FATIGUE TECHNOLOGY INC.

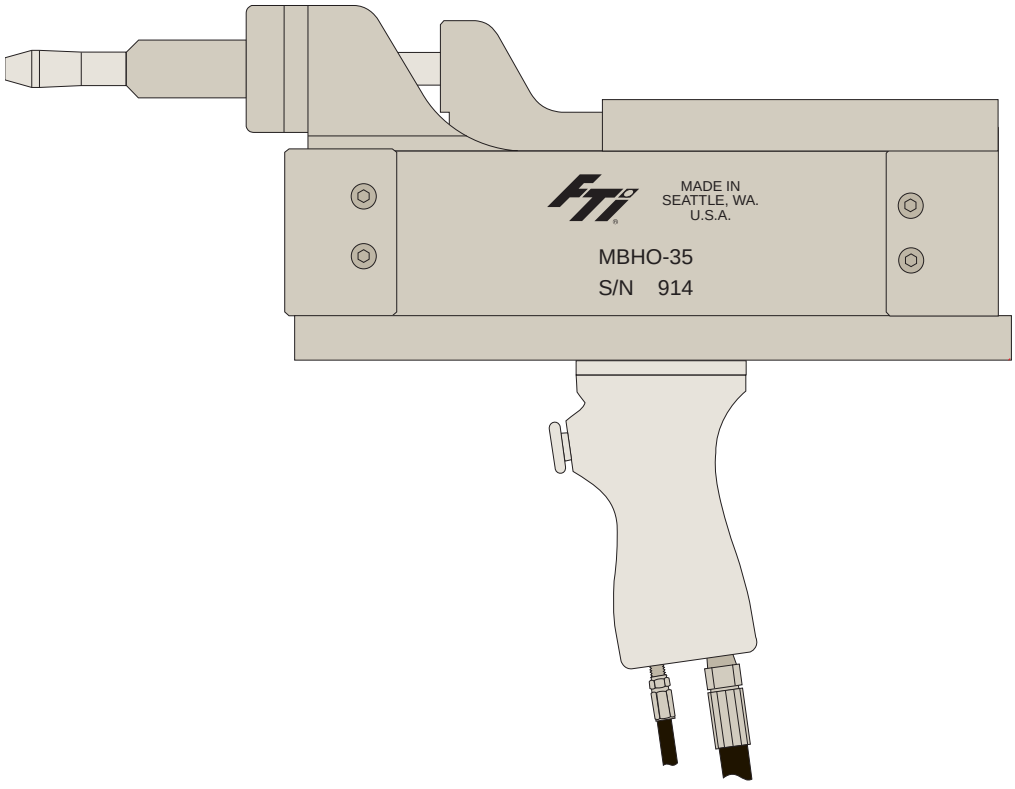
401 Andover Park East
Seattle, Washington 98188-7605
USA (206) 246-2010

FTI OPERATIONS, MAINTENANCE AND REPAIR MANUAL

Medium Brute Hydraulic Offset Puller Unit

FTI Part # 2720-011 ELN: 1310

Revised January 2006



This page intentionally left blank for two-sided printing.

FATIGUE TECHNOLOGY INC.

Seattle, WA • USA

Fatigue Technology Inc. (FTI) is the supplier of Split Sleeve Cold Expansion$_{TM}$ (Cx$_{TM}$) Systems to the aerospace industry worldwide. These proprietary systems and associated tooling may be covered by patents or agreements owned by, or exclusively licensed to Fatigue Technology Inc. Use of tooling procured from other than a licensed source may constitute patent infringement.

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 Cold Expansion$_{TM}$ 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; 5,129,253; 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; 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$_{TM}$ 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.

Uncontrolled if printed

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

ABOUT FATIGUE TECHNOLOGY INC.

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.

Customer Technical Support is always available to assist with special fatigue life enhancement requirements. Please contact FTI with questions at any time.

Burke F. Gibson
CEO/Chairman of the Board

Revised January 2006

FATIGUE TECHNOLOGY INC.

Uncontrolled if printed

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

TABLE OF CONTENTS

Uncontrolled if printed

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

TABLES

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

SECTION 1: INTRODUCTION

This instruction manual contains information on the operation and maintenance of the Medium Brute Hydraulic Offset (MBHO) puller unit. To obtain optimum performance and many years of trouble-free service, operate the puller unit properly and carefully follow maintenance procedures.

