
| M6X1.0 | PNT800A-6 | PNT600-02-6 | φ6.1 | PNT600-01-6P | M6X1.0 |
| M8X1.25 | PNT800A-8 | PNT600-02-8 | φ8.1 | PNT600-01-8 | M8X1.25 |
| M10X1.5 | PNT800A-10 | PNT600-02-10 | φ10.1 | PNT600-01-10A | M10X1.5 |
| M4, M5, M6 & M8 | PNT800A | | | | |
| 6-32 | PNT800A-632R | PNT600-02-632 | φ 3.6 | PNT600-01-632 | 6-32 |
| 8-32 | PNT800A-832R | PNT600-02-832 | φ 4.3 | PNT600-01-832 | 8-32 |
| 10-24 | PNT800A-1024R | PNT600-02-5 | φ5.1 | PNT600-01-1024 | 10-24 |
| 10-32 | PNT800A-1032R | PNT600-02-5 | φ5.1 | PNT600-01-1032 | 10-32 |
| ¼-20 | PNT800A-420R | PNT600-02-420 | φ 6.5 | PNT600-01-420 | ¼-20 |
| 5/16-18 | PNT800A-518R | PNT600-02-8 | φ8.1 | PNT600-01-518R | 5/16-18 |
| 3/8-16 | PNT800A-616R | PNT600-02-10 | φ10.1 | PNT600-01-616R | 3/8-16 |
| Thin Wall (TK,TL,TH) POP NUT Thread size | POP NUT Tool Part No. | Piloted Nosepiece | | Mandrel | |
| | |  | |  | |
| | | Part No. | I.D. | Part No. | Thread size |
| M4X0.7 | PNT800A-4P | PNT600-02-4P | φ4.3 | PNT600-01-4P | M4X0.7 |
| M5X0.8 | PNT800A-5P | PNT600-02-5P | φ5.1 | PNT600-01-5P | M5X0.8 |
| M6X1.0 | PNT800A-6P | PNT600-02-6P | φ6.1 | PNT600-01-6P | M6X1.0 |
| M8X1.25 | PNT800A-8P | PNT600-02-8P | φ8.1 | PNT600-01-8P | M8X1.25 |
| M10X1.5 | PNT800A-10P | PNT600-02-10P | φ10.1 | PNT600-01-10P | M10X1.5 |
| 6-32 | PNT800A-632P | PNT600-02-3P | φ 3.6 | PNT600-01-632 | 6-32 |
| 8-32 | PNT800A-832P | PNT600-02-4P | φ 4.3 | PNT600-01-832 | 8-32 |
| 10-24 | PNT800A-1024P | PNT600-02-5P | φ5.1 | PNT600-01-1024 | 10-24 |
| 10-32 | PNT800A-1032P | PNT600-02-5P | φ5.1 | PNT600-01-1032 | 10-32 |
| ¼-20 | PNT800A-420P | PNT600-02-420P | φ 6.5 | PNT600-01-420 | ¼-20 |
| 5/16-18 | PNT800A-518P | PNT600-02-8P | φ8.1 | PNT600-01-518 | 5/16-18 |
| 3/8-16 | PNT800A-616P | PNT600-02-10P | φ10.1 | PNT600-01-616 | 3/8-16 |

Note: Refer to the Tool Setup section for details of Nosepiece and Mandrel installation.

PNT800A Diagram



(*) These items require Loctite® 242 adhesive.



Parts List

| Item | Part No. | Description | Qty |
|------|--------------|-----------------------|-----|
| 1 | PNT600-01-6P | Mandrel M6 | 1 |
| 2 | PNT600-02-6 | Nose Piece M6 | 1 |
| 3 | PNT600-03 | Lock Nut | 1 |
| 4 | PNT600-04A | Nose Housing | 1 |
| 5 | DPN277-001 | Spin Pull Head Case | 1 |
| 6 | DPN277-002 | Spin Pull Head | 1 |
| 7 | PNT600-07B | Mast Housing | 1 |
| 8 | DPN277-003 | Joint | 1 |
| 9 | DPN901-004 | Return Spring | 1 |
| 10 | PNT600-10 | Housing Lock | 1 |
| 11 | DPN277-004 | Hydraulic Piston | 1 |
| 12 | DPN277-005 | Rod Seal Case | 1 |
| 13 | DPN908-009 | Scraper | 1 |
| 14 | DPN900-031 | O-Ring | 1 |
| 15 | DPN908-010 | Back Up Ring | 1 |
| 16 | DPN908-011 | Penta Seal | 1 |
| 17 | DPN908-012 | Piston Seal | 1 |
| 18 | DPN900-032 | O-Ring | 1 |
| 19 | PNT600-19A | Bit | 1 |
| 20 | PNT600-20 | Start Bar | 1 |
| 21 | DPN239-047 | Fill Screw | 1 |
| 22 | DPN900-033 | O-Ring | 2 |
| 23 | DPN277-006 | Lock Pin Holder | 1 |
| 24 | DPN277-007 | Lock Pin | 1 |
| 25 | DPN900-034 | O-Ring | 1 |
| 26 | PNT600-26 | Lock Pin Pusher | 1 |
| 27 | DPN901-009 | Spring | 1 |
| 28 | DPN907-005 | Socket Head Cap Screw | 2 |
| 29 | PNT600-29A | Truss Head Screw | 1 |
| 30 | PNT600-30A | Rear Case Tube | 2 |
| 31 | PNT800-02 | Chamber Assembly | 1 |
| 32 | DPN900-015 | O-Ring | 13 |
| 33 | PNT600-33A | Joint Adapter | 3 |
| 34 | PNT600-34 | Truss Head Screw | 3 |
| 35 | DPN900-035 | O-Ring | 1 |
| 36 | DPN277-008 | Sleeve Upper | 1 |
| 37 | DPN900-036 | O-Ring | 1 |
| 38 | DPN277-009 | Handle | 1 |

| Item | Part No. | Description | Qty |
|------|------------|----------------------|-----|
| 39 | PNT600-39 | Truss Head Screw | 4 |
| 40 | DPN277-183 | Chamber | 1 |
| 41 | PNT600-41A | R Joint Adapter | 1 |
| 42 | DPN900-021 | O-Ring | 2 |
| 43 | PNT600-43 | R Joint Spacer | 1 |
| 44 | PNT600-44B | R Joint | 1 |
| 45 | PNT600-45A | Rear Case | 1 |
| 46 | PNT600-46 | Truss Head Screw | 2 |
| 47 | DPN277-010 | Handle Upper | 1 |
| 48 | PNT600-48A | Front Case | 1 |
| 49 | PNT600-49 | T Valve End Screw | 1 |
| 50 | DPN900-037 | O-Ring | 5 |
| 51 | PNT600-51 | Hexagon Thin Nut | 2 |
| 52 | DPN905-004 | Socket Set Screw | 2 |
| 53 | PNT600-53 | Control Knob | 1 |
| 54 | PNT600-54C | Control Nut | 1 |
| 55 | PNT600-55A | T Valve Push Rod | 1 |
| 56 | DPN277-011 | Trigger | 1 |
| 57 | DPN277-071 | Flat Head Screw M3X8 | 1 |
| 58 | PNT600-58 | Joint Tube | 1 |
| 59 | PNT600-59A | Assist Plate | 1 |
| 60 | DPN900-006 | O-Ring | 2 |
| 61 | PNT800-14 | Retainer Plate | 1 |
| 62 | DPN908-003 | Penta Seal | 1 |
| 63 | DPN908-013 | Back Up Ring | 1 |
| 64 | DPN277-012 | Handle Lower | 1 |
| 65 | DPN277-013 | Sleeve | 1 |
| 66 | PNT800-05 | Tube | 1 |
| 69 | DPN900-038 | O-Ring | 1 |
| 70 | DPN900-039 | O-Ring | 1 |
| 71 | PNT600-71 | Washer | 1 |
| 72 | PNT600-72 | Tube Seal Case | 1 |
| 73 | DPN900-011 | O-Ring | 2 |
| 74 | DPN909-001 | SS-Washer | 1 |
| 75 | DPN900-040 | O-Ring | 1 |
| 76 | DPN900-023 | O-Ring | 1 |
| 77 | FAN277-014 | Air Piston Assembly | 1 |
| 78 | PNT800-07A | J Valve Stopper | 1 |

| Item | Part No. | Description | Qty |
|------------|-------------------|----------------------|-------------|
| 79 | PNT800-08A | J Valve Rod | 1 |
| 80 | DPN900-014 | O-Ring | 6 |
| 81 | DPN901-010 | Spring | 1 |
| 82 | DPN277-310 | Plug | 1 |
| 83 | DPN239-065 | J Valve Cap | 1 |
| 84 | PNT800-10 | T Valve Rear Case | 1 |
| 85 | DPN900-013 | O-Ring | 1 |
| 86 | DPN901-011 | Spring | 1 |
| 87 | PNT800-11 | T Valve Center Case | 1 |
| 88 | PNT800-12 | T Valve Front Case | 1 |
| 89 | DPN900-041 | O-Ring | 5 |
| 90 | PNT600-90 | T Valve Cap | 1 |
| 91 | PNT600-91 | T Valve Front Piece | 1 |
| 92 | PNT600-92 | T Valve Rod | 1 |
| 93 | PNT600-93 | S Valve End | 1 |
| 94 | DPN900-012 | O-Ring | 2 |
| 95 | DPN902-001 | Retaining Ring | 1 |
| 96 | PNT600-96 | S Valve Rod | 1 |
| 97 | PNT600-97B | S Valve Case | 1 |
| 132 | DPN277-176 | Scale Label | 1 |
| 200 | PNT600-200 | Air Motor | 1set |
| 60 | DPN900-006 | O-Ring | 2 |
| 80 | DPN900-014 | O-Ring | 2 |
| 98 | PNT600-98B | M Valve End | 1 |
| 99 | DPN900-042 | O-Ring | 1 |
| 100 | DPN277-177 | Flat head screw M3x6 | 1 |
| 101 | PNT600-101A | Motor Case End Plate | 1 |
| 102 | DPN900-043 | O-Ring | 1 |
| 103 | PNT600-103 | M Valve Rod | 1 |
| 104 | PNT600-104 | Motor Case End | 1 |
| 105 | PNT600-105 | Washer | 1 |
| 106 | DPN900-044 | O-Ring | 1 |
| 107 | PNT600-107 | O-Ring Holder | 1 |
| 108 | DPN900-045 | O-Ring | 1 |
| 109 | DPN902-002 | Retaining Ring | 1 |
| 110 | PNT600-110 | Casing | 1 |

