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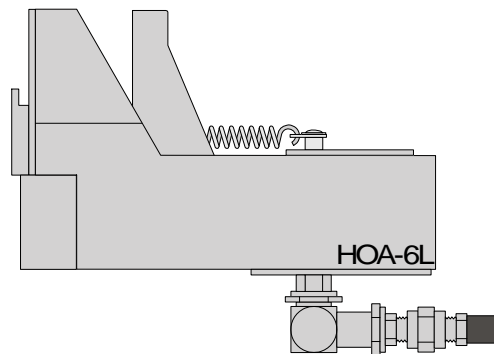
FTI OPERATIONS, MAINTENANCE AND REPAIR MANUAL

Hydraulic Offset Adapter

Operating and Cold Working Instructions

FTI Part #2720-096

October 15, 2008



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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.

FTI's systems and processes are the subject matter of one or more of the following patents: 4,809,420; 4,885,829; 4,934,170; 5,083,363; 5,096,349; 5,103,548; 5,127,254; 5,218,854; 5,245,743; 5,305,627; 5,341,559; 5,380,136; 5,405,228; 5,433,100; 5,468,104; 6,077,010; 6,183,180; 6,487,767; 6,792,657; 5,129,253; 513,898; 692015124; 581,385; 69310828; 468,598; 69105390; 643,231; 69414946; 696,686; 785,366; 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 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 purchased from other than a licensed supplier could jeopardize fatigue life enhancement and may constitute patent infringement.

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 setup

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

The Technical Sales Department is always available to assist with special fatigue enhancement requirements. Please contact FTI with questions at any time.

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
1.0	Assembly Instructions.....	1
1.1	Hose and Pump Setup.....	1
1.2	Tool Selection.....	1
1.3	Mandrel Installation.....	1
1.4	Nosecap Installation	1
1.5	Maintenance	1
2.0	Cold Working Instructions.....	2
2.1	Equipment Testing.....	2
2.2	Cold Working the Hole	2
3.0	Parts Diagram/Listing	3

FIGURES

Figure 1.0-1	HOA Operating and Cold Working Instructions	1
Figure 3.0-1	Hydraulic Offset Adapter - Cut Away View	3

1.0 ASSEMBLY INSTRUCTIONS

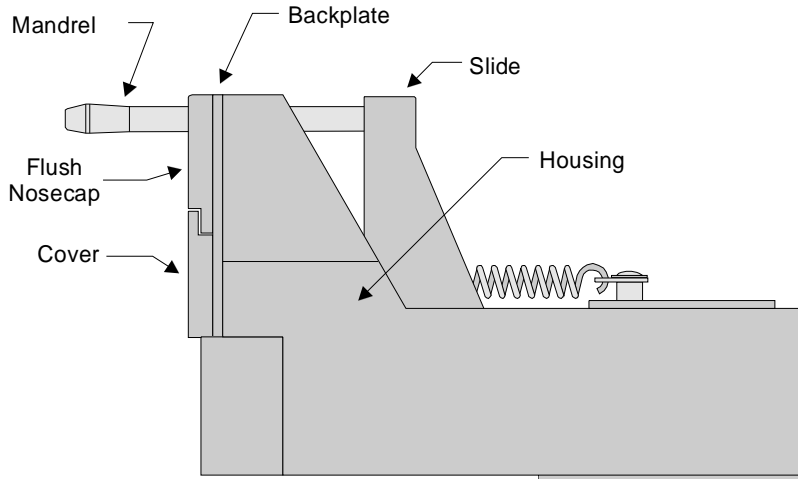


Figure 1.0-1
HOA (Hydraulic Offset Adapter)
Operating and Cold Working Instructions

1.1 Hose and Pump Setup

- Connect the hose using the quick disconnect fitting to the hydraulic hand pump. Ensure couplers are completely screwed together. Failure to do so may prevent the puller from returning to the forward position.
- Open the release-return valve on the pump to ensure that slide remains in the forward position. (**Note:** Some manual assistance may be required to make certain that the offset has fully returned to forward position.)

1.2 Tool Selection

Ensure the proper size of the mandrel, nosecap and sleeve are selected for the hole size to be cold expanded.

1.3 Mandrel Installation

Thread the mandrel into the slide. Use fingers only to install mandrel; do not use pliers or a wrench.

1.4 Nosecap Installation

- Insert the nosecap pivot pins into the matching holes in the backup plate and housing.
- Attach the cover to the housing using 10-32 flat head screws.