Read this manual before operating the puller unit and retain it for future reference.

1.1 ABOUT THE MEDIUM BRUTE HYDRAULIC OFFSET PULLER UNIT

The MBHO hydraulic puller unit is a powerful, small lightweight tool specifically designed for use with FTI's patented Split Sleeve Cold Expansion process. The MBHO puller unit is designed to pull a mandrel, fitted with a pre-lubricated split sleeve through a hole.

The MBHO puller has a maximum pull force of 17,000 pounds at 10,000 psi pump pressure. It is available in two sizes (models) for cold expanding holes up to 1/2-inch diameter in aluminum and 3/8-inch diameter in steel and titanium. The MBHO-20 will pull a mandrel through 2-inch thick material and the MBHO-35 through
3-1/2-inch thick material.

The MBHO has a safety feature in the air control system that causes the puller retraction cycle to be interrupted whenever the operator releases finger pressure on the trigger or in the event of air hose failure. All puller units operate in conjunction with either of FTI's PowerPak air-hydraulic power units, the standard FT-200 or portable FT-20 (and compatible with older units IW100MF and IW10MF). The MBHO has proven to be very reliable and requires minimal maintenance.

1.2 GENERAL DESCRIPTION

NOTE: Specifications are the same for both MBHO-20 and MBHO-35 pullers.

Hydraulic Fluid Requirements	U.S. MIL-SPEC #5606
Operating Hydraulic Pressure	10,000 psi
Pull Force Capacity	17,000 pounds
Air Line Requirements	3/8 inch to 1/2 inch ID
Air Flow Requirements (via PowerPak)	90-120 psi, 50 cfm
Actuation	Pneumatic
Operation	Hydraulic
Compatible PowerPaks	FT-200 or FT-20
Safety Air Trigger	Air logic safety circuit halts mandrel retraction when trigger is released
Replacement Seal Kit	MBHO Seal Kit (MBHO-SK)

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

1.3 GENERAL SPECIFICATIONS

The MBHO-20 puller is the preferred model since material stack-ups rarely exceed the MBHO-20's 2-inch stackup capability in the applicable diameter range. Actual specifications for both the MBHO-20 and MBHO-35 are shown in Table 1.3-1 on page 3.

Nosecap Selection: The MBHO is compatible with the MBHO series of nosecap.

Mandrel Selection: The MBHO is designed to be used with the 5/8-inch (type 20A) threaded Medium Brute Offset Adapter mandrels.

