POP®

POP NUT™

PNT800A

Maintenance Manual

Emhart® Teknologies

POP NUT™

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Introduction

The PNT800A is a 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	✓	✓	✓	✓	✓	
Hexgonal	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 (10.5 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, *Specified Hydraulic Oils*
Setting capacity	See Table 1, *POP NUT™ blind rivet nut range*
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)

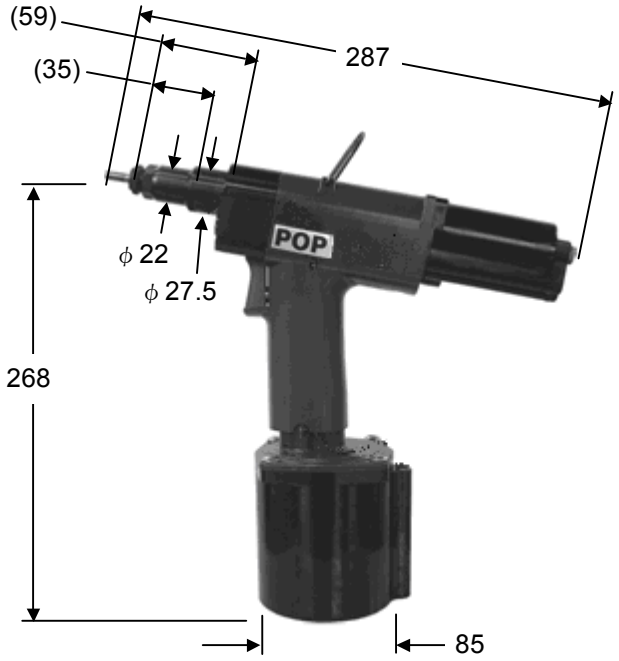


Figure 1: Tool Dimensions (mm)

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

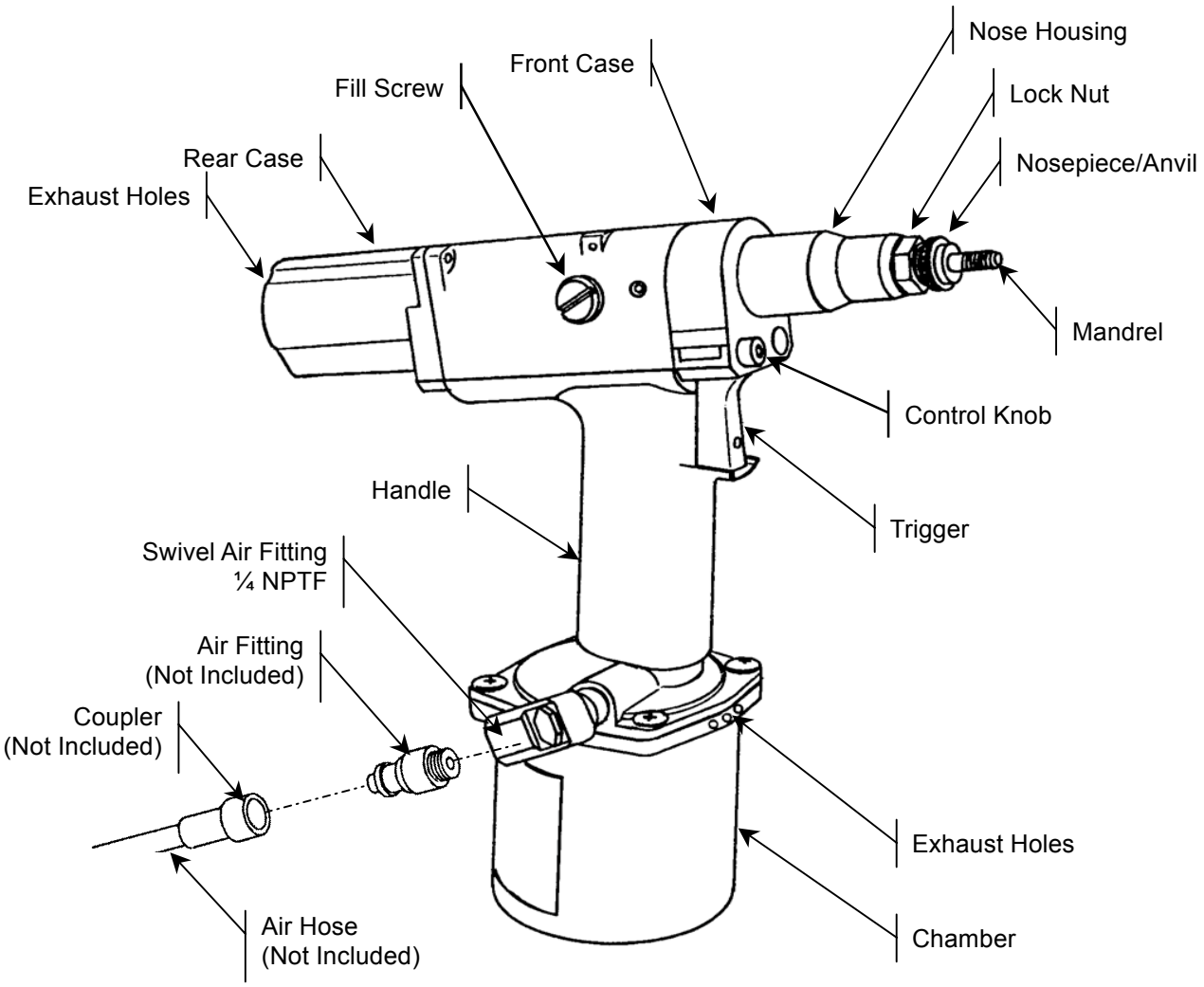


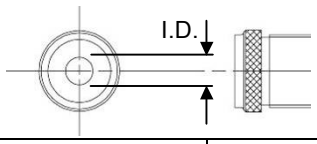
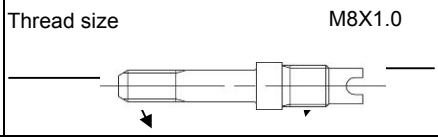
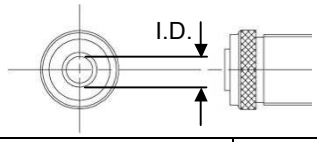
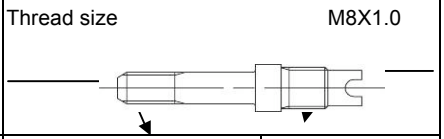
Figure 2: Tool Parts Diagram

