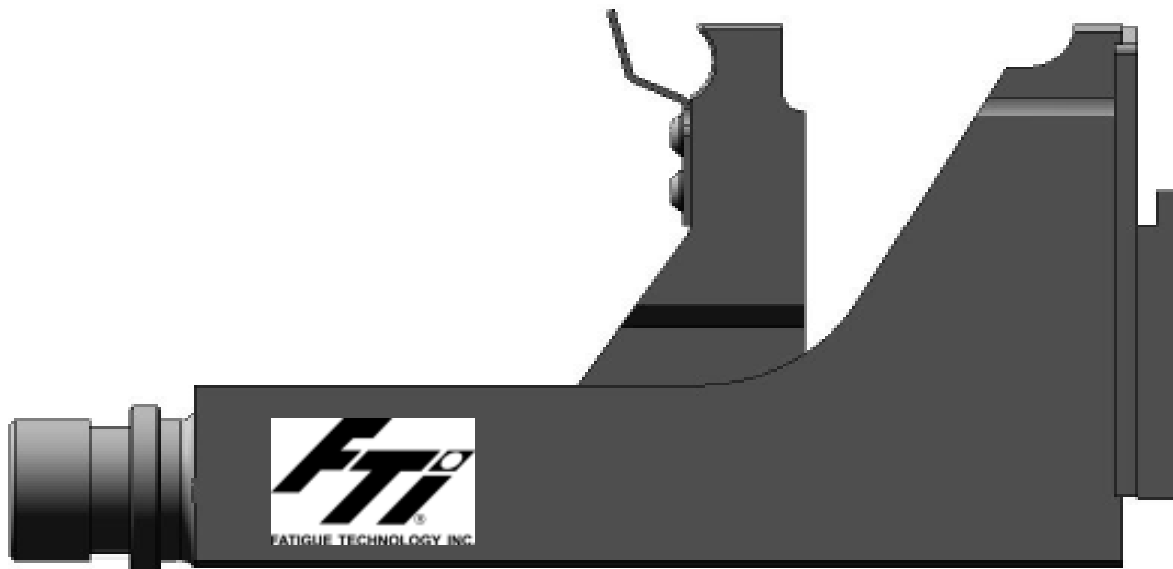


FTI OPERATIONS, MAINTENANCE AND REPAIR MANUAL

**LBOA
Little Brute
Offset Adapters**

FTI Part #2720-010 Log #1203
Revision B, December 12, 2007



**This manual should be used in conjunction with the
FTI "Little Brute Operations, Maintenance, and Repair Manual."**



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The detailed tooling information in this manual was compiled and written by FTI. The tooling was designed specifically for use with FTI's Cx Systems. FTI cannot be held responsible for damage or injury as a result of operating this equipment if it is used for other than the process intended, with any other tooling not provided by FTI, or not used in accordance with the instructions contained in this manual. To avoid personal injury, please observe all safety precautions and instructions. FTI reserves the right to change specifications or configurations of equipment detailed in this manual as part of our ongoing technical and product improvement programs. If you have any questions about the use or serviceability of this equipment, please contact our Technical Sales Department.

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Fatigue Technology Inc. (FTI) has provided innovative solutions to fatigue problems in metal structures since 1969. Complete systems of tooling are used worldwide to enhance the fatigue life of holes in airframes, turbine engines, and other critical structures.

The FTI staff of professionals provides a full range of support services including:

- Application engineering
- Detailed project planning implementation and management
- On-site assistance, including training and tool room set-up

Complete inventory allows FTI to respond quickly to customers' requirements.

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Published December 2007

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FTI's Cold Expansion_{TM} Systems and processes are the subject matter of one or more of the following U.S. and foreign patents: 4,809,420; 4,885,829; 4,943,170; 5,083,363; 5,096,349; 5,103,548; 5,127,254; 5,129,253; 5,218,854; 5,245,743; 5,305,627; 5,351,559; 5,380,136; 5,405,228; 5,433,100; 5,468,104; 6,077,010; 6,183,180; 6,487,767; 6,792,657; 6,990,722; 7,024,908; 1,061,276; 513,898; 692015124; 581,385; 69310828; 468,598; 69105390; 643,231; 69414946; 696,686; 785,366; 1032769; and other patents pending. These systems and processes are tooling critical and must be performed in accordance with FTI's specifications or controlling documents. To ensure proper results from FTI's Cold Expansion_{TM} Systems and to be licensed to use FTI's patented processes, it is essential that FTI's complete integrated system of tooling be purchased and utilized. The use of tooling procured from other than a licensed supplier could jeopardize fatigue life enhancement and may constitute patent infringement.