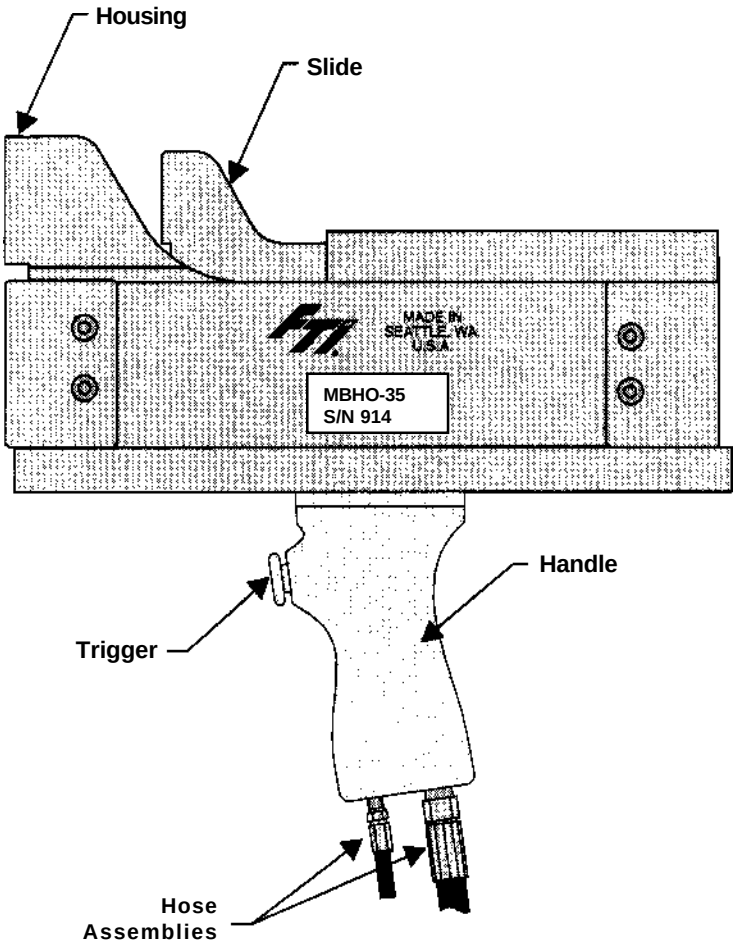


Figure 1.3-1
Medium Brute Hydraulic Offset General Parts

Table 1.3-1
Medium Brute Hydraulic Offset Specifications

Model Number	Maximum Material Stackup	Overall Length L (Ref Fig 2)	Frontside Clearance F (Ref Fig 2)	Stroke
MBHO-20	2.0"	9.1"	5.6"	3.10"
MBHO-35	3.5"	12.1"	7.1"	7.10"

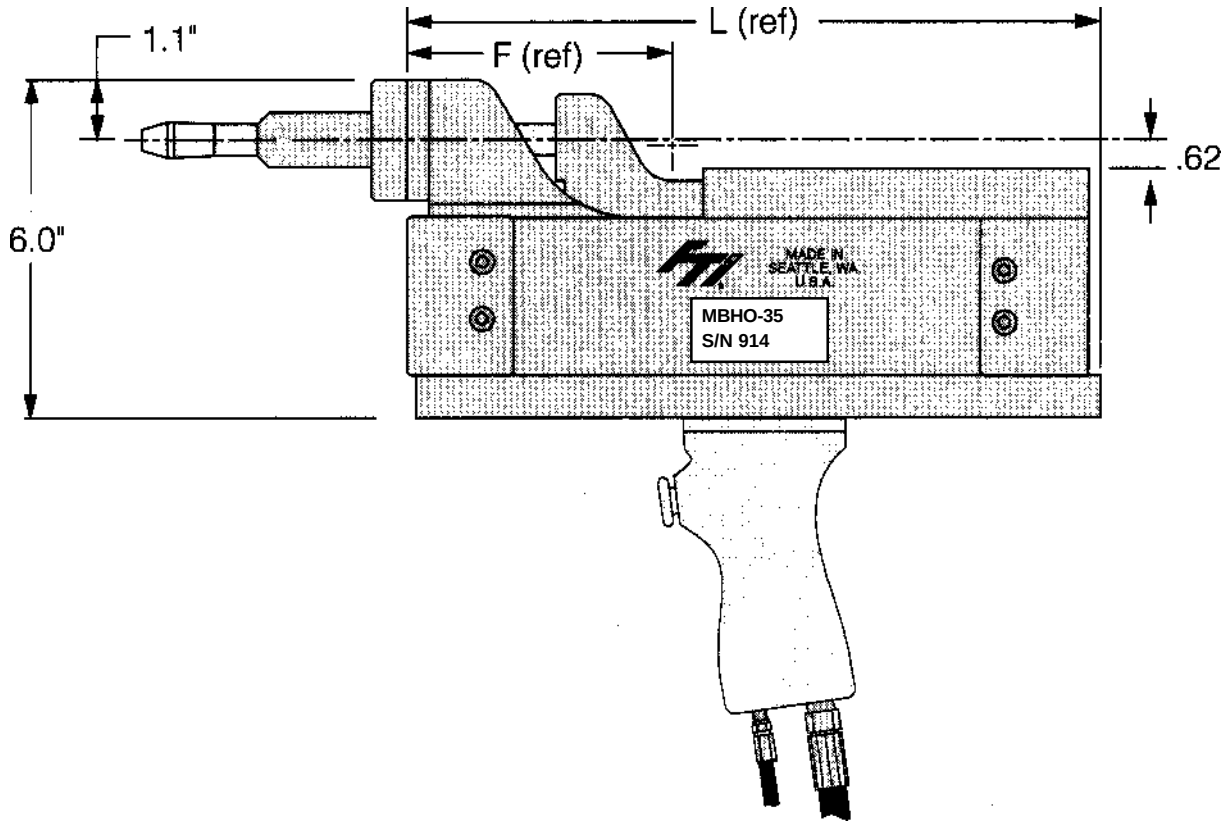


Figure 1.3-2
Medium Brute Hydraulic Offset Measurements

FATIGUE TECHNOLOGY INC.
Telephone (206) 246-2010
401 Andover Park East
www.fatiguetech.com
Seattle, WA 98188-7605 USA
Fax: (206) 244-9886

This page intentionally left blank for two-sided printing.