Packaged Accessories

Table 4: Packaged Accessories

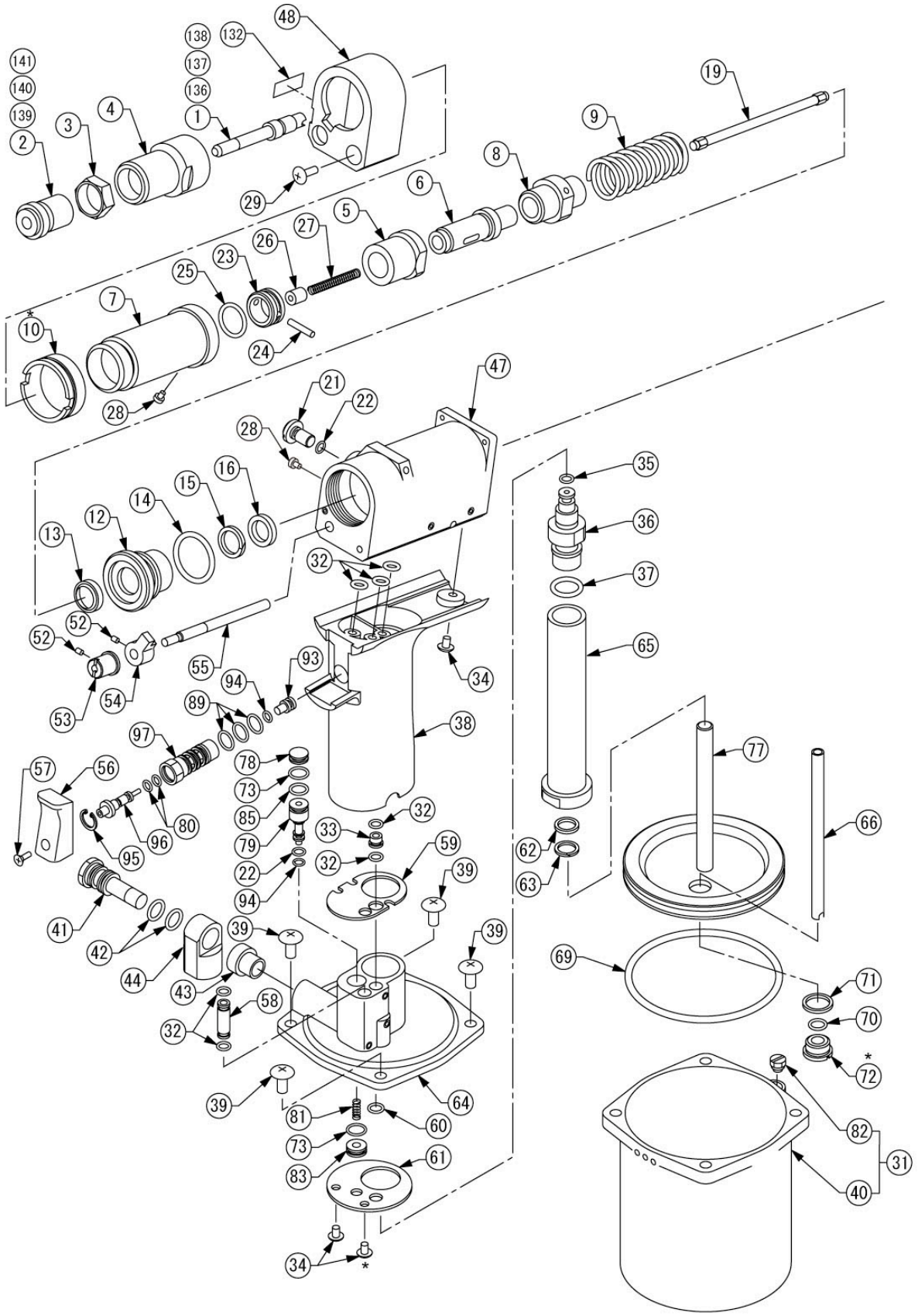
Part No.	Item	Qty
PNT800A	PNT800A-POP NUT™ Tool	1
PNT600-132	Hook	1
PNT600-133	Hex wrench 1.5 mm	1
DPN907-006	Cap screw M4 X 20	1
DPN277-179	POP NUT™ Mandrel Release	1
FG2245	Operating Instructions	1
FG2244	Maintenance Manual	1
FG2222	Warranty Card	1