| Item | Part No. | Description | Qty |
|---|--------------|-------------------------|-----|
| 111 | PNT600-111 | Ball Bearing | 1 |
| 112 | PNT600-112 | Rear Plate | 1 |
| 113 | PNT600-113 | Rotor | 1 |
| 114 | PNT600-114 | Blade | 4 |
| 115 | PNT600-115 | Spring Pin | 1 |
| 116 | PNT600-116 | Cylinder | 1 |
| 117 | PNT600-117 | Front Plate | 1 |
| 118 | PNT600-118 | Ball Bearing | 1 |
| 119 | PNT600-119 | Spacer | 1 |
| 120 | PNT600-120 | Sun Gear | 1 |
| 121 | PNT600-121 | Planet Gear | 6 |
| 122 | PNT600-122 | Needle Pin | 6 |
| 123 | PNT600-123 | Gear Cage & Gear | 1 |
| 124 | PNT600-124 | Spacer | 1 |
| 125 | PNT600-125 | Internal Gear | 1 |
| 126 | DPN901-012 | Spring | 1 |
| 127 | PNT600-127 | Gear Cage | 1 |
| 128 | PNT600-128 | Spacer | 1 |
| 129 | PNT600-129 | Ball Bearing | 1 |
| 130 | DPN902-003 | Retaining Ring | 1 |
| 131 | DPN902-004 | Retaining Ring | 1 |
| Accessories | | | |
| 133 | PNT600-132 | Hook | 1 |
| 134 | PNT600-133 | HS Screw Key 1.5mm | 1 |
| 135 | DPN907-006 | Cap Screw M4X20 | 1 |
| 136 | PNT600-01-4 | Mandrel M4 | 1 |
| 137 | PNT600-01-5P | Mandrel M5 | 1 |
| 138 | PNT600-01-8 | Mandrel M8 | 1 |
| 139 | PNT600-02-4 | Nose Piece M4 | 1 |
| 140 | PNT600-02-5 | Nose Piece M5 | 1 |
| 141 | PNT600-02-8 | Nose Piece M8 | 1 |
| 142 | DPN277-179 | POP NUT Mandrel Release | 1 |
| *See table 5 for additional Mandrels and Nosepieces | | | |

Tool Setup

Initial Setup

1. Check that the correct Nosepiece and Mandrel are fitted for the POP NUT™ to be installed. See the *Basic Tool Operation* section for proper tool adjustment.
2. Connect an air fitting to the Swivel Air Fitting of the tool. The Swivel Air Fitting is a 1/4 NPT thread.
3. Connect an Air Hose to the tool.
4. Connect an air filter, regulator and lubricator inline with the air supply, between the Air Supply and the Air Hose, within 3m [6 ft] of the tool.
5. Adjust the air pressure supply and oil drip volume of the lubricator
 - Air Pressure: 0.5-0.6 MPa. (72.5-87 psi)
 - Oil drip volume: 1-2 drops/ 20 nuts fastened

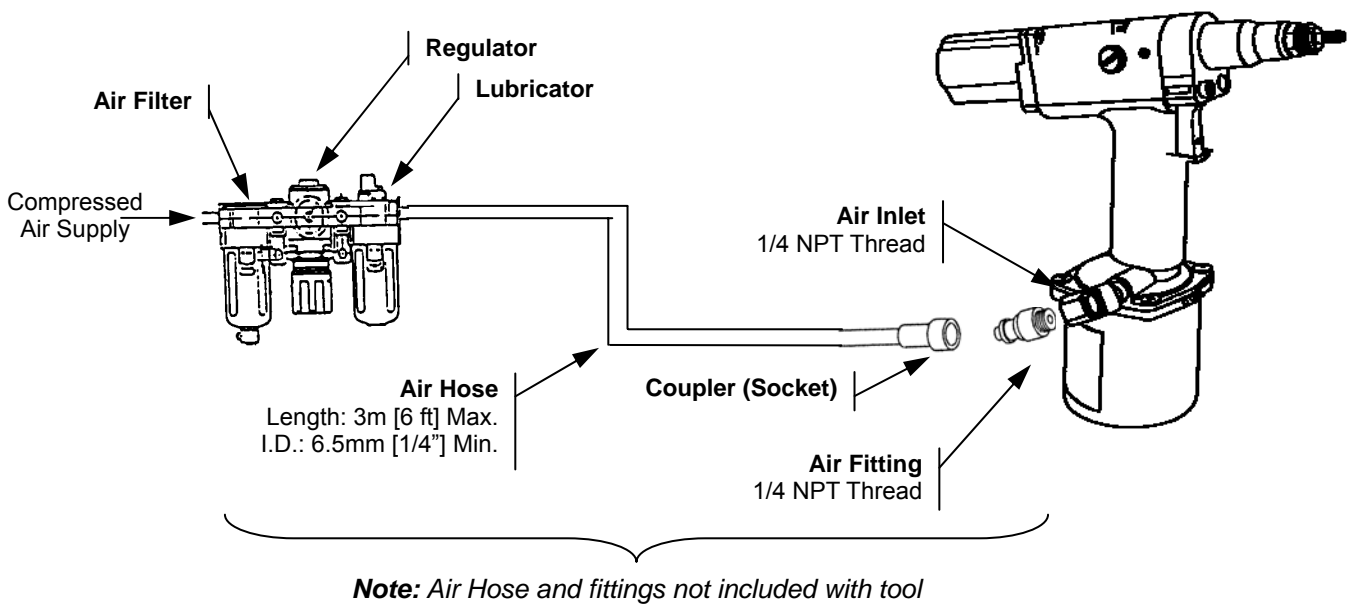


Figure 3: Tool Setup

Note: Refer to the instruction manual for the Lubricator used for the proper adjustment method and lubrication oils to use relating to air motors.

Note: The tool may be manually lubricated if an oil lubricator is not available.



WARNING!

Use an air hose with a rating of 1.0 MPa (145 psi / 10 bar) or greater, Maximum Ordinary Operating pressure. Also make sure the hose material is suitable for the operating environment (i.e. oil proof, wear and abrasion resistance etc.). For details, refer to your hose manufacturer's catalog.

Mandrel and Nosepiece installation

Mandrel Installation (with POP NUT™ Mandrel Release, DPN277-179)

1. **Disconnect the Air Supply**
2. Select the correct Mandrel and Nosepiece according to Table 5.
3. Remove the Nosepiece from the tool by loosening the Lock Nut and unscrewing it (Figure 4).
4. Insert the POP NUT™ Mandrel Release tool over the Mandrel and into the Nose Housing.
5. Push Mandrel Release into the tool in order to disengage the Lock Pin Holder from the Mandrel.
6. While holding the Mandrel Release in, unscrew the Mandrel by turning it counter-clockwise.
7. While holding the Mandrel Release in, screw in the desired Mandrel until it stops.
8. Release the Mandrel Release tool and rotate the Mandrel counter-clockwise to ensure the Lock Pin Holder has engaged the Mandrel.
9. Install the Nosepiece.

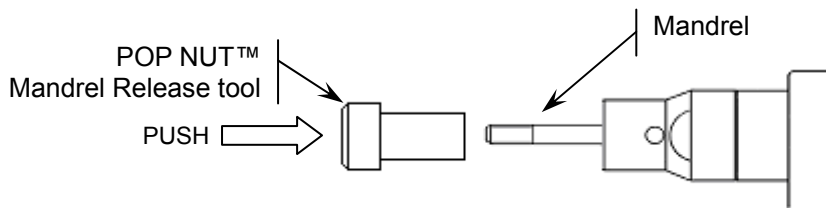


Figure 4: POP NUT™ Mandrel Release

Mandrel Installation (without POP NUT™ Mandrel Release, DPN277-179)

1. **Disconnect the Air Supply**
2. Select the correct Mandrel and Nosepiece according to Table 5.
3. Remove the Nose Housing from the tool to expose the Mandrel and Spin Pull Head Case (Figure 5).
4. Pull the Lock Pin Holder back and unscrew the Mandrel by turning it counter-clockwise.
5. While holding the Lock Pin Holder back, screw in the desired mandrel until it stops.
6. Release the Lock Pin Holder.
- Note:** If the Lock Pin Holder does not return to its original position then turn the Mandrel counter-clockwise to ensure the Lock Pin engages the Mandrel and the holder moves forward.
7. Replace the Nose Housing.