FATIGUE TECHNOLOGY INC.
Telephone (206) 246-2010
401 Andover Park East
www.fatiguetech.com
Seattle, WA 98188-7605 USA
Fax: (206) 244-9886

SECTION 2: SAFETY

Consult PowerPak Manual for safety precautions before connecting the puller unit.

When used in accordance with these instructions, the puller unit is safe and easy to use. All general safety precautions associated with hydraulic and pneumatically operated power tools should be observed. Many of these are noted in this section.

Ultimately, the operator is responsible for his own safety; however, the following general safety precautions should be observed.

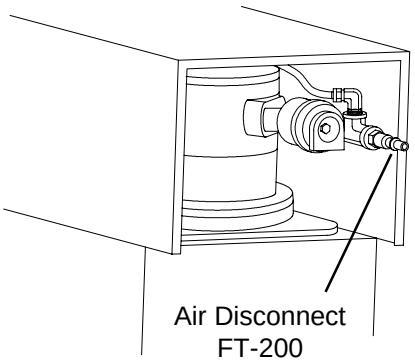


Figure 2.0-1a

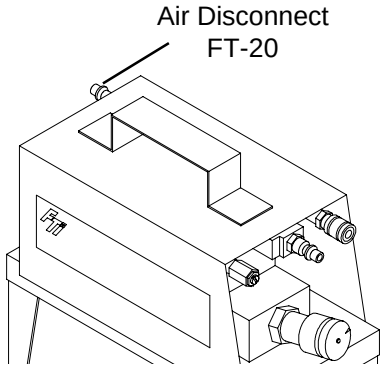


Figure 2.0-1b

Figure 2.0-1
Location of Air Disconnect

1. Wear eye protection when operating the puller unit.

2. Disconnect the air supply when:
   - Maintenance is to be performed.
   - Hydraulic hose is disconnected.
   - PowerPak is not in use.

3. In the event of a ruptured or leaking hydraulic hose, **IMMEDIATELY RELEASE THE TRIGGER AND DISCONNECT THE AIR LINE**, at the air coupler, from the PowerPak (see Figure 2.0-1). Never use your hands to grasp a leaking hose under pressure. The force of escaping hydraulic fluid could cause serious injury.

4. **DO NOT** attempt to disconnect the hydraulic hose while it is under pressure.

5. **DO NOT** expose hoses to potential hazards such as extreme heat or cold, sharp surfaces, or heavy impact.

6. **DO NOT** allow hoses to kink, curl, or bend so tightly that the oil flow within the hose is blocked or reduced. Periodically inspect the hose for wear or damage which could cause premature failure of the hose and possibly result in injury.

7. **DO NOT** use the hose to move attached equipment.

8. Hose material and coupler seals must be compatible with hydraulic fluid that meets the requirements of U.S. MIL-SPEC #5606.

9. Hoses must not come in contact with toxic materials such as creosote imprinted objects and some paints. Keep couplers and hoses clean and free of paint. Hose deterioration due to chemical degradation may cause the hose to fail under pressure.

10. Release puller unit trigger when mandrel clears the workpiece, or becomes stuck.

11. Before operating pump, make sure all hose connections are securely tightened. **DO NOT** overtighten.

12. Keep hands away from nosecap assembly while holding nosecap against the workpiece.

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

This page intentionally left blank for two-sided printing.

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

SECTION 3: PULLER UNIT OPERATING INSTRUCTIONS

Become familiar with these instructions before operating the puller.

3.1 PULLER UNIT SET-UP PROCEDURE AND OPERATION

Refer to Section 6.4 (MBHO Puller Assembly Diagram/Parts List) for parts identification.