FTI reserves the right to change the specifications or configurations of tooling detailed in this manual as part of its ongoing technical and product information program. Should inconsistencies occur between your tooling and this manual, please contact our Technical Sales Department.

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NOTES

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SECTION 2: LBOA SPECIFICATIONS

Little Brute Offset Adapter Specifications

Model Number	Maximum Material Stackup (inch)	Combined Puller and Length OAL (inch)	Adapter Length L (inch)	Frontside Clearance F (inch)
LBOA-10	1.0	11.8	6.7	4.05
LBOA-15	1.5	13.3	7.7	4.55
LBOA-20	2.0	14.8	8.7	5.05
LBOA-20-FVC	2.0	14.8	8.7	5.05
LBOA-25	2.5	16.3	9.7	5.55
LBOA 30	3.0	17.8	10.7	6.05
LBOA-35	3.5	19.3	11.7	6.55

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Note: The LBOA-20 is standard.

Nosecap Selection: The LBOA uses special LBOA nose caps (refer to FTI Tooling Catalog Section 2, pages 73-75).

Mandrel Selection: The LBOA uses special LBOA mandrels (refer to FTI Tooling Catalog Section 2, page 59).

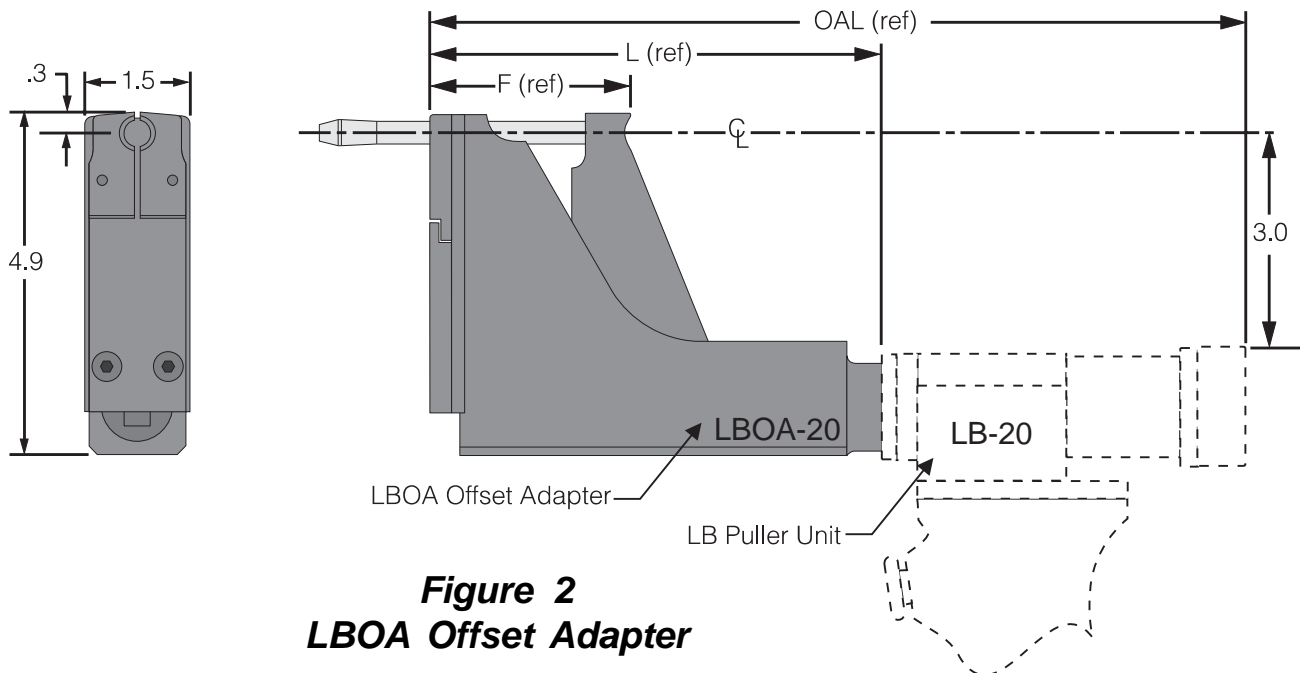


Figure 2
LBOA Offset Adapter

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SECTION 3: ASSEMBLY AND USAGE OF THE LBOA