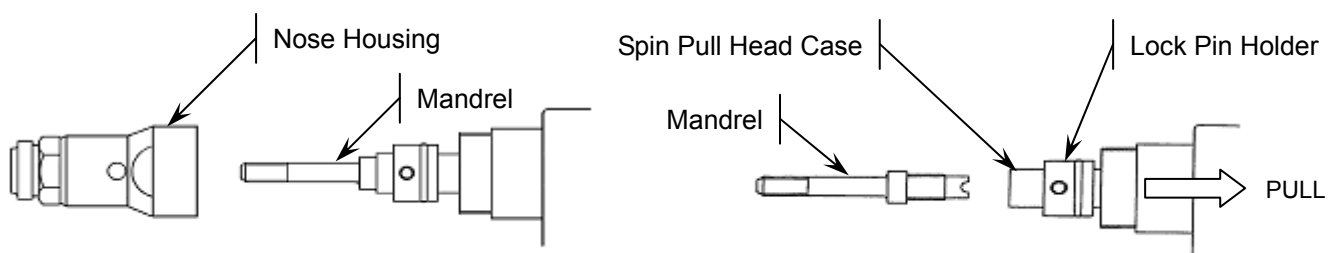


Figure 5: Mandrel Installation

Nosepiece Installation

1. **Disconnect the Air Supply**
2. Select the correct Nosepiece according to Table 5.
3. Remove the current Nosepiece from the tool by loosening the Lock Nut and unscrewing it.
4. Remove the Lock Nut from the Nosepiece
5. Thread the Lock Nut onto the desired Nosepiece
6. Screw the Nosepiece into the Nose Housing
7. Lock it in place by tightening the Lock Nut against the Nose Housing (Refer to the *Mandrel & Nosepiece Adjustment* in the Basic Tool Operation section for adjustment).

Basic Tool Operation

Before setting POP NUTs™ with this tool, refer to the Safety Instructions and Tool Setup sections of this manual to ensure safe and reliable tool operation.

Mandrel & Nosepiece Adjustment

1. Verify that the correct Mandrel and Nosepiece are fitted to the tool for the desired POP NUT™ (See Table 5, *Mandrel and Nosepiece Requirements* table in the Specifications section).

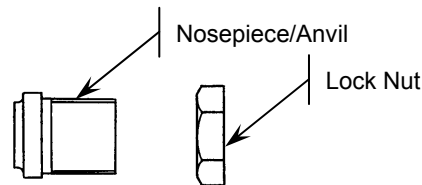


Figure 6: Nosepiece and Lock Nut

2. Loosen the lock nut on the tool and thread the Nosepiece all the way into the Nose Housing.
3. Thread the desired POP NUT™ onto the tool (see Figure 7).

Open End POP NUTs™

- a. Thread the insert onto the Mandrel until the Mandrel extends beyond the insert by approximately 1 full thread
- b. Unthread the Nosepiece until it is touching the flange of the insert
- c. Tighten the lock nut against the Nose Housing.

Closed End POP NUTs™

- a. Thread the insert onto the Mandrel until it stops
- b. Unthread the insert on full turn (one thread pitch)
- c. Unthread the Nosepiece until it is touching the flange of the insert
- d. Tighten the lock nut against the Nose Housing.

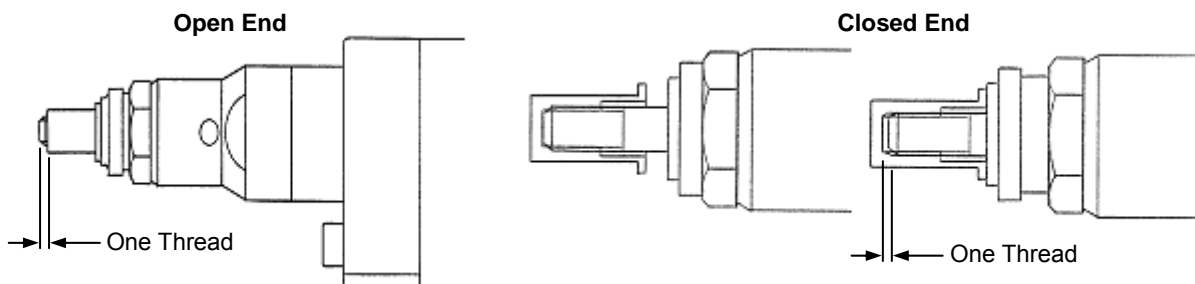


Figure 7: Proper Mandrel and Nosepiece adjustment

Tool Operation

Loading the POP NUT™ onto the tool

1. Connect the air supply to the tool.
2. Thread the insert 1/4 turn onto the Mandrel.
3. Press the insert against the Mandrel as indicated and the Mandrel will spin, automatically threading the insert onto the Mandrel.
4. Keep pushing the insert onto the Mandrel until the Mandrel stops spinning (If the insert is not fully threaded, the setting stroke will be shortened by the gap between the head of the insert and the Nosepiece).

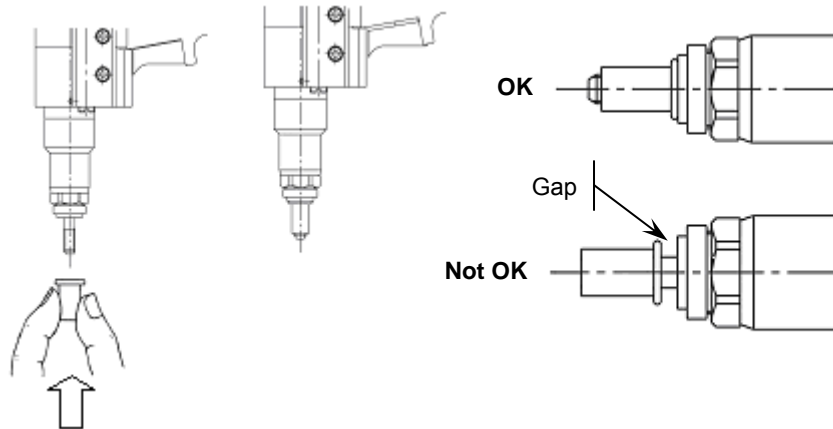


Figure 8: Loading the POP NUT™ onto tool

Installing the POP NUT™ into the work piece

1. With the POP NUT™ mounted on the Mandrel, insert it perpendicularly into the hole of the work piece
2. Pull trigger and hold it in order to install the insert
3. Keep trigger depressed until the Mandrel automatically reverses direction and completely unthreads the Mandrel from the insert.
4. Lightly pull the tool away from the work piece as Mandrel is reversing in order to disengage it from the insert.
5. Once the tool is disengaged from the insert, release the trigger.*

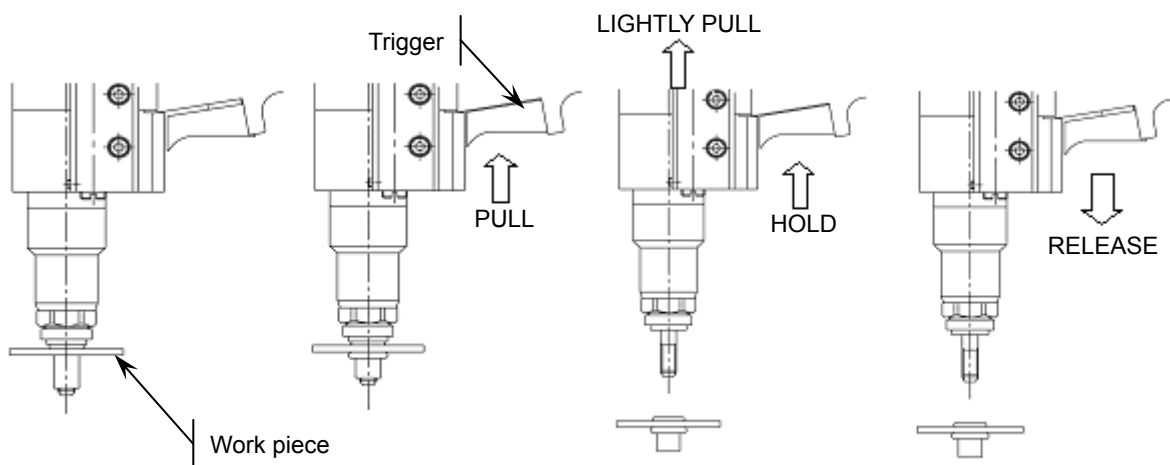


Figure 9: Setting the POP NUT™

Note:

- Fit the flange of the insert flat against the work piece.
- Do not tilt the tool. The tool must be perpendicular to the work piece.

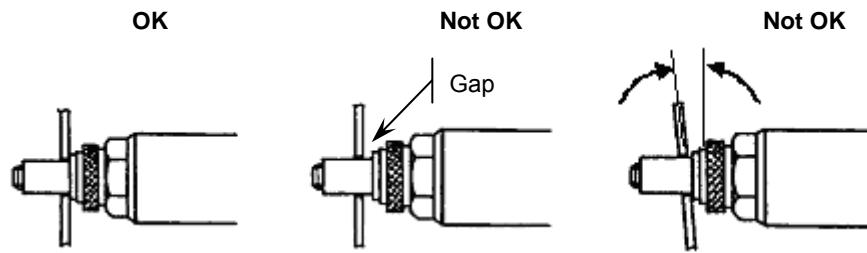


Figure 10: Proper insertion of POP NUT™ threaded inserts into an application

****Disengaging the tool from the insert***



WARNING!

If you let go of the trigger during the installation sequence, the insert may not set completely, the hydraulics will reset and the tool will not automatically unthread from the insert.

DO NOT pull the trigger again, follow the steps below to disengage the insert.

To disengage the tool from the insert and application:

1. Depress and hold the Control Knob (see Figure 11).
2. While holding the Control Knob, press and hold the trigger. This will cause the Mandrel to spin counter-clockwise and unthread the insert.
3. When fully unthreaded, release the trigger.

To disengage the tool from the insert and work piece if the Mandrel is stuck:

1. Disconnect the air supply
2. Thread the M4 x 20 Cap screw provided with the tool, into the hole on the side of the Nose Housing until it fits snugly against the inner Spin Pull Head, locking the rotation of the Mandrel to the tool.
3. Turn the body of the tool counter-clockwise to detach it from the insert.