1. Inspect all threads and fittings for signs of wear or damage and replace them if necessary.

2. Uncoil the hose assembly of the puller unit and inspect all threads, couplings and hoses for damage and degradation.

3. Remove thread protectors from the hydraulic fittings and thread the hydraulic hose fitting from the puller unit (male) onto the hydraulic fitting of the FTI PowerPak (female). Wipe fittings clean prior to connecting.

4. Thread couplers completely together. There should be positive contact between the PowerPak coupler and the hose fitting flange. Failure to completely tighten the coupler will prevent the puller from returning to the forward (start) position. Strain relievers must be placed on hose fittings during operation. If strain relievers are worn or damaged, they must be replaced immediately.

5. Connect the male/female AIR quick disconnects from the puller to the FTI PowerPak.

6. Test shop air to ensure that air is clean dry and between 90 and 120 psi at 50 cfm.

7. Connect the female quick disconnect of a 3/8" or 1/2" ID shop air line onto the male air inlet of the PowerPak.

8. Install appropriate mandrel in threaded adapter.

9. Install appropriate nosecap assembly over mandrel and thread it into place.

3.2 ACTIVATION OF PULLER UNIT

1. The puller can be activated only when correctly connected to an FTI PowerPak.

2. Activate puller by depressing the trigger on the handle. Hydraulic pressure is transmitted through the hose to the cylinder of the puller which then retracts the hydraulic piston which is connected to the cold expansion mandrel.

3. Releasing the trigger changes pressure at the pilot valve and stops the pull cycle and returns puller to original position.

4. If the puller fails to operate as detailed above, refer to Section 5 (Troubleshooting).

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

This page intentionally left blank for two-sided printing.

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

SECTION 4: MAINTENANCE

The puller requires routine checking and periodic preventative maintenance to ensure safe, trouble-free operation. No special maintenance is required. The following maintenance actions are suggested.

CAUTION
Disconnect the PowerPak from the air supply before performing maintenance or repair procedures.

4.1 GENERAL CLEANING

1. Periodically clean the outer surfaces of the puller unit and PowerPak.
2. When not in use, ensure thread protectors are reinstalled.
3. Keep all hose connections free of dirt and grime.

4.2 LUBRICATION

1. There is no internal lubrication requirement for the puller unit.
2. Whenever the puller is to be stored for any length of time, maintain a thin coat of 10-weight oil on the outside of black oxide surfaces.

4.3 INSPECTION

1. Periodically inspect the threaded fittings for cracks, leaks, or other damage. Repair and replace as necessary.

4.4 DISASSEMBLY

Refer to Section 6.4 for parts list, Figure 6.4-1 (MBHO Assembly)

1. Remove safety cover (33).
2. Remove block plate (12).
3. Remove handle assembly (14). Do not remove hoses from handle.
4. Remove manifold (4).
5. Remove front cover (9) by pushing hydraulic piston (5) and slide toward back position. Then slide cover (9) toward bottom to remove.
6. Remove slide (3) along with wear guides (10) and spring (37).

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

7. Remove back cover (11) from housing halves (26 and 2).

8. Remove pneumatic piston (6) from back.

CAUTION: Safety glasses must be worn when removing hydraulic piston. Proceed with care, excessive pressure can cause piston to exit slide with high velocity.

9. Remove hydraulic piston (5) from slide (3) by forcing compressed air into hydraulic port.

4.5 REASSEMBLY

Refer to Section 6.4 for parts list. Install screws where required.

IMPORTANT:

1. **Thoroughly clean all parts prior to reassembly**
2. **Check to see if O'rings are installed toward hydraulic flow with teflon backup rings behind.**

1. Install pneumatic piston (6) into back cover (11).

2. Assemble right housing (26), left housing (2) and back cover (11).

3. Install hydraulic adapter (13) into hydraulic piston (5).

4. Install hydraulic piston (5) into slide (3).

5. Install slide (3) with wear guides (10) and spring (37) into housing.

6. Install front cover (9) by pushing slide (3) and hydraulic piston (5) toward back position. When released, hydraulic piston (5) should fit into pocket on front cover (9).

7. Install manifold (4).