1. Remove the nosecap assembly from LB puller unit. (Figure 3)

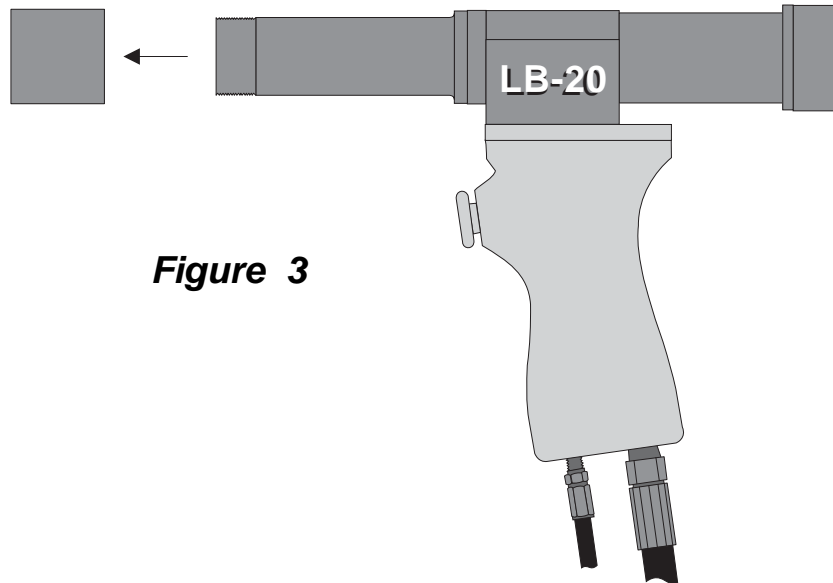


Figure 3

2. Unscrew and remove barrel from LB puller unit. (Figure 4)

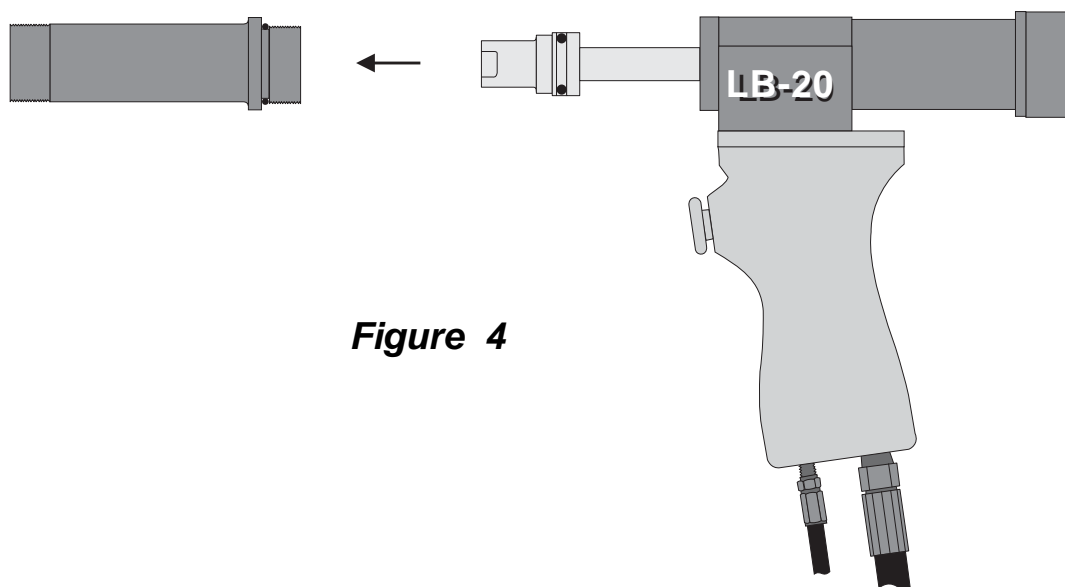


Figure 4

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- Remove mandrel adapter from piston rod. (Figure 5)