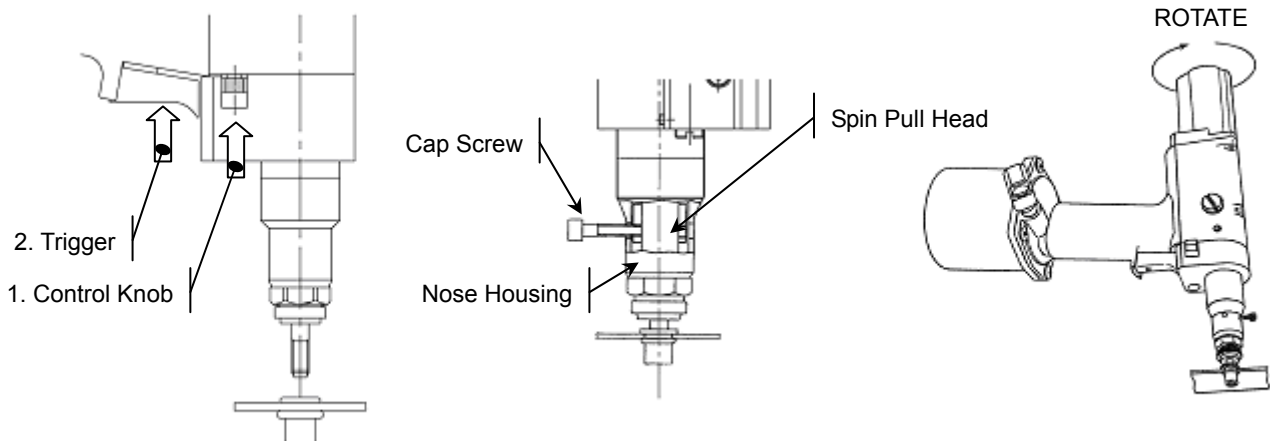


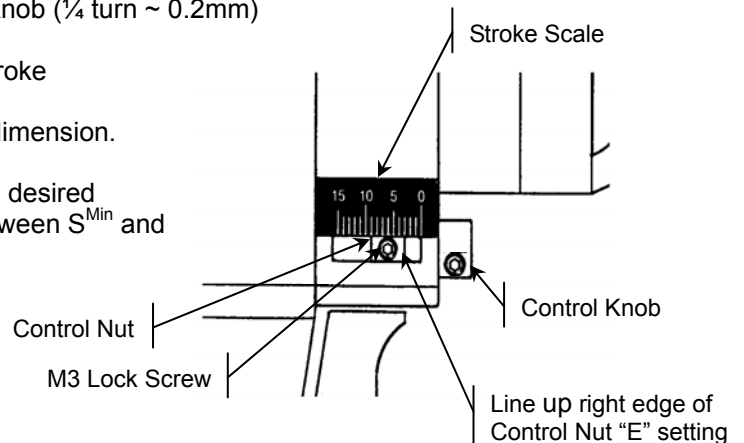
Figure 11: Disengaging the tool from the insert

Setting Tool Stroke

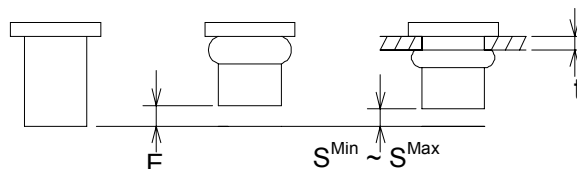
- Adjust the stroke of the tool according to insert size and thickness of work piece as indicated in the instructions below.
- Test 5 pieces before beginning production work to ensure proper setting of the POP NUT™.
- Proper setting stroke is critical:
 - Insufficient setting stroke results in insufficient clamping of the insert, leading to a “Spin Out” failure in the application
 - Too much setting stroke results in possible insert threads stripping and Mandrel damage

Stroke Adjustment

1. Loosen the M3 Lock Screw on the Control Nut using a 1.5mm Hex Wrench.
2. Set Stroke to the value of “E” as determined by the stroke formula below or from the POP NUT™ Stroke Charts.
3. Adjust the stroke by turning the Control Knob (¼ turn ~ 0.2mm)
 - a. Clockwise to decrease stroke
 - b. Counter-clockwise to increase stroke
4. Tighten the Lock Screw
5. Set a POP NUT™ and measure the “E” dimension.
6. Adjust the stroke to “E” +/-0.1mm
7. Set a POP NUT™ in a test piece with the desired thickness and verify that the stroke is between S^{Min} and S^{Max} .
8. Re-adjust stroke as necessary.



| IF... | THEN... |
|--|---|
| $E^{(Measured)} < E^{(Formula)}$ | Increase stroke – See “ <i>Stroke Adjustment</i> ” |
| $E^{(Measured)} > E^{(Formula)}$ | Check POP NUT™ threads and Mandrel for damage Reduce stroke – See “ <i>Stroke Adjustment</i> ” |
| $S^{Min (Measured)} < S^{Min (Formula)}$ | Increase stroke – See “ <i>Stroke Adjustment</i> ” |
| $S^{Max (Measured)} > S^{Max (Formula)}$ | Check POP NUT™ threads and Mandrel for damage Reduce stroke – See “ <i>Stroke Adjustment</i> ” |



Stroke Setting for Standard POP NUTs™

Use the following procedure to determine the proper setting requirements for the **SPH, SFH, APH, AFH, SPS, SFS, APS, AFS & SRH Series** of POP NUTs™:

1. Determine stroke minimum, “S^{Min}”, maximum, “S^{Max}”, and stroke setting, “E”, from the appropriate formula in Table 6, *Stroke Formula for Standard POP NUTs™*, for the POP NUT™ being used.
2. Set the insert in a test piece with the proper thickness
3. Measure the value of S^{Min} and compare to the formula result.

Table 6: Stroke Formula for Standard POP NUTs™

| Thread Size | Stroke Formulas [mm] | | |
|-------------|----------------------|-----------------------|-----------------------|
| | S ^{Max} | S ^{Min} | E |
| M3X0.5 | 1.2+(N-t) | S ^{Max} -0.2 | S ^{Max} +0.1 |
| M4X0.7 | 1.6+(N-t) | S ^{Max} -0.3 | S ^{Max} +0.1 |
| M5X0.8 | 2.0+(N-t) | S ^{Max} -0.3 | S ^{Max} +0.1 |
| M6X1.0 | 2.4+(N-t) | S ^{Max} -0.4 | S ^{Max} +0.2 |
| M8X1.25 RLT | 2.4+(N-t) | S ^{Max} -0.4 | S ^{Max} +0.2 |
| M8X1.25 | 2.8+(N-t) | S ^{Max} -0.4 | S ^{Max} +0.2 |
| M10X1.5 | 3.0+(N-t) | S ^{Max} -0.4 | S ^{Max} +0.2 |

Example: SPH625 POP NUT™ with a 1.5mm thick work piece

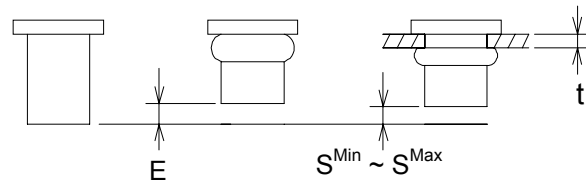
$t = \text{Workpiece thickness}, \quad N = \frac{1}{10} \text{ value of last 2 digits of POP Nut number}$

$$t = 1.5\text{mm}, \quad N = \frac{1}{10}(25) = 2.5$$

$$S^{Max} = 2.4 + (N - t)$$

$$S^{Max} = 2.4 + (2.5 - 1.5)$$

$$S^{Max} = 3.4\text{mm}, \dots S^{Min} = 3.0\text{mm}, \dots E = 3.6\text{mm}$$



Stroke Setting for ST & Thin Wall POP NUTs™

Use the following procedure to determine the proper setting requirements for the ST, TK, TL, TH Series of POP NUTs™ or use the POP NUT™ Stroke Charts:

1. Determine the Installed Length, “IL” of the POP NUT™ being used. This information can be found in the Emhart POP NUT™ Blind Rivet Nut catalog.
2. Set the insert in a test piece with the proper thickness
3. Measure the IL value after insertion and compare to the desired value

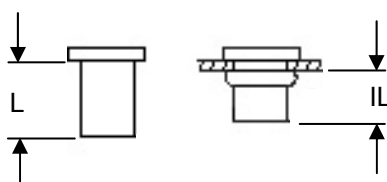


Figure 12: “IL” Measurement

| IF... | THEN... |
|------------------------------------|---|
| $IL_{(Measured)} > IL_{(Desired)}$ | Increase stroke – See “Stroke Adjustment” |
| $IL_{(Measured)} < IL_{(Desired)}$ | Check POP NUT threads and Mandrel for damage Reduce stroke – See “Stroke Adjustment” |

Note:

- The stroke may increase or decrease due to changes in air pressure [~ 0.1 mm (0.004 in) per 0.1 MPa (15 psi)]