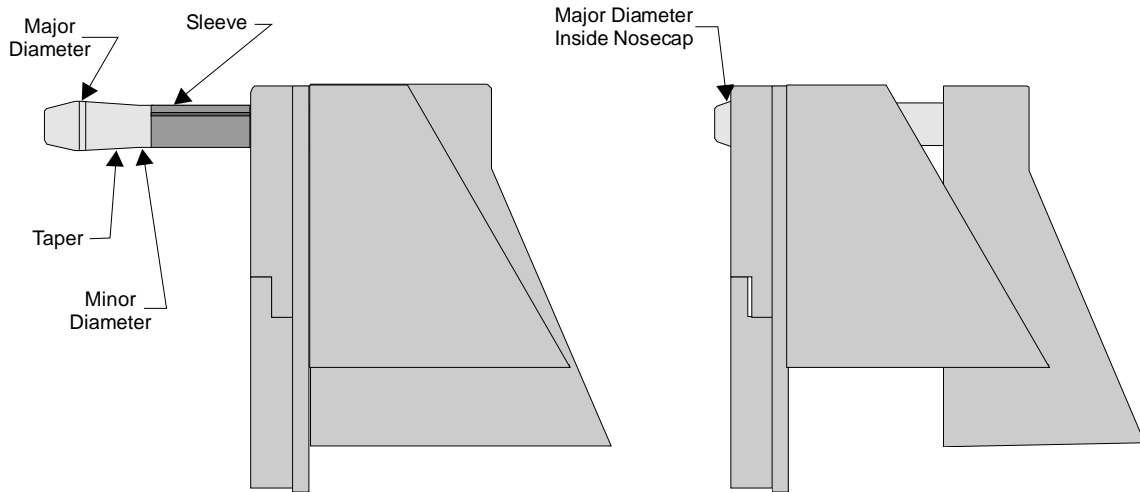
1.5 Maintenance

- Periodically lubricate the internal slide guides and housing with the heavy grease.

2.0 COLD WORKING INSTRUCTIONS

2.1 Equipment Testing

- a. After assembly completion, the mandrel may require slight adjusting in or out to ensure that the split sleeve rests on the minor diameter without riding up the taper (see sketch below). The mandrel threads should not protrude beyond the front of the slide to ensure full thread usage and to allow puller to return to the forward position.
- b. Close the release-return valve on the pump and actuate the handle. The mandrel major diameter must return into the nosecap (see sketch below).



2.2 Cold Working the Hole

- a. Open the release-return valve on the pump so the slide will return. Manual assistance may be required to push the slide back to the forward position.
- b. Close the release-return valve.
- c. Slide the split sleeve over the mandrel. The sleeve should rest against the nosecap.
- d. Insert the mandrel into the starting hole until the nosecap is flat against the work piece.
- e. **Caution:** During operation, do not rest the puller on any fasteners or surfaces other than the actual workpiece. Doing so could result in damage to the tooling, structure or injury to the operator.
- f. Hold the puller unit by the sides of the housing. Keep hands clear of the front surface and from inside the puller housing.
- g. Actuate the pump handle until mandrel is pulled completely through the stack-up.
- h. After the hole is cold worked, repeat steps “a” through “h” for each hole to be cold worked.

Note: Refer to next page for a detailed parts listing and cut away view of the puller unit.