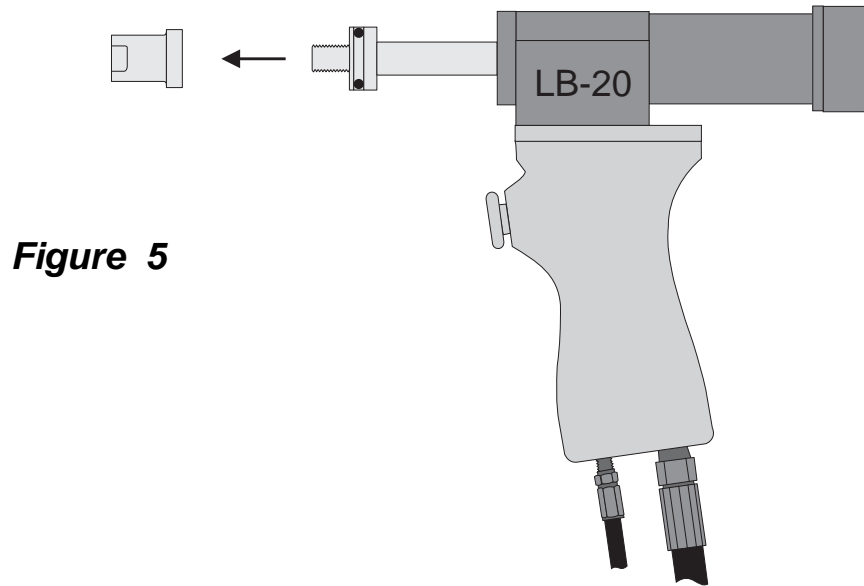


Figure 5

- Select proper LBOA slide assembly (for tang mandrel, threaded mandrel, or broach). If the proper slide assembly is already installed, disregard Steps 5 and 6.
- Remove face plate from LBOA and insert slide assembly into housing. (Figure 6)
- Install proper face plate, special jaw plate or special nosecap spacer. (Figure 6)
- If a standard face plate is used, install the proper jaw on the LBOA. (Figure 6)

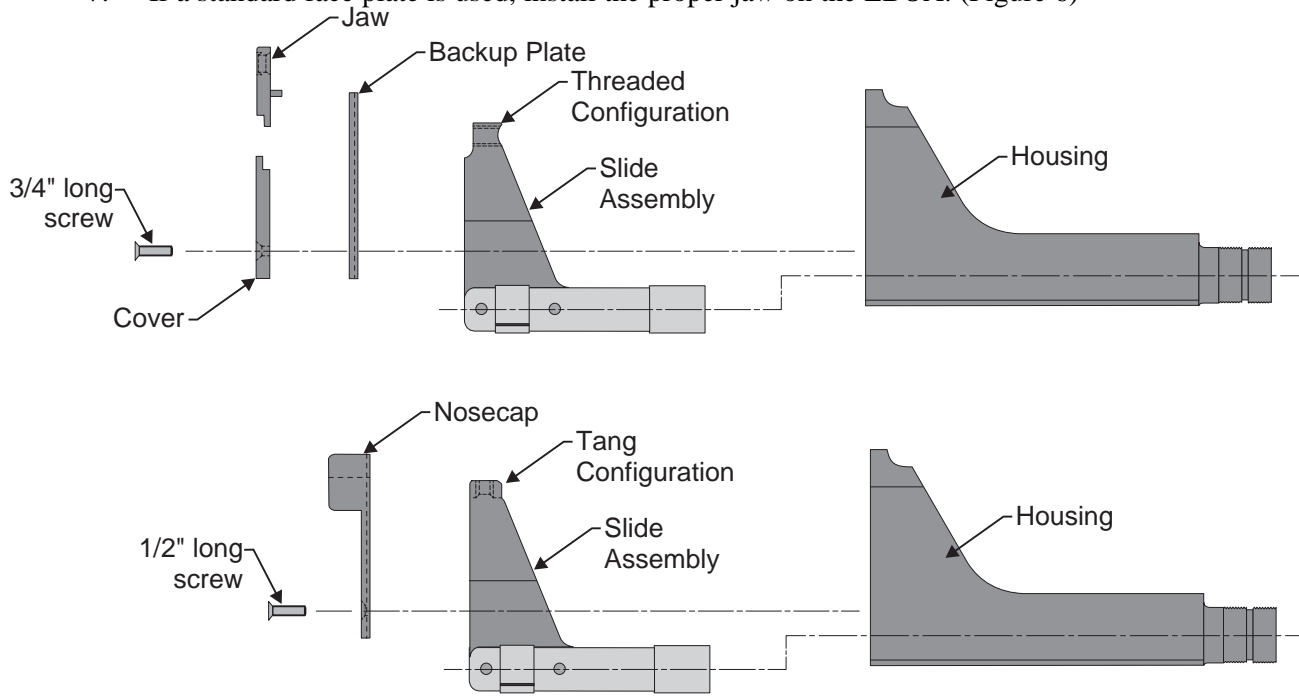


Figure 6

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8. Screw LBOA onto LB (Figure 7). Connect piston first then connect housing. Tighten lock ring.