Table 5: Mandrel and Nosepiece requirements

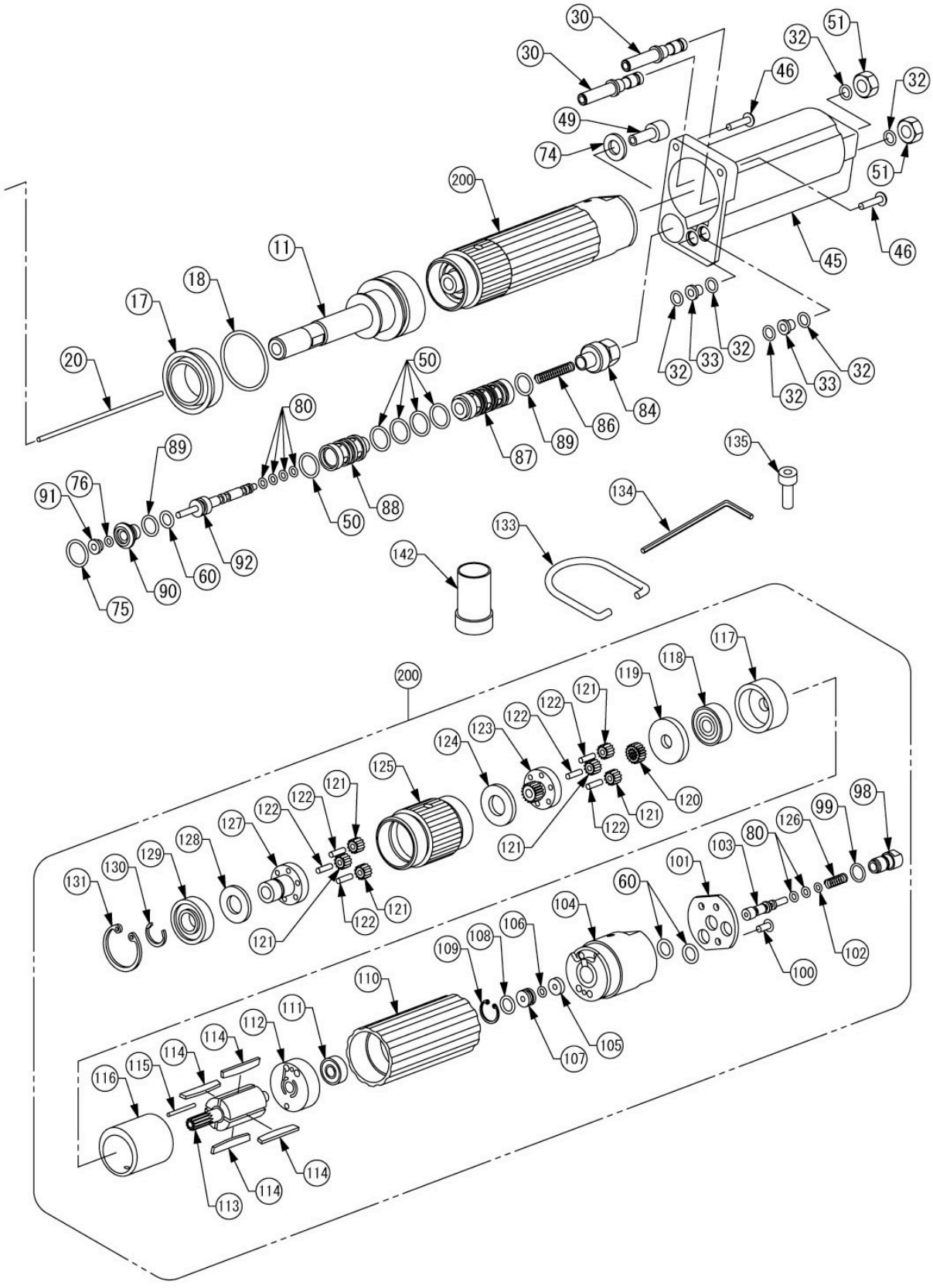
Thick Wall **(Std & ST)** POP NUT Thread size	POP NUT Tool Part No.	**Flat Nosepiece**		**Mandrel**	
					
		Part No.	I.D.	Part No.	Thread size
M3X0.5	PNT800A-3	PNT600-02-3	φ4.0	PNT600-01-3	M3X0.5
M4X0.7	PNT800A-4	PNT600-02-4	φ4.5	PNT600-01-4	M4X0.7
M5X0.8	PNT800A-5	PNT600-02-5	φ5.1	PNT600-01-5	M5X0.8
M6X1.0	PNT800A-6	PNT600-02-6	φ6.1	PNT600-01-6	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	PNT600-01-10	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.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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 M3×6*	*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 NPTF 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

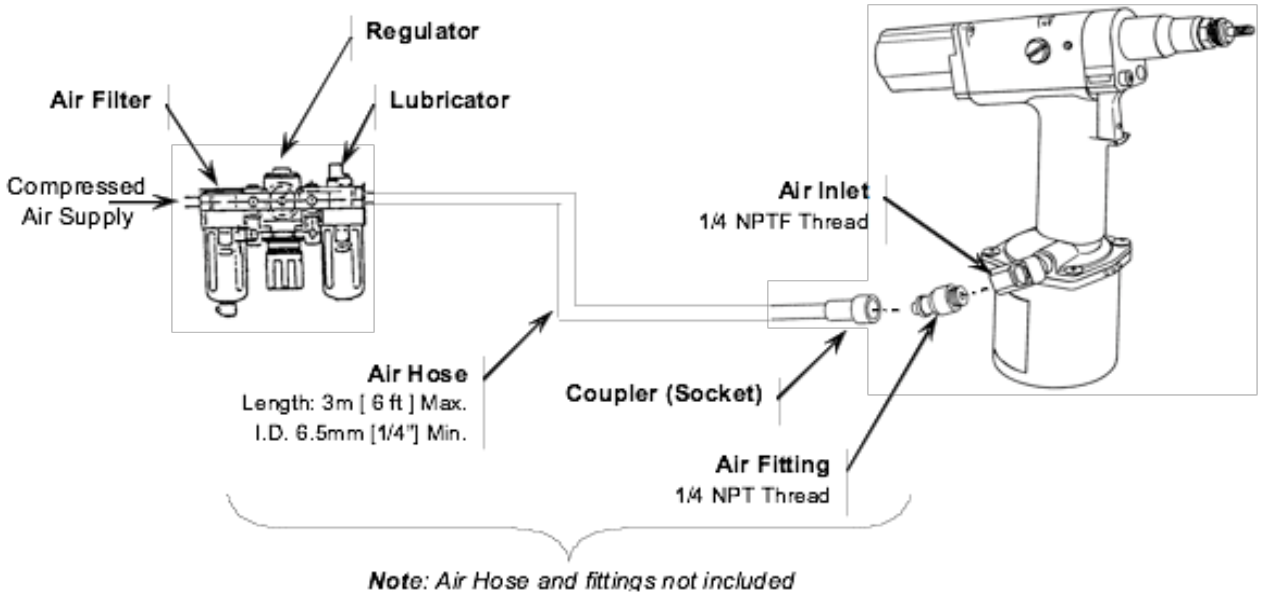


Figure 3: Tool Setup

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, DPN277-185)

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.
4. Insert the POP NUT™ Mandrel Release tool over the Mandrel and into the Nose Housing.
5. Push in 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 and rotate the Mandrel counter-clockwise to ensure the Lock Pin Holder has engaged the Mandrel.
9. Install the Nosepiece.