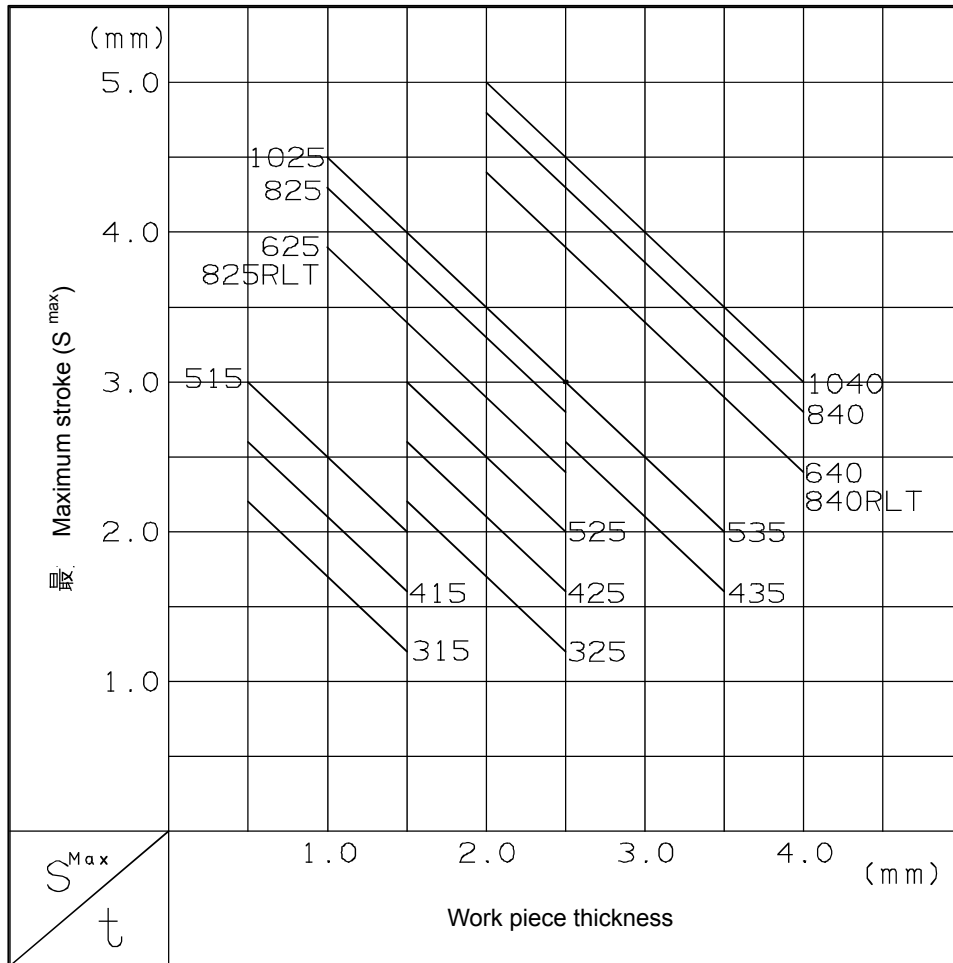
WARNING!

Adjust stroke Control Knob by 1/4 rotations.

If the Control Knob is rotated counter-clockwise by a large amount to increase the stroke, it may cause stripping or sticking of Mandrel and/or POP NUT™ threads.

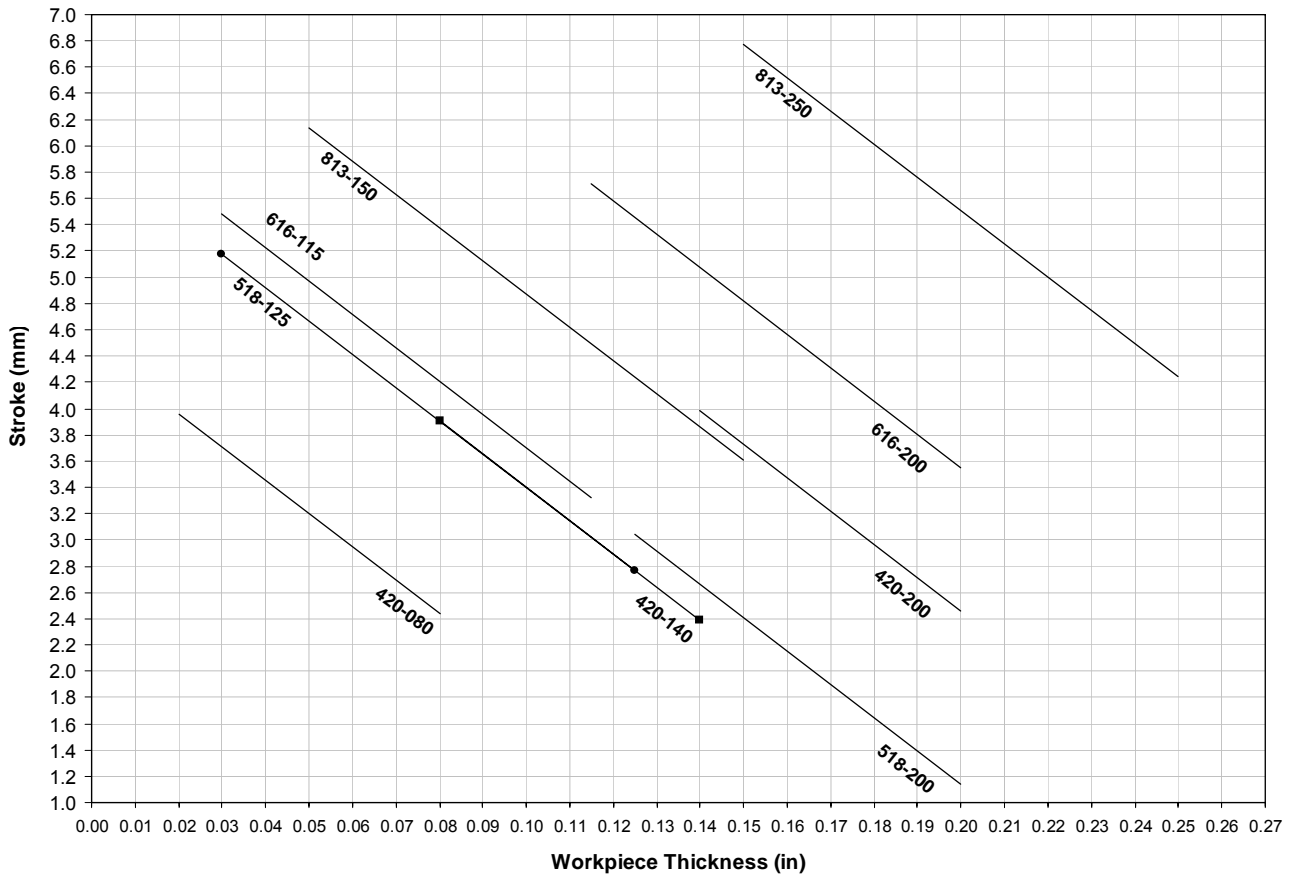
POP NUT™ Stroke Charts

Thick Wall, Standard POP NUTS™
(SPH, SFH, APH, AFH, SPS, SFS, APS, AFS & SRH Series)



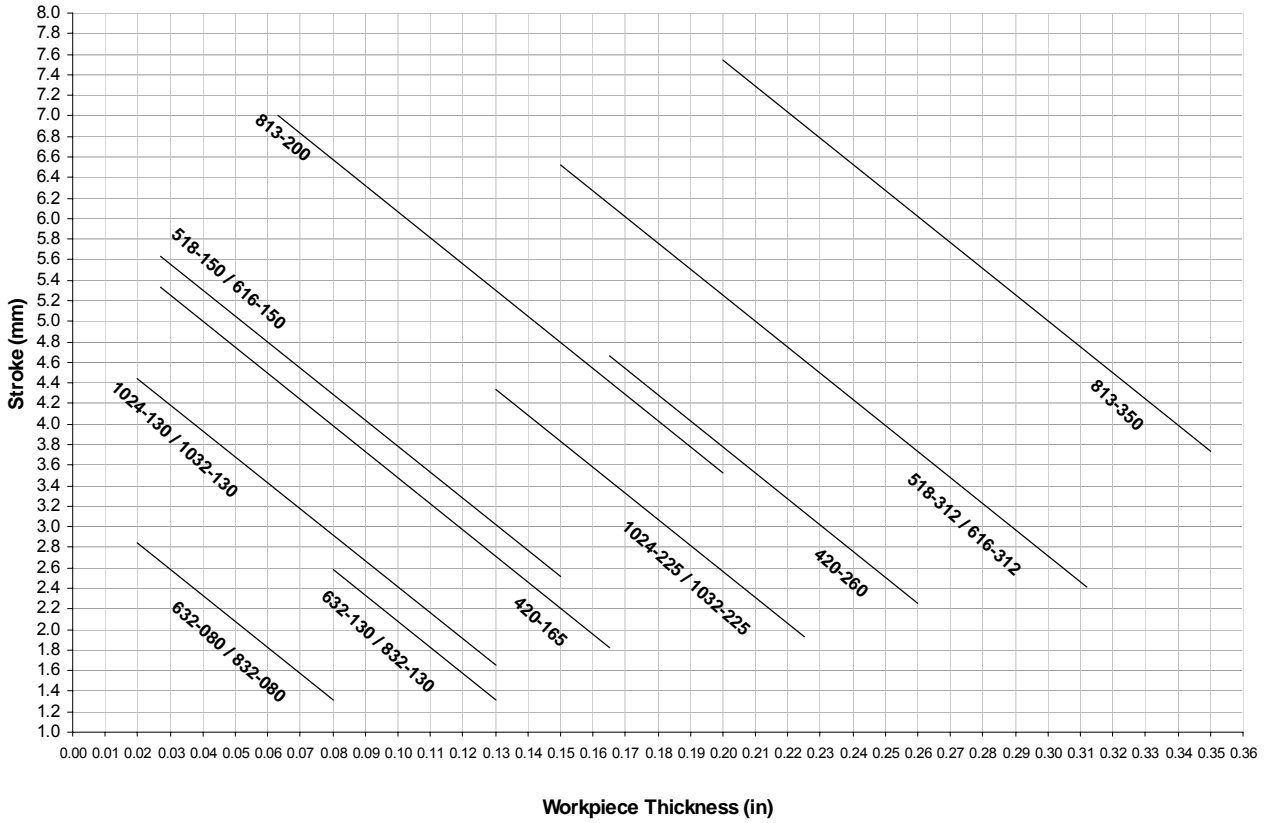
Thick Wall, "ST" POP NUTS

ST Series Open End (Inch)