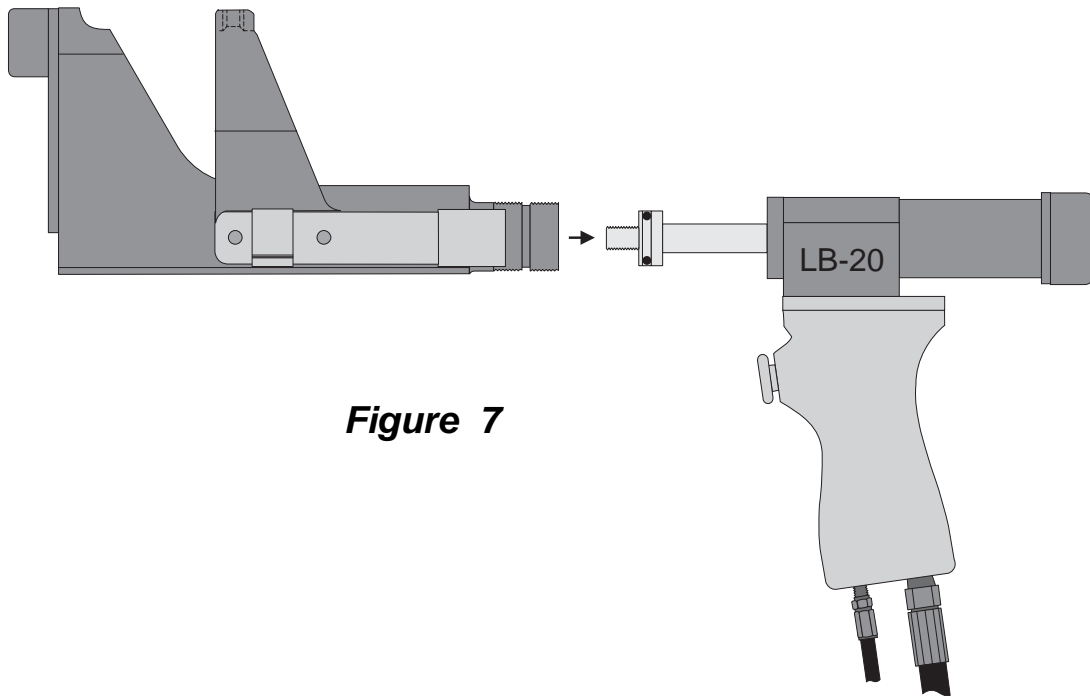


Figure 7

9. Ream or broach starting hole to proper diameter. (Figure 8)

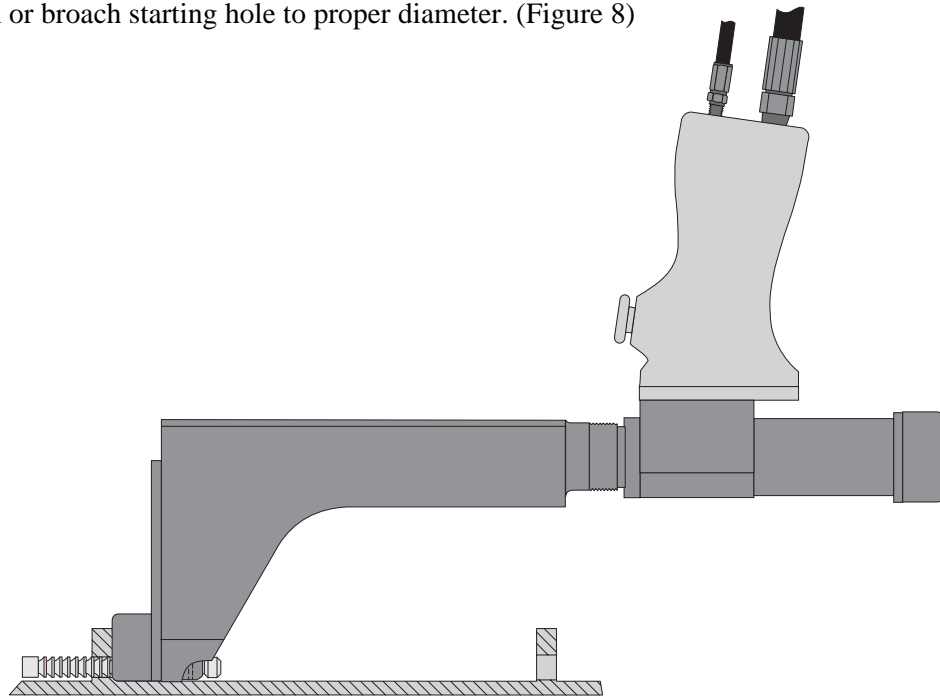


Figure 8

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10. Verify starting hole diameter (SHD) using the stepped go/no-go end of combination gage. (Figure 9)

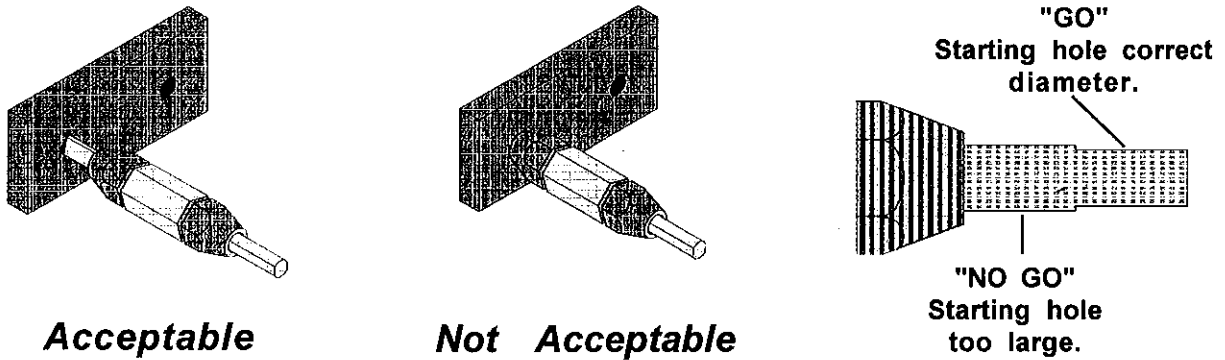


Figure 9

Note: For threaded slide assembly, refer to Steps 12 to 16;
for a tang assembly, refer to Steps 17 to 21.