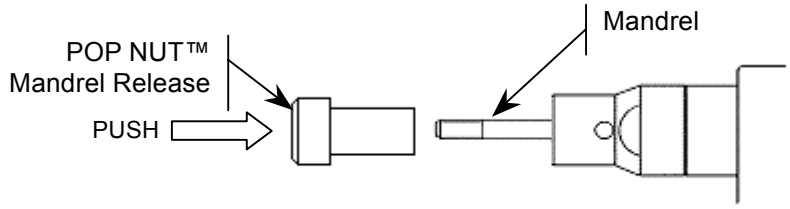


Figure 4: POP NUT™ Mandrel Release

Mandrel Installation (without POP NUT™ Mandrel Release, DPN277-185)

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.
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.

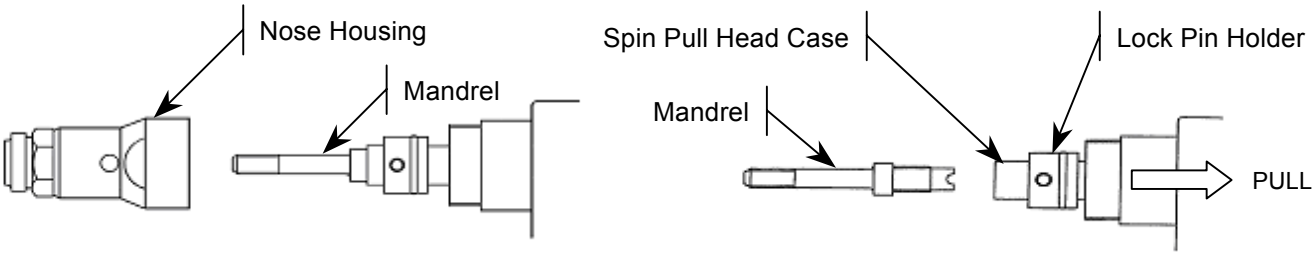


Figure 5: Mandrel Installation

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

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).

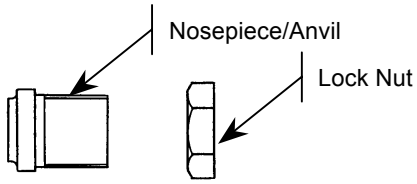


Figure 6: Nosepiece and Lock Nut

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.

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.

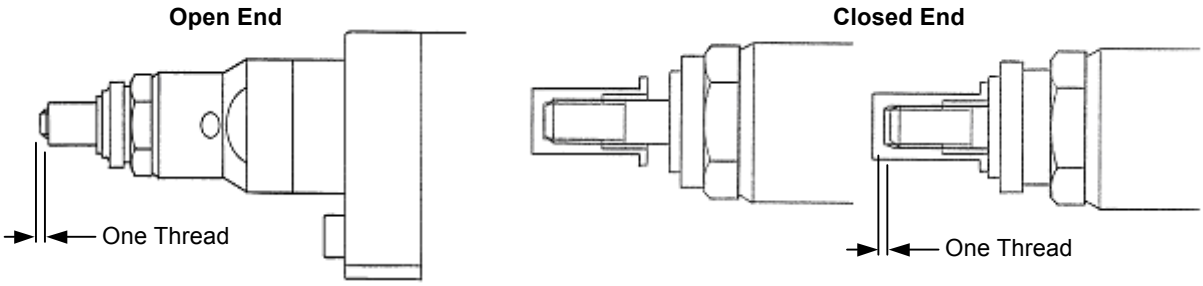


Figure 7: Proper Mandrel and Nosepiece adjustment

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.

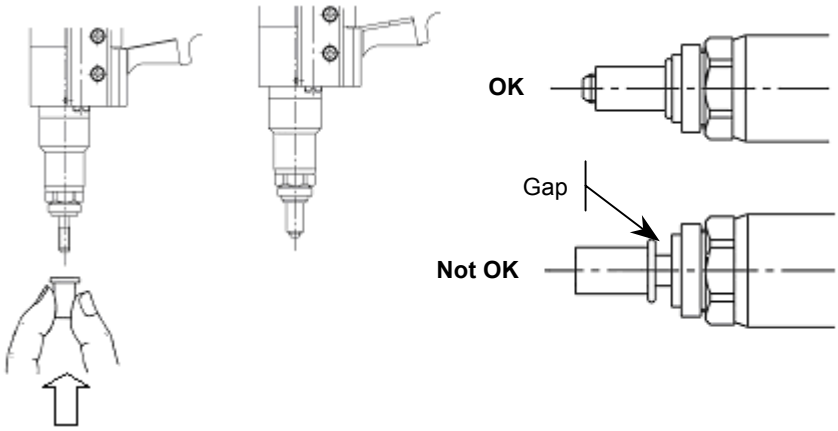


Figure 8: Loading the POP NUT™ onto tool

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 the trigger and hold it to install the insert
3. Keep trigger depressed until the Mandrel reverses direction and completely unthreads the Mandrel from the insert.
4. Lightly pull the tool away from the work piece as Mandrel is reversing to disengage it from the insert.
5. Once the tool is disengaged from the insert, release the trigger.*