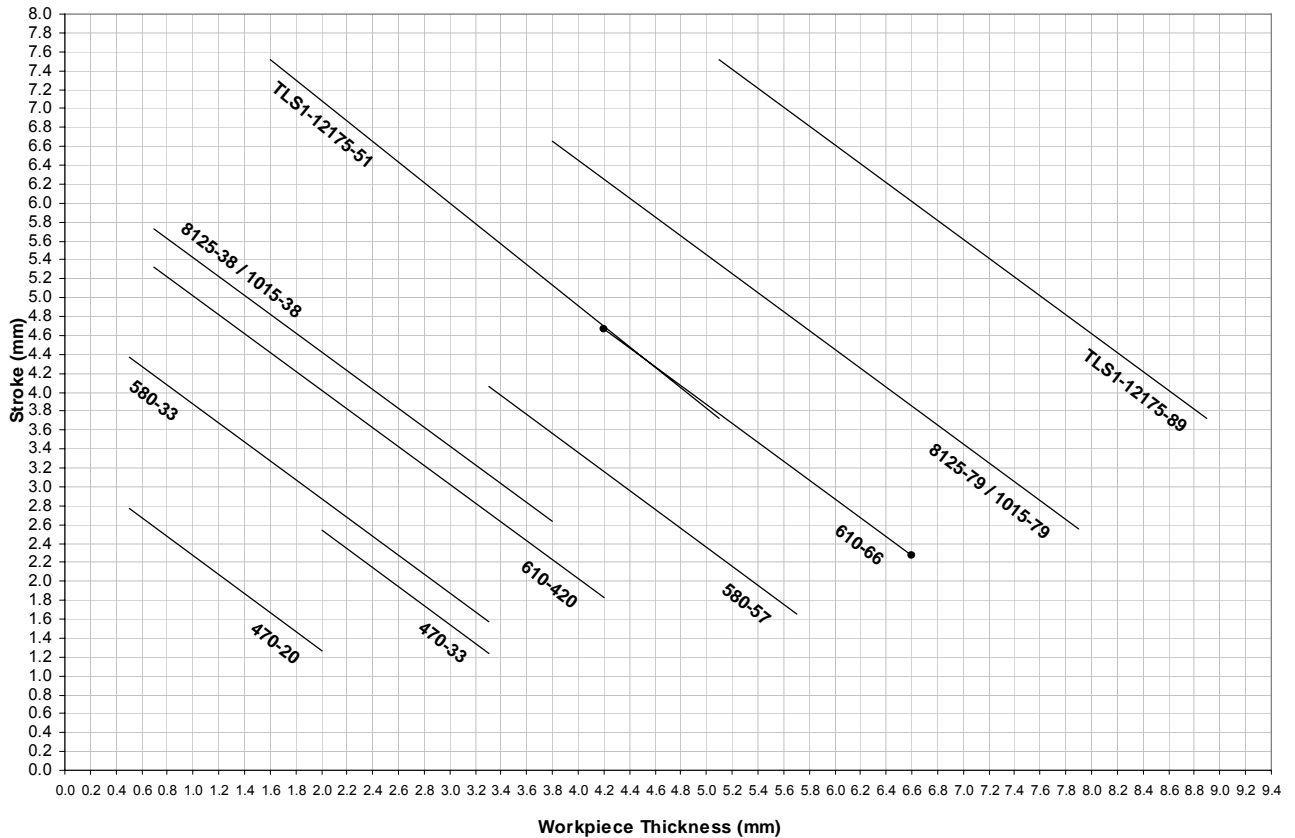


Thin Wall, TK & TL POP NUTS

TK/TL Series Open End (Inch)

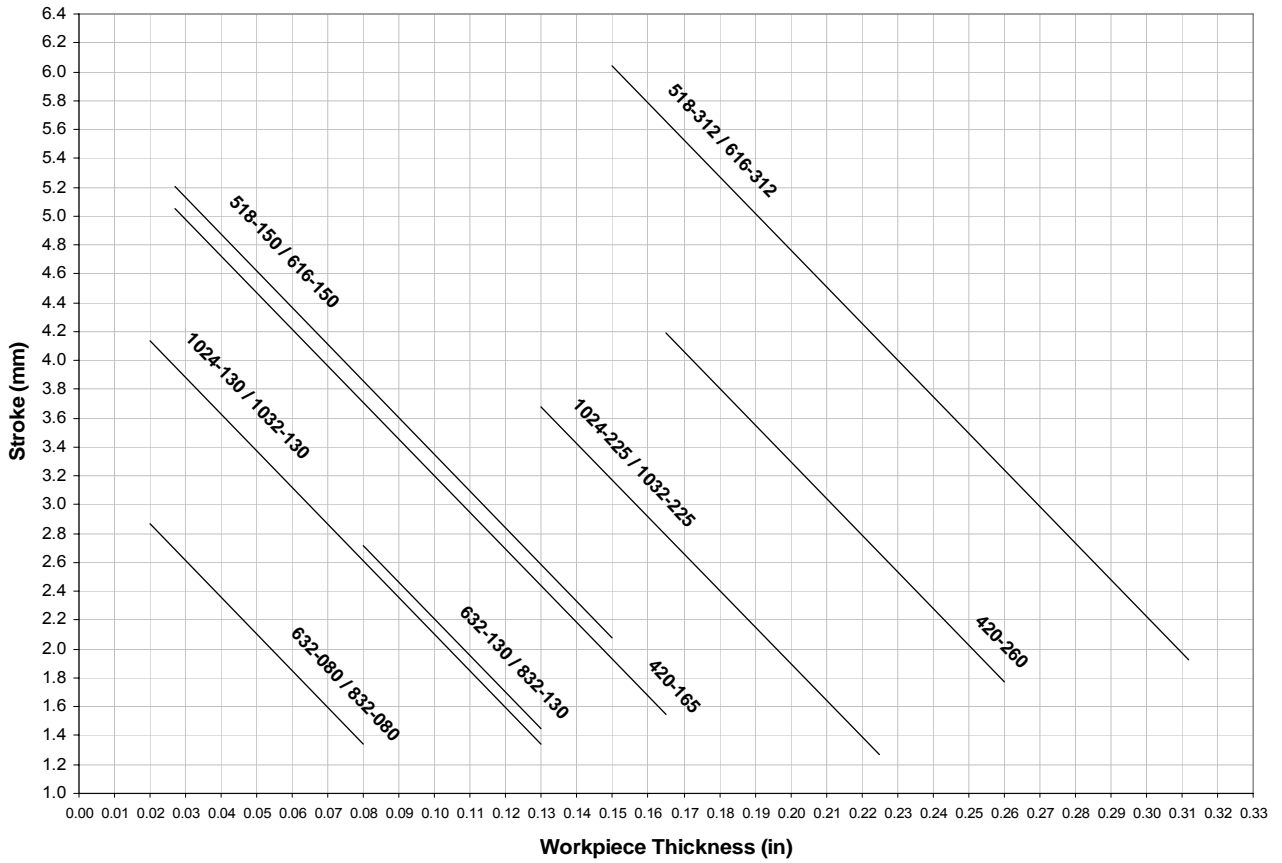


TK/TL Series Open End (Metric)

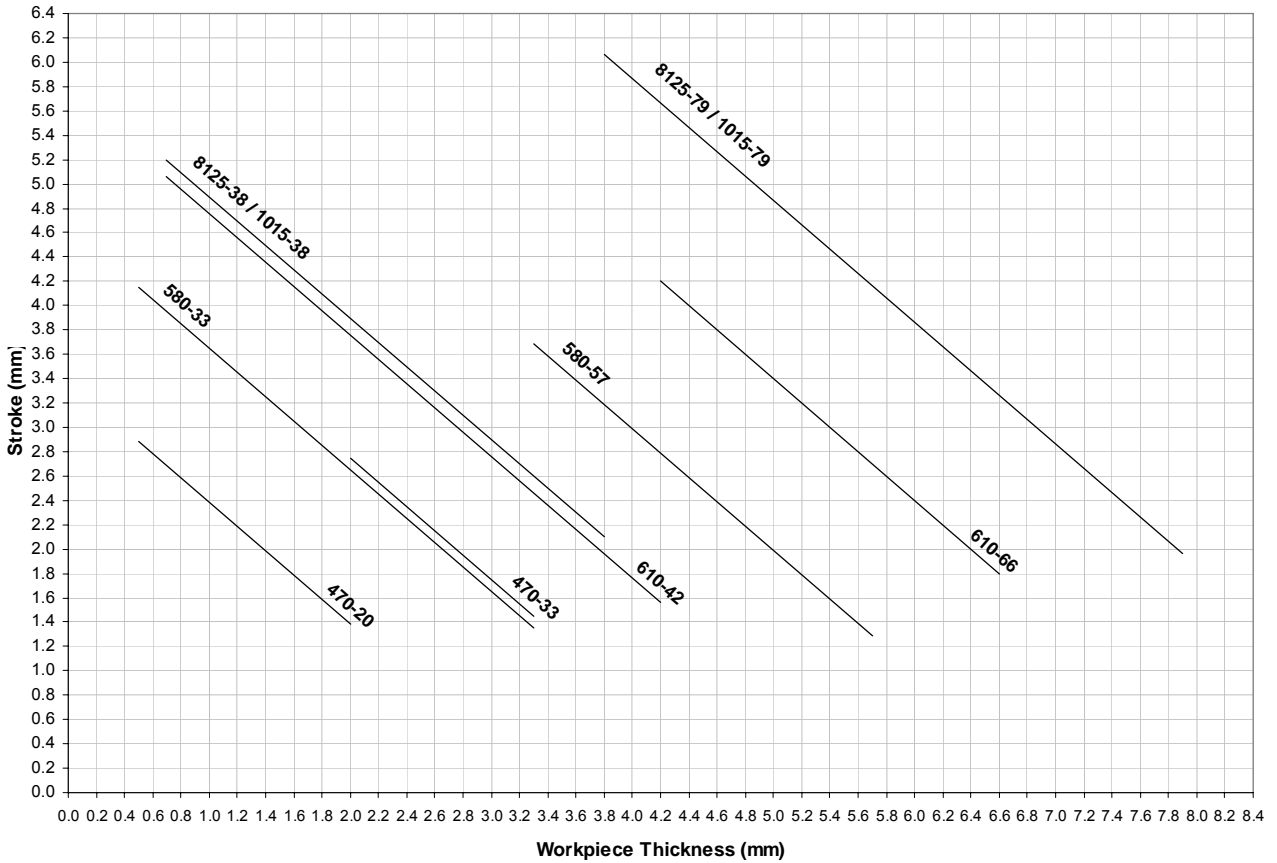


Thin Wall, TH POP NUTs

TH Series Open End (Inch)