11. Select the proper mandrel and check major diameter for wear by inserting mandrel into mandrel gage. If the mandrel can be passed through the gage, it is excessively worn and must be discarded. (Figure 10)

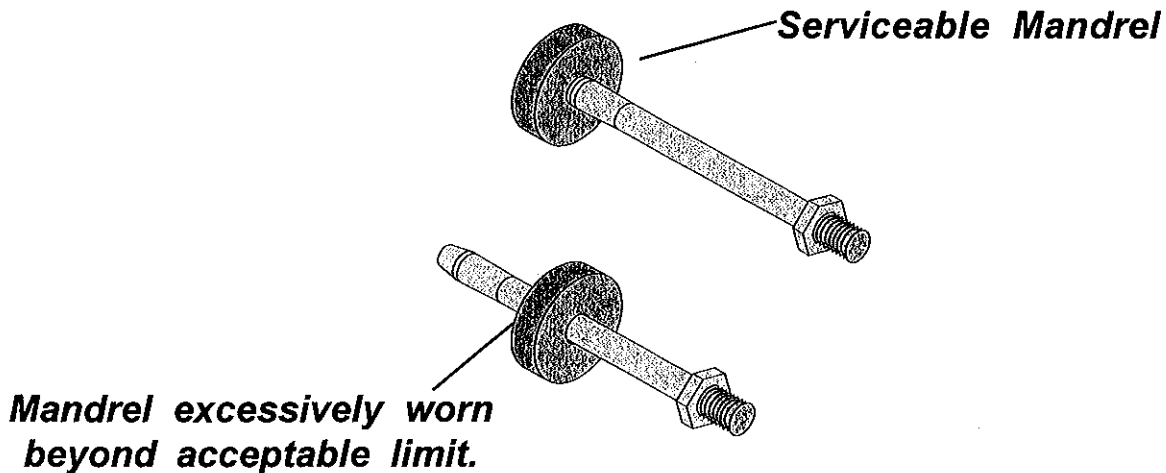


Figure 10

SECTION 4: PROCEDURE FOR THREADED MANDREL SLIDE ASSEMBLY

The LBOA Offset Adapter will allow for the use of threaded (7/16" -20) mandrels or tang-style mandrels (Section 5). The following instructions identify how to install threaded mandrels.