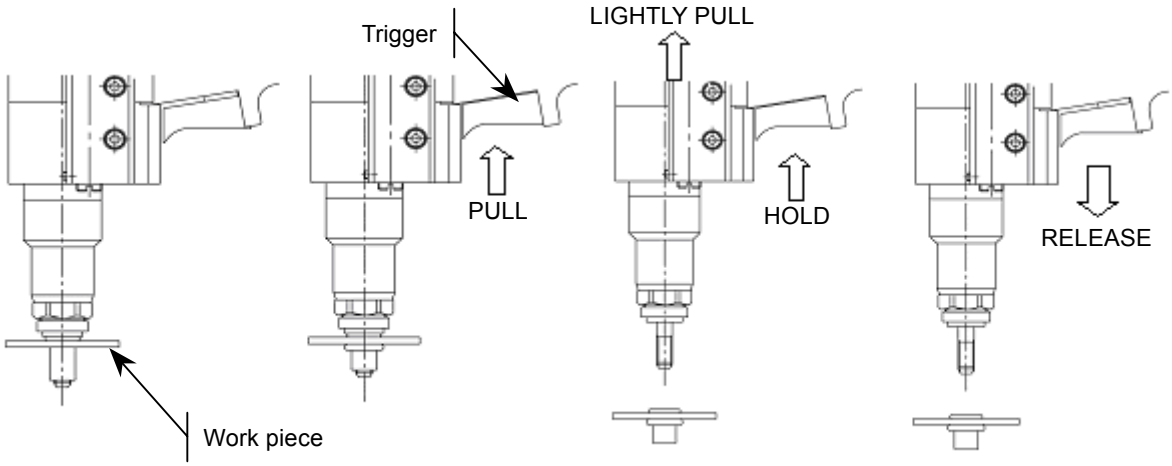


Figure 9: Setting the POP NUT™

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.

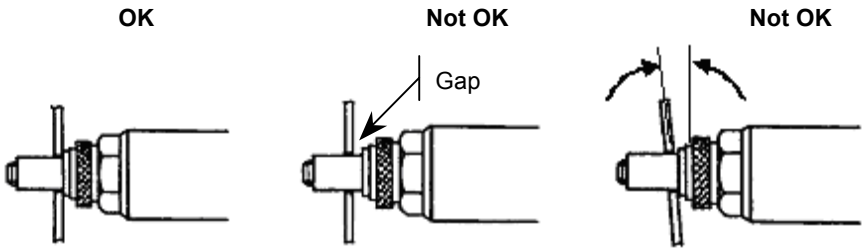


Figure 10: Proper insertion of POP NUT™ threaded inserts into an application

**Disengaging the tool from the insert*

- If you let go of the trigger during the installation sequence, the hydraulics will reset, the insert may not set completely and the tool will not 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
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 x20 Cap screw provided with the tool, into the hole in the side of the Nose Housing. Thread the Cap screw in until if fits snugly against the inner Spin Pull Head, locking the rotatioin of the Mandrel to the tool.
3. Turn the body of the tool counter-clockwise to detach it from the insert.

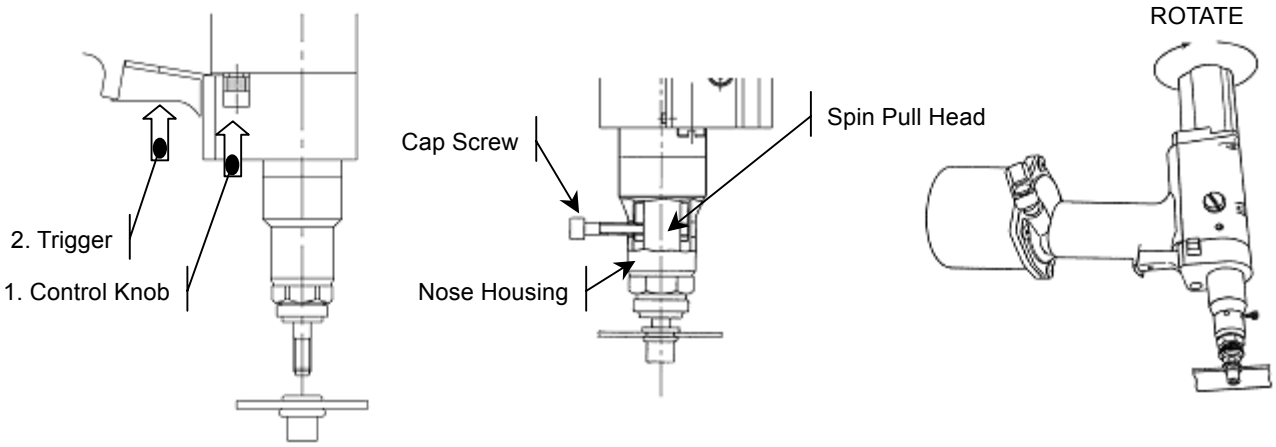


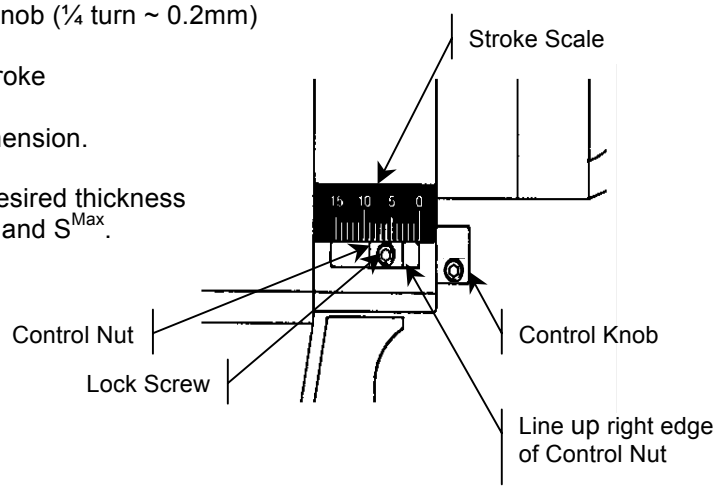
Figure 11: Disengaging the tool from the insert

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 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 “*Stroke Adjustment*”
$E^{(Measured)} > E^{(Formula)}$	Check POP NUT threads and Mandrel for damage Reduce stroke – See “*Stroke Adjustment*”
$S^{Min\ (Measured)} < S^{Min\ (Formula)}$	Increase stroke – See “*Stroke Adjustment*”
$S^{Max\ (Measured)} > S^{Max\ (Formula)}$	Check POP NUT threads and Mandrel for damage Reduce stroke – See “*Stroke Adjustment*”

Stroke Setting for Standard POP NUTs™

Use the following procedure to determine the proper setting requirments for POP NUTs™:

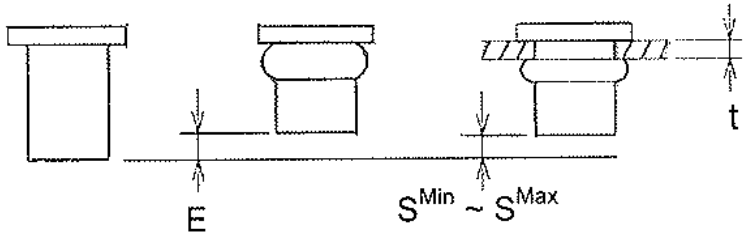
1. Determine stroke minimum, "S^{Min}", maximum, "S^{Max}", and stroke setting, "E", from the appropriate formula in Table 6 for the POP NUT™ being used.
2. Set the insert in a test piece with the proper thickness
3. Measure the value of S^{Min} and compare to the formula result.