TH Series Open End (Metric)



Maintenance

Table 7: Maintenance Schedule

| Item | Frequency | Details |
|--|-------------------|--|
| Lubricate Air | 1-2 drops/20 sets | <ul style="list-style-type: none"> • See “<i>Tool Setup</i>” • Lubricates internal seals and Air Motor |
| Clean & Lube Mandrel | 50 sets | <ul style="list-style-type: none"> • Replace if worn/damaged • Prevents insert damage or jamming. |
| Inspect Nosepiece | 50 sets | <ul style="list-style-type: none"> • Replace if worn/damaged • Prevents insert damage or jamming. |
| Lubricate rotating parts. | 1000 sets | <ul style="list-style-type: none"> • Prevents loss of Mandrel rotation force. |
| Inspect Control Nut, T Valve Push Rod. | Mandrel breakage | <ul style="list-style-type: none"> • Replace if bent or broken |
| Recharge hydraulics | Loss of Stroke | <ul style="list-style-type: none"> • See “<i>Recharging Hydraulics</i>” |

Clean & Lube Mandrel

- Clean and Lube the Mandrel every 50 sets.
 - Over time, debris can stick to the Mandrel reducing its lubrication making it difficult to mount POP NUTs™ or causing premature wear or jams.
 - Lube the Mandrel with 1 drop of oil. Use the same oil that is used with the Air Lubricator or an ISO VG 32 type oil.

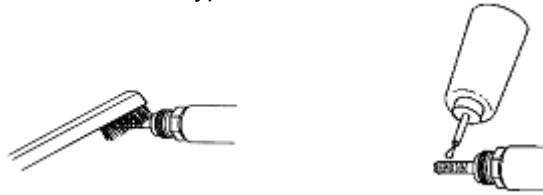


Figure 13: Clean and Lube Mandrel

Lubricate Rotating Parts

- Lubricate the Spin Pull Head and Spin Pull Head Case after approximately every 1000 sets.
 - Lack of lubrication will cause increase internal friction causing premature wear and reducing the Mandrel rotation speed and torque

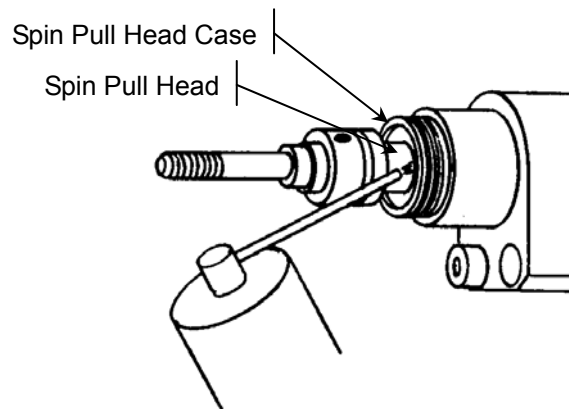


Figure 14: Lubricating the Spin Pull Head

Control Nut & T-Valve Push Rod replacement

- If the Mandrel breaks or the screw thread of a POP NUT™ breaks due to excessive stroke or wear, the Control Nut and/or the T-Valve Push Rod may be broken.

Replacement Procedure

1. Disconnect the air supply
2. Remove the Front Case from the tool with a cross-head screw driver.
3. Use a 1.5mm hex wrench to loosen the Lock Screw on the Control Nut.
4. Turn the Control Knob counter-clockwise until it reached the end of its travel.
5. Press the Control Knob in and turn counter-clockwise to disengage the Control Nut from the Nose Housing and remove.

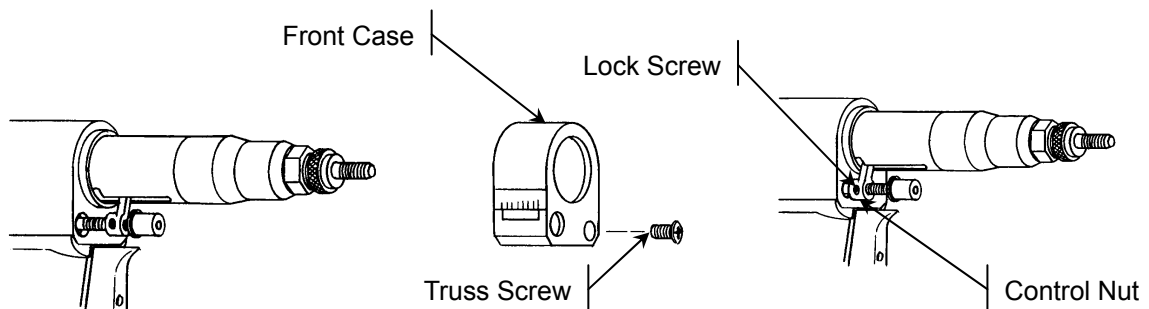


Figure 15: Replacing the Control Nut and T-Valve Push Rod

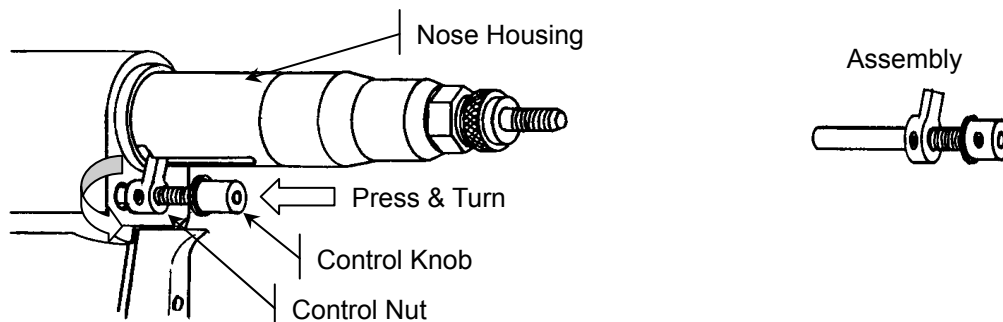


Figure 16: Replacing the Control Nut and T-Valve Push Rod

6. Use the 1.5mm Hex Wrench to loosen the lock screws on the Control Knob.
7. Remove the Control Knob from the T-Valve Push Rod.
8. Replace the T-Valve Push Rod and Lock Nut as necessary.
9. Re-assemble and adjust the total length of the assembly to 66 ± 0.1 mm.
10. Tighten the lock screw on the Control Knob.

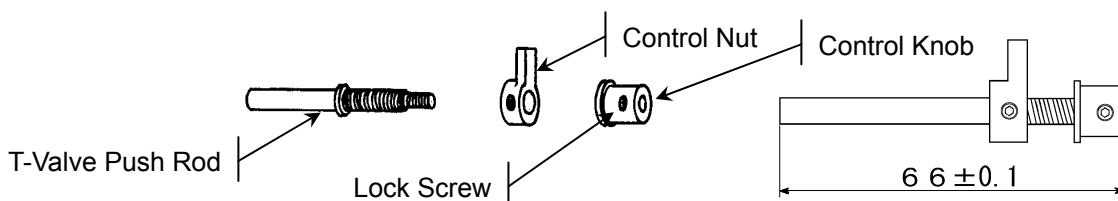


Figure 17: T-Valve Push Rod assembly

11. Re-assemble to tool.
12. Turn the Control Knob clock-wise until it reaches the end of its movement.
13. Set a POP NUT™ without a work piece and check the stroke. The stroke should be 1.3mm or less.
14. If the stroke is greater than 1.3mm, check the assembly length of the T-Valve Push Rod.

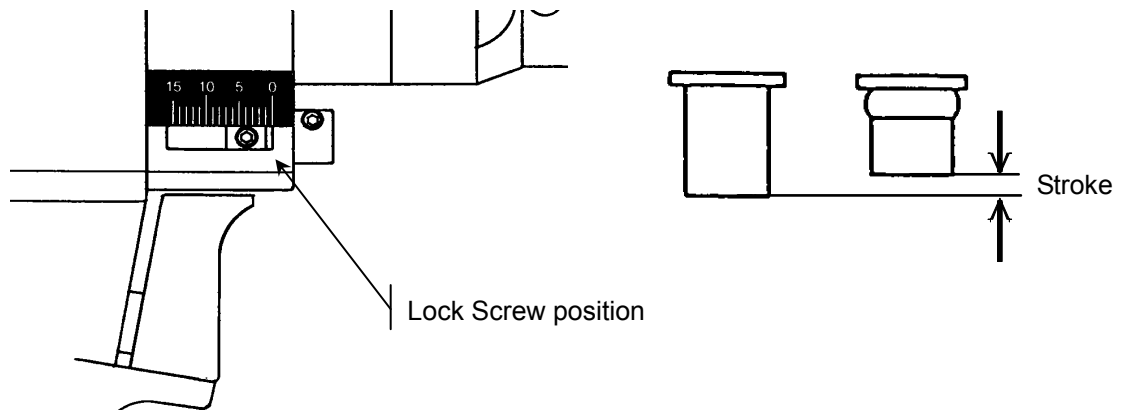


Figure 18: T-Valve Push Rod assembly re-assembled to tool

Recharging Hydraulics

- If the stroke gets too short and the tool is unable to properly set an insert the Hydraulic Oil may need to be recharged.
Note: If the stroke is still inadequate after recharging, the Hydraulic Seals may need to be replaced. Contact your local distributor for tool repair.