1. Pull the LBOA slide assembly back, thread in the mandrel and return the slide assembly to its forward position. (Figure 11)
2. Thread LB piston rod fully into LBOA slide assembly then thread LBOA housing into LB housing (Figure 11). Ensure O-Ring on LBOA housing is seated at the LB housing.
3. Select the proper sleeve and install it on mandrel with the flared end towards the nose cap jaw.
4. Move LB/LBOA combination into position, holding nose cap or nose cap spacer flush against workpiece. Press trigger to retract mandrel and cold expand hole.
5. Verify that the hole has been properly cold expanded.
6. Thread LB piston rod into LBOA slide assembly then thread LBOA housing into LB housing. (Figure 11)

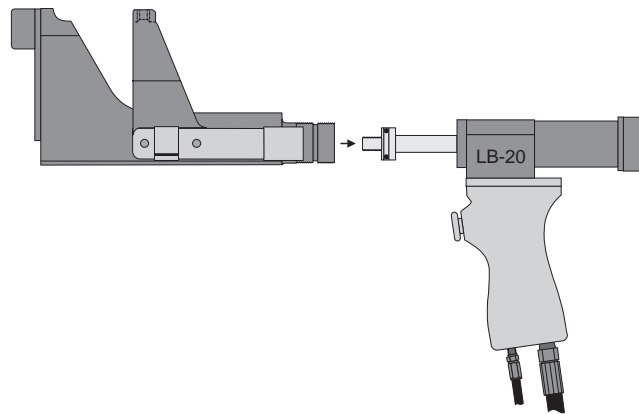


Figure 11

7. Select and install sleeve on mandrel with flare away from nose cap. Insert mandrel and sleeve into hole as shown. (Figure 12)

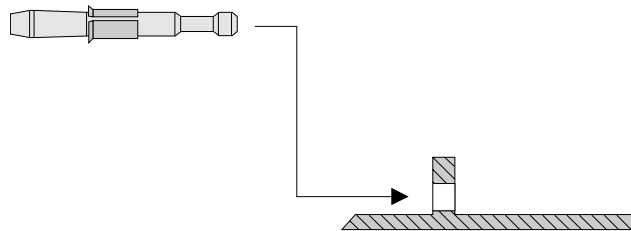


Figure 12

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SECTION 5: PROCEDURE FOR TANG MANDREL SLIDE ASSEMBLY

The LBOA Offset Adapter will allow for the use of tang-style mandrels or threaded (7/16" -20) mandrels (Section 4). The following instructions identify how to install tang-style mandrels.

1. Position LB/LBOA combination and hook LBOA slide assembly onto mandrel tang.
(Figure 13)

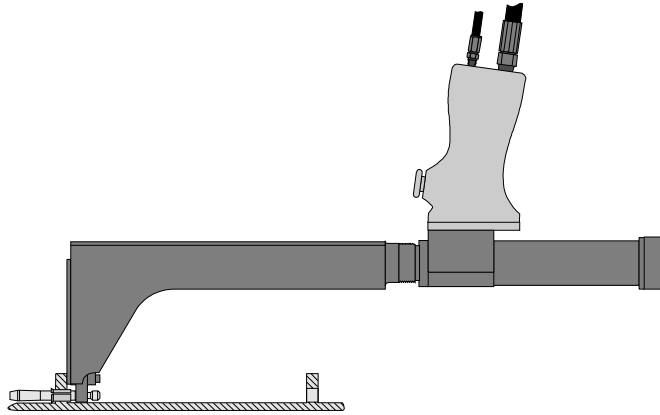


Figure 13

2. Keep nosecap spacer flush against workpiece and press LB trigger to retract mandrel and cold expand hole.
3. Verify that the hole has been properly cold expanded.