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: *PSZFON630* POP NUT™ with a 1.5mm thick work piece

t = Workpiece thickness
N = maximum grip
t = 1.5mm, n = 3.0
$S^{max} = 2.4 + (N - t)$
$S^{max} = 2.4 + (3.0 - 1.5)$
S^{max} = 3.9mm S^{min} = 3.5mm E = 4.1mm



Stroke Setting for ST & Thin Wall POP NUTs™

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

1. Determine the Installed Length, "IL" of the POP NUT™ being used. This information can be found in the POP NUT™ Blind Rivet Nut catalog (North America).
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

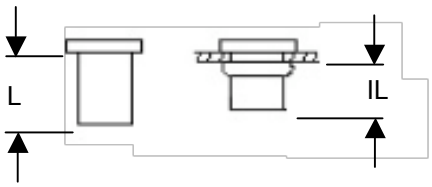


Figure 12: "IL" Measurement

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 stoke 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.

Maintenance

Table 7: Maintenance Schedule

Item	Frequency	Details
Lubricate Air	1-2 drops/20 sets	• See "*Tool Setup*" • Lubricates internal seals and Air Motor
Clean & Lube Mandrel	50 sets	• Replace if worn/damaged • Prevents insert damage or jamming.
Inspect Nosepiece	50 sets	• Replace if worn/damaged • Prevents insert damage or jamming.
Lubricate rotating parts.	1000 sets	• Prevents loss of Mandrel rotation force.
Inspect Control Nut, T Valve Push Rod.	Mandrel breakage	• Replace if bent or broken
Recharge hydraulics	Loss of Stroke	• See "*Recharging Hydraulics*"

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

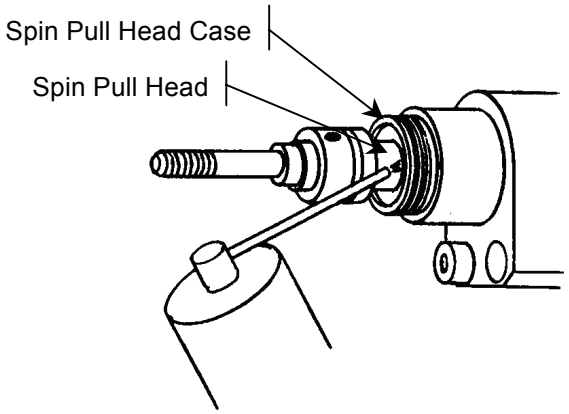


Figure 14: Lubricating the Spin Pull Head

- 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. Remove Air Tube from the fitting in the Chamber
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

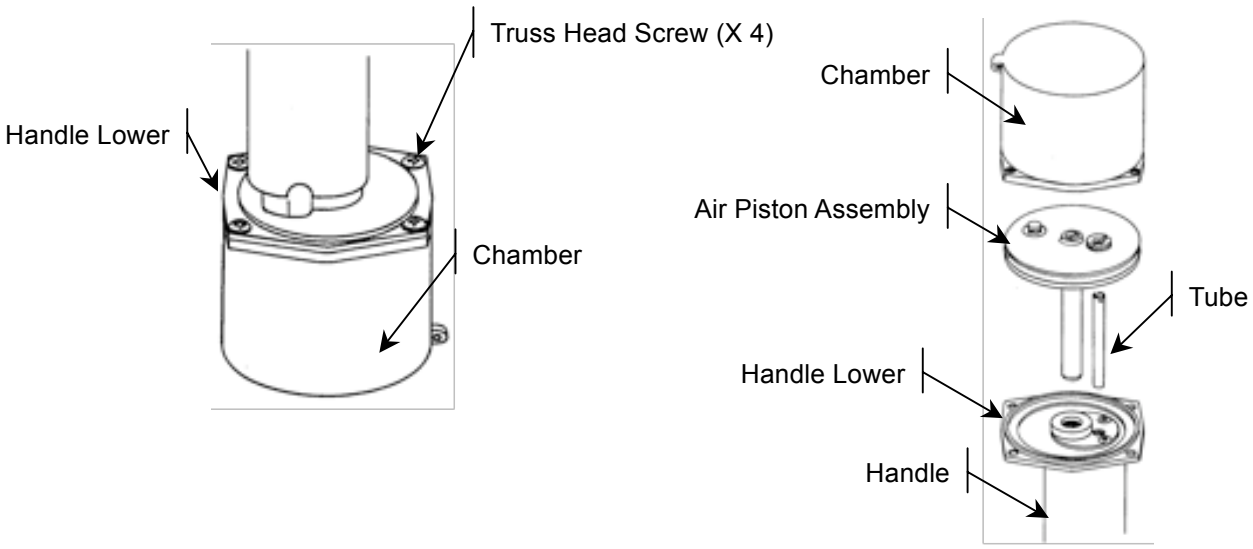


Figure 15: Removing the Chamber and Air Piston Assembly

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*"