Recharging Procedure

1. Disconnect the air supply
2. Set the position of the Control Nut to approximately 10mm on the scale.
3. Remove the four (4) truss head machine screws attaching the Chamber to the Handle Lower
4. Turn the tool upside down and slowly remove the Chamber from the tool
5. Remove the Air Piston Assembly and the Tube

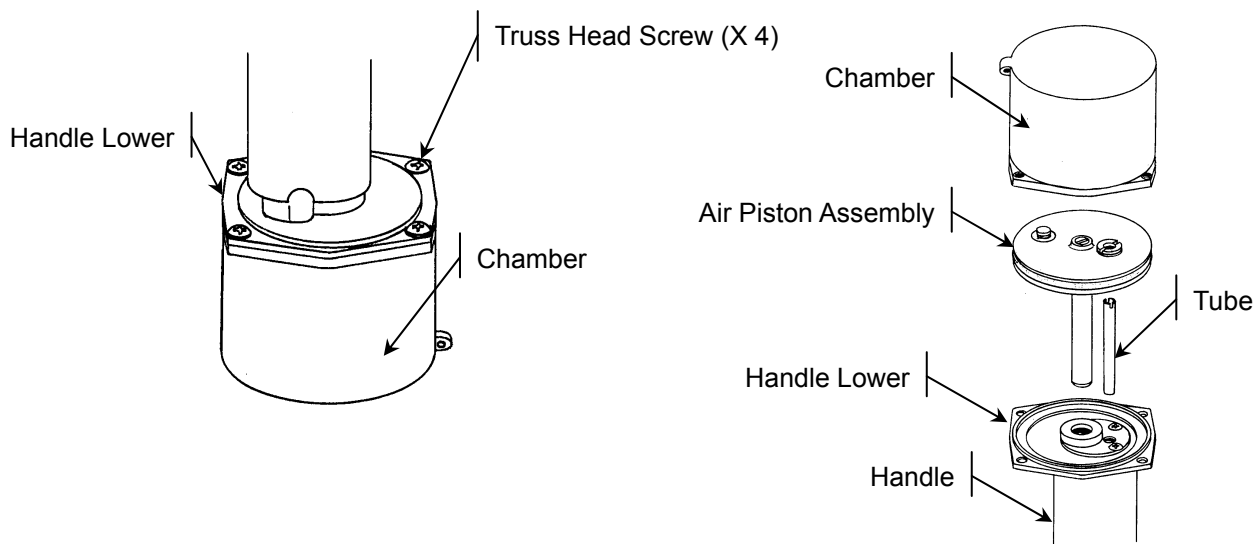


Figure 19: Removing the Chamber and Air Piston Assembly

6. Dispose of the old hydraulic oil in a proper waste oil container
7. Pour the new hydraulic oil into the bore of the handle until the oil is level with the Back-up Ring
Note: Use only Emhart approved Hydraulic Oils – See Table 3, “Specified Hydraulic Oils”

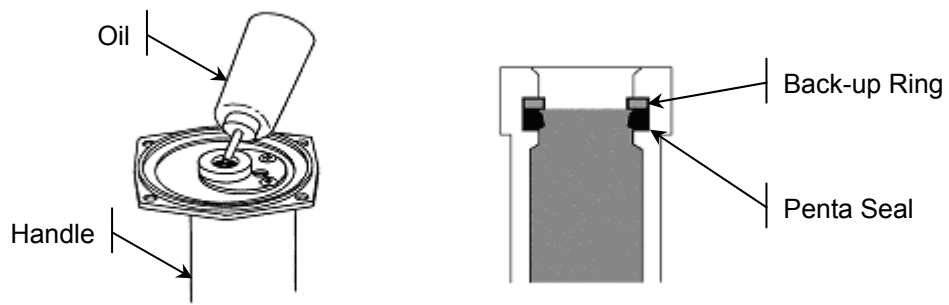


Figure 20: Re-filling Hydraulic Oil

8. Replace the Air Piston Assembly and push it into the Handle slowly, 5 times, and then remove it
9. Check to see if the oil level has fallen or if there are air bubbles present in the oil
10. If the oil level has dropped or air bubbles are present, repeat steps 7 thru 9

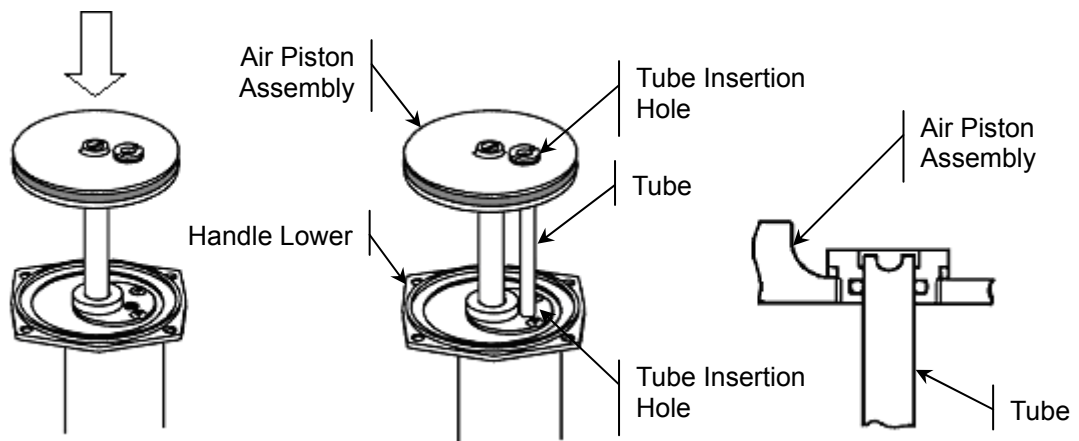


Figure 21: Recharging and purging air bubbles

11. After replacement of the hydraulic oil, line up the Air Piston Assembly and the Tube Insertion Hole in the Handle Lower and push the Tube into place.
12. Pass the Tube into the tube insertion holes in the Air Piston Assembly and the Handle Lower
13. Replace the Chamber and the four (4) truss head machine screws and tighten
14. Place the tool on its side so that the Fill Screw is uppermost.
15. Use a flat bladed screwdriver to unscrew the fill screw to let any excess oil and air (bubbles) escape.
16. Once the hydraulic oil stops coming out, tighten the Fill Screw

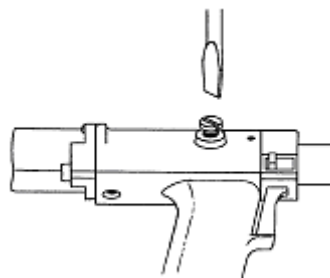


Figure 22: Purging excess oil

Troubleshooting

If you are unable to fix the tool after reviewing this manual and the troubleshooting section, contact your distributor or Emhart Technologies for repair.

| Problem | Cause | Action | Section |
|--|---|---|---|
| Cannot thread the POP NUT™ onto Mandrel | Incorrect Mandrel and Nosepiece | Change to the correct parts for the POP Nut you are using. | Specifications, <i>Table 5</i> |
| | Mandrel threads are damaged. | Replace the Mandrel | Tool Setup |
| | Metal chip are jammed in Mandrel's threads. | Check tool for proper stroke Clean and lube the Mandrel | Setting Tool Stroke Maintenance |
| No forward or reverse rotation of the Mandrel. (Slow rotation) | Low air pressure. | Adjust the air supply to the correct pressure range | Tool Setup |
| | Insufficient Lubricant. | Adjust the Lubricator drip rate. | Tool Setup |
| | Insufficient Lubricant in the rotating parts. | Lubricate the rotating parts | Maintenance |
| | After installation, the tool is still threaded into the insert and workpiece | Disengage the tool from the workpiece using the Control Knob | Tool Operation |
| The Mandrel cannot unthread from the insert | The insert threads have been damaged due to over stroking of the tool | Disengage the tool from the workpiece | Tool Operation |
| | | Adjust the setting stroke correctly | Setting Tool Stroke |
| | Mandrel threads are damaged. | Replace the Mandrel Check tool for proper stroke | Tool Setup Setting Tool Stroke |
| Unthreading sequence stopped during automatic reverse | Trigger was released while detaching the tool (before unthreading was complete) | Disengage the tool from the workpiece using the Control Knob | Tool Operation, <i>Disengaging the tool from the insert</i> |
| | | Review the proper operating procedure | Basic Tool Operation |
| The insert is not fully set, stroke is incomplete | Low air pressure. | Adjust the air supply to the correct pressure range | Tool Setup |
| | Too little hydraulic oil. | Recharge the hydraulic oil | Maintenance |
| The tool automatically reverse rotates | T-Valve assembly is stuck in back position due to lack of lube | Lube air inlet, cycle tool trigger and push T-Valve Push Rod in and out | Maintenance |
| The tool does not reverse rotate automatically | Low air pressure | Adjust the air supply to the correct pressure range | Tool Setup |
| | Too much hydraulic oil or air is mixed in hydraulic oil. | Recharge and bleed the hydraulic oil | Maintenance |
| The Mandrel is damaged and/or broken | Life of the Mandrel | Replace the Mandrel | Tool Setup |
| | | Check T-Valve Push Rod for damage & replace as necessary | Maintenance |

| Problem | Cause | Action | Section |
|--|---|--|---|
| | The setting stroke is excessive | Adjust the setting stroke correctly Replace the damaged parts Check T-Valve Push Rod for damage & replace as necessary | Setting Tool Stroke Tool Setup Maintenance |
| | Tool is not perpendicular to the work piece during installation | Review the proper operating procedure Replace the damaged parts Check T-Valve Push Rod for damage & replace as necessary | Basic Tool Operation Tool Setup Maintenance |
| Tool cannot be adjusted to achieve a proper installation | Too little hydraulic oil or air in the hydraulic oil | Recharge the hydraulic oil | Maintenance |
| Mandrel rotates clockwise as soon as air is supplied to tool and does not stop | M-Valve Rod (#103) at back of Air Motor is stuck | Remove Rear Case (#45) and inspect M Valve End (#98) and M Valve Rod (#103) | PNT800A Diagram |