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SECTION 6: SAFETY

Safe operation of the LBOA Offset Adapter is of paramount concern. Besides standard shop safety practices (eye protection, safe handling of high-pressure equipment, etc.), the following are peculiar to the LBOA assembly:

1. Use self-alignment nut for tooling numbered 14-0-N through 16-0-N to prevent mandrel breakage.
2. When using self-alignment nut, ensure nut retainer is in place. Bending the nut retainer may cause damage or failure.
3. Keep fingers out of slide channel.
4. Take care not to scratch puller piston rod of LB-XX puller unit.
5. Observe all safety precautions associated with FTI's puller units and PowerPaks as listed in their separate manuals.

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APPENDIX A: CONVERTING THE LBOA INTO A BROACH PULLER

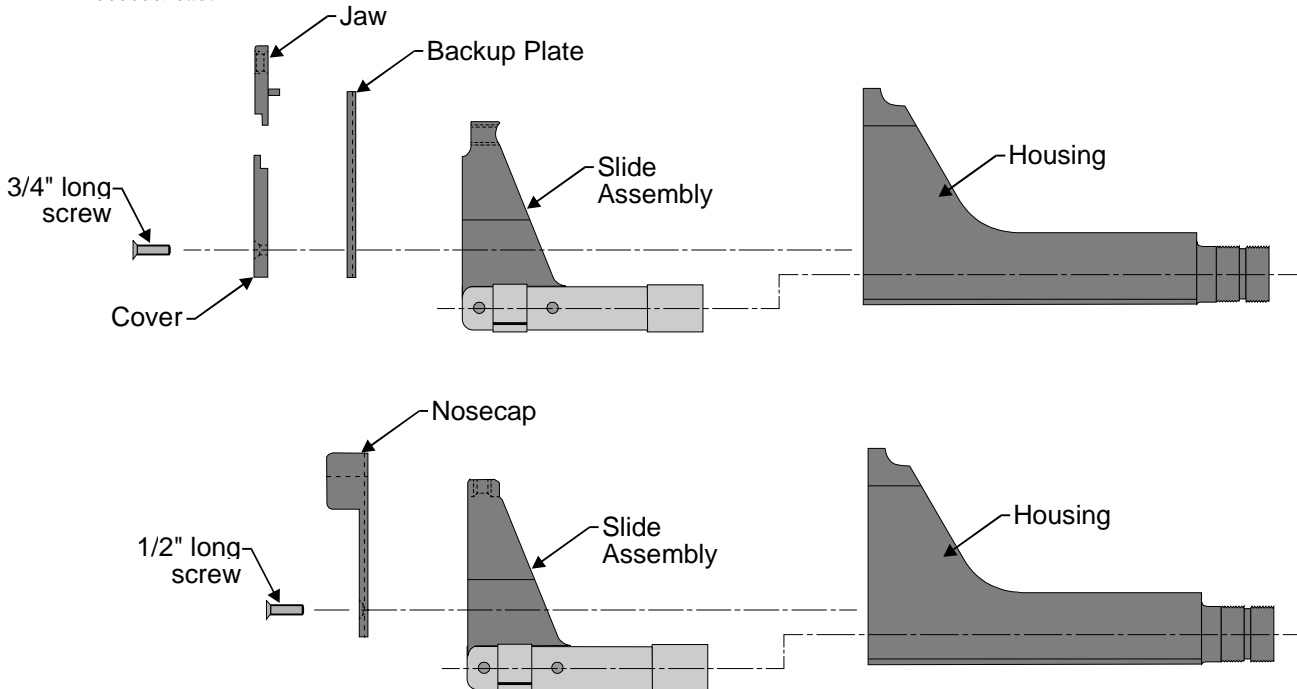
1. Disconnect air lines from PowerPak.
2. Disconnect LBOA from Little Brute Puller Unit.
3. Remove cover plate of LBOA with Allen head wrench.
4. Remove LBOA jaw.
5. Remove backup plate.
6. Remove slide assembly. This assembly should slide straight out of housing.
7. Install tang slide assembly into housing.
8. Place noscap against slide assembly and fasten with 1/2" long Allen head screw.
9. Reinstall LBOA onto LB puller per Section 5.

(Reference A300-53-244)

Parts Needed for Conversion:

Quantity	Part Number	Description
1	LBOA-XX	Offset Adapter
1	LBOA-XX-T6	Tang Slide Assembly, Offset Adapter Kit

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