3.0 PARTS DIAGRAM / LISTING

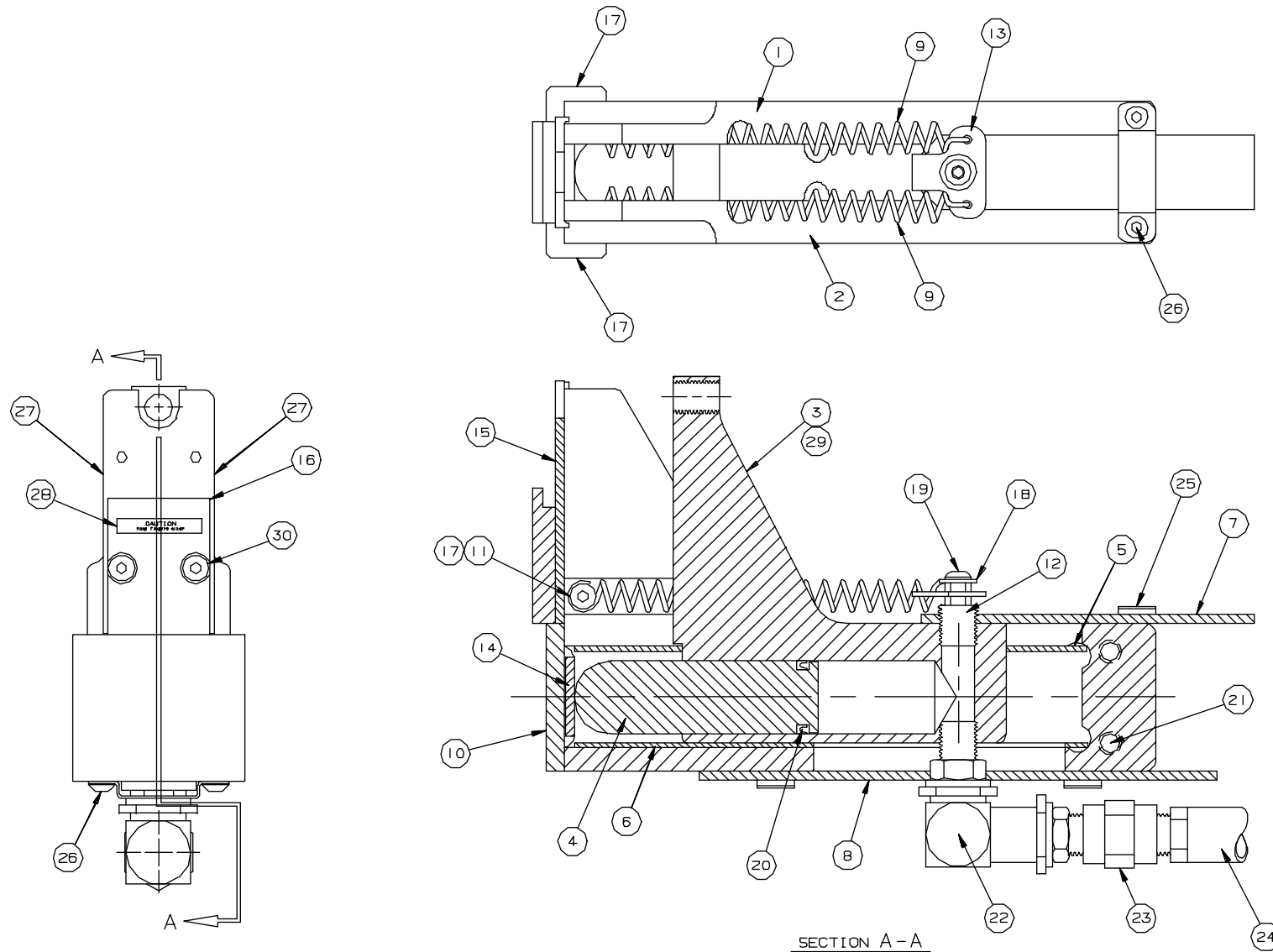


Figure 3.0-1 (Continued)
Hydraulic Offset Adapter
"Cut Away View"

No.	Description	Qty.	HOA-6L	HOA-7L	HOA-8L
1	Housing, Right Half	1	2756-001	2756-002	2756-003
2	Housing, Left Half	1	2757-001	2757-002	2757-003
3	Slide	1	2758-001	2758-002	2758-003
4	Piston	1	2811-001	2811-002	2811-003
5	Guide, Upper Wear	2	2791-001	2791-002	2791-003
6	Guide, Lower Wear	1	2792-001	2792-002	2792-003
7	Cover, Upper Safety	1	2752-001	2752-002	2752-003
8	Cover, Lower Safety	1	2753-001	2753-002	2753-003
9	Spring	2	1064-002	1064-003	1064-004
10	Cover, Front	1	2759-001	2759-001	2759-001
11	Spring Hookup	2	2813-001	2813-001	2813-001
12	Plug	1	2814-001	2814-001	2814-001
13	Spring Plate	1	2755-001	2755-001	2755-001
14	Piston Wear Plate	1	2812-001	2812-001	2812-001
15	Backup Plate	1	2806-001	2806-001	2806-001
16	Cover	1	2807-001	2807-001	2807-001
17	Socket Flat Head Screw	4	1029-018	1029-018	1029-018
18	Flat Washer	1	1045-051	1045-051	1045-051
19	Socket Button Head Screw	1	1029-032	1029-032	1029-032
20	T-Seal	1	1046-114	1046-114	1046-114
21	Socket Head Cap Screw	2	1037-008	1037-008	1037-008
22	Modified Swivel Assembly	1	2817-002	2817-002	2817-002
23	Male to Male Coupler	1	1047-033	1047-033	1047-033
24	Hydraulic Hose	1	2107-001	2107-001	2107-001
25	Safety Cover Hold	3	2751-001	2751-001	2751-001
26	Socket Head Cap Screw	6	1029-001	1029-001	1029-001
27	Label	2	1009-247	1009-247	1009-247
28	Label	1	1009-242	1009-242	1009-242
29	Label	1	1009-184	1009-184	1009-184
30	Socket Flat Head Screw	2	1029-019	1029-019	1029-019

Figure 3.0-1 (Continued)
Hydraulic Offset Adapter Part List
(See "Cut Away View")