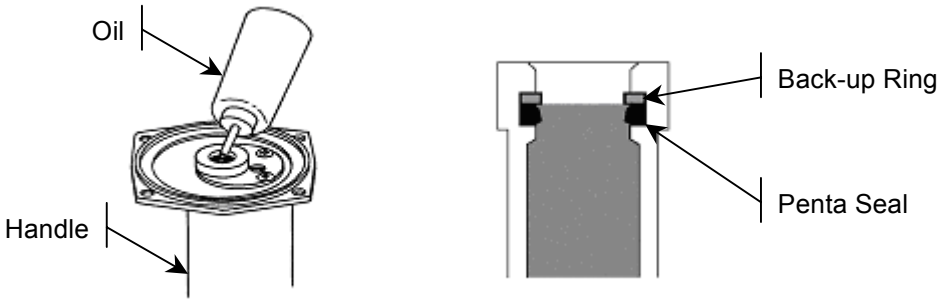


Figure 16: Re-filling Hydraulic Oil

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

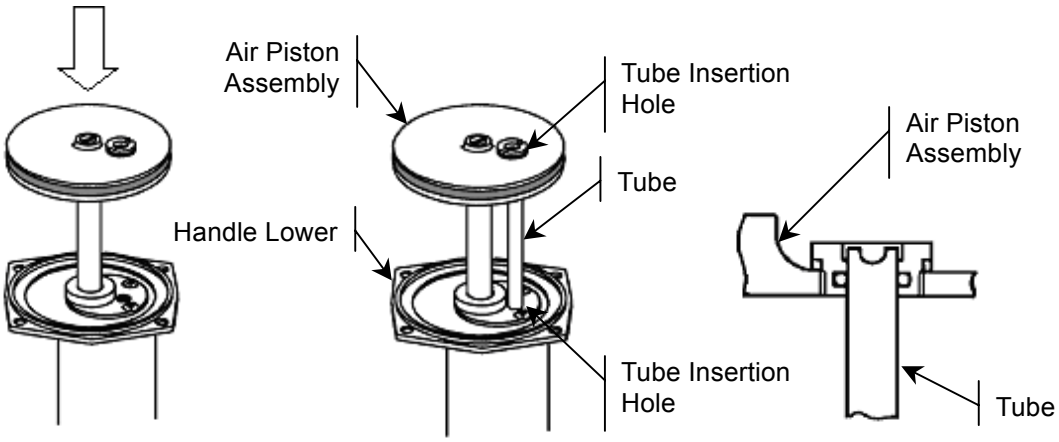


Figure 17: Recharging and purging air bubbles

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

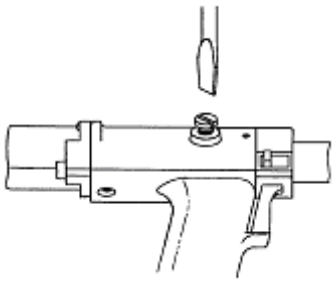


Figure 18: Purging excess oil

Troubleshooting

If you are unable to fix the tool after reviewing this manual and the troubleshooting section, contact your distributor or Emhart Teknologies 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, Table 5
	Mandrel threads are damaged.	Replace the Mandrel	Tool Setup, Mandrel and Nosepiece installation
	Metal chip are jammed in Mandrel's threads.	Clean and lube the Mandrel	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 work piiece	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 high setting force	Disengage the tooll from the work piece Adjust the setting force correctly	Tool Operation Setting Force Adjustment
	Mandrel threads are damaged.	Replace the Mandrel	Tool Setup, Mandrel and Nosepiece installation
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 Review the proper operating procedure	Tool Operation 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	Too much hydraulic oil or air is mixed in hydraulic oil	Recharge the hydraulic oil	Maintenance
The tool does not reverse rotate automatically	Low air pressure	Adjust the air supply to the correct pressure range	Tool Setup
	Too little hydraulic oil or air is mixed in hydraulic oil.	Recharge the hydraulic oil	Maintenance

Problem	Cause	Action	Section
The Mandrel is damaged, and/or broken	Life of the Mandrel	Replace the Mandrel	Tool Setup, Mandrel and Nosepiece installation
	The setting force is excessive	Adjust the setting force correctly Replace the damaged parts	Setting Force Adjustment Tool Setup, Mandrel and Nosepiece installation
	Tool is not perpendicular to the work piece during installation	Review the proper operating procedure Replace the damaged parts	Basic Tool Operation Tool Setup, Mandrel and Nosepiece installation
Tool cannot be adjusted to achieve a proper installation	Too little hydraulic oil	Recharge the hydraulic oil	Maintenance
	Too much hydraulic oil or air is mixed in hydraulic oil	Recharge the hydraulic oil	Maintenance

Safety Data

SEAL LUBE (P/N: PSA075508P)

LUBRIPLATE® 130-AA

Manufactured by:
Fiske Brothers Refining Co.
Phone: (419) 691-2491
Emergency: (800) 255-3924

ALVANIA® EP Grease 1

Prod Code: 71124
Manufactured by:
Shell Oil Products
Phone: (877) 276-7285
MSDS#: 57072E-5

First Aid:

SKIN:

Remove any contaminated clothing and wash with soap and warm water. If injected by high pressure under skin, regardless of the appearance of its size, contact a physician IMMEDIATELY.
Delay may cause loss of affected part of body.

INGESTION:

Call a physician immediately. Do not induce vomiting.

EYES:

Flush with clear water for 15 minutes or until irritation subsides. If irritation persists, consult a physician.

Fire:

FLASH POINT: COC- 400°F
Cool exposed containers with water.
Use foam, dry chemical, carbon dioxide or water spray.

Environment:

WASTE DISPOSAL:

Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved waste disposal facility or site.

SPILLAGE:

Scrape up grease, wash remainder with suitable petroleum solvent or add absorbent.

Handling/ Storage:

Keep containers closed when not in use. Do not handle or store near heat, sparks, flame or strong oxidants.

Lubriplate® is a registered trademark of Fiske Brothers Refining Company.

Please refer to the actual MSDS for complete safety and handling information. These can be obtained from

HYDRAULIC OIL (P/N: PRG540-130)

MOBIL DTE 26

Manufactured By:
ExxonMobil Corporation
Emergency Phone: (609) 737-4411
MSDS Fax on Demand:
(613) 228-1467 MSDS # 602649-00

Shell TELLUS 68

Manufactured By:
SOPUS Products
Health Information: (877) 504-9351
MSDS Assistance:
(877) 276-7285 MSDS # 402288L-0

Distributed By:
Emhart Teknologies
Phone: (203) 924-9341

First Aid:
SKIN:
Remove contaminated clothing and shoes and wipe excess from skin. Flush skin with water, then wash with soap and water. If irritation occurs, get medical attention.

INGESTION:
Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical attention.

EYES:
Flush with water. If irritation occurs, get medical attention.

Fire:
FLASH POINT: 390° F/198.9° C
Material will float and can be re-ignited on the surface of water. Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use a direct stream of water.

Environment:
SPILLAGE:
Soak up residue with an absorbent such as clay, sand or other suitable material. Place in a non-leaking container and seal tightly for proper disposal.

Handling:
Wash with soap and water before eating, drinking, smoking, applying cosmetics or using toilet. Properly dispose of leather articles such as shoes or belts that cannot be decontaminated. Use in a well ventilated area.

Storage:
Store in a cool, dry place with adequate ventilation. Keep away from open flames and high temperatures.

EC Declaration of Conformity

We, Emhart Teknologies

Tucker Fasteners Limited
Birmingham B42 1BP
United Kingdom.

Declare that:

PNT800A

Conforms to the following standards:

EN 292 part 1 and part 2
ISO 3744
ISO prEN 792 part 1
EN ISO 4871
ISO prEN 15744
EN 28662 - 1
EN 12096

Following the provisions of the Machine Directive 98/37/EEC which replaces Directive 89/392/EEC and it's amending Directives 91/368/EEC, 93/44/EEC and 93/68/EEC.

Signed: _____

Eymard Chitty, Vice President, R&D

Birmingham
October, 2006

POP®

EUROPE

United Kingdom
Emhart Teknologies
Tucker Fasteners
177 Walsall Road
Birmingham, B42 1BP
United Kingdom
Tel: +44 121 356 4811
Fax: +44 121 356 1598
csduk@bdk.com

The Netherlands
Emhart Teknologies
P.O. Box 514
6190 BA Beek
Europalaan 12
6199 AB Maastricht-Airport
The Netherlands
Tel: +31 43 750 2020
Fax: +31 43 750 2030

Spain
Emhart Teknologies
Sistemas de Fijacion Tucker
Carretera M-300
KM. 29,700
28802 Alcalá de Henares
Madrid, Spain
Tel: +34 91 887 1470
Fax: +34 91 882 3602
sft.pedidos@bdk.com

France
Emhart Teknologies
Emhart Fastening & Assembly S.N.C.
ZA des Petits Carreaux
2 Bis Avenue des Coquelicots
94835 Bonneuil-sur-Marne
Cedex, France
Tel: +33 1 56 71 24 37
Fax: +33 1 49 80 42 93
csdfr@bdk.com

Germany
Emhart Teknologies
Tucker Fasteners GmbH
Max-Eyth-Strasse 1
D-35394 Giessen
Germany
Tel: +49 641 405 0
Fax: +49 641 405 366
pop.de@bdk.com

Norway
Emhart Teknologies
Emhart Sjong
PO Box 203
Skjutbanevägen 6
S-701 44 Örebro
Sweden
Tel: +47 22 90 99 90
Fax: +46 19 26 00 38
info@emhart-teknik.se

Denmark
Emhart Teknologies
Emhart Harttung A/S
Farverland 1B
DK-2600 Glostrup
Denmark
Tel: +45 44 84 11 00
Fax: +45 44 84 62 12
salg.danmark@bdk.com

Sweden
Emhart Teknologies
Emhart Teknik AB
PO Box 203
Skjutbanevägen 6
S-701 44 Örebro
Sweden
Tel: +46 19 20 58 00
Fax: +46 19 26 00 38
info@emhart-teknik.se

Finland
Emhart Teknologies
Emhart Finland
Hyttimestarinkuja 4 PL 25
FI-02781, Espoo
Finland
Tel: +358 9 819 0060
Fax: +358 9 812 428
myynti.emhart@bdk.com

Czech Republic
Emhart Teknologies
Tucker s.r.o.
Tel: +420 725 800 454
Fax: +420 493 546 567

Poland
Emhart Teknologies
Tel: +48 661 233 304
Fax: +48 32 749 70 75

AMERICAS

USA - Connecticut
Emhart Teknologies
4 Corporate Drive, Suite 395
Shelton, CT 06484
USA
Tel: +1 203 925 2260
Fax: +1 203 925 2279

Canada
Emhart Teknologies
9870 Boulevard Du Golf
Anjou, Quebec
Canada H1J 2Y7
Tel: +1 514 351 0330
Fax: +1 514 351 0458

Mexico
Emhart Teknologies
Bosque De Cidros
Acceso Radiatas No 42
Bosque De Las Lomas,
3a Seccion, Mexico City
Mexico DF 05120
Tel: +52 55 5326 7100
Fax: +52 55 5236 7141

Brazil
Emhart Teknologies
Emhart Refal
Rua Ricardo Cavatton, 226
CEP: 05038-110 São Paulo
Brazil
Tel: +52 55 11 3871 6460
Fax: +52 55 11 3611 3505

ASIA

China
Emhart Teknologies
Shanghai Emhart Fastening Systems
488 Jialou Road
Jaiding District
Shanghai 201807, China
Tel: +86 21 5954 8626
Fax: +86 21 5954 8775

Japan
Emhart Teknologies
Shuwa Kioicho Park Building 302
3-6 Kioicho, Chiyoa-Ku
Tokyo, 1020094, Japan
Tel: +81 3 3265 7291
Fax: +81 3 3265 7298

Korea
Emhart Teknologies
Seorin Building
45-15 Yeoido-Dong
Yeongdeungpo-Ku
Seoul, 150-891, R.O. Korea
Tel: +82 2 783 9226
Fax: +82 2 783 9228

India
Emhart Teknologies
APEX Towers, 5th Floor
No 54, 2nd Main Road
R.A. Puram, Chennai- 600028
India
Tel: +91 44 4306 0639
Fax: +91 44 4306 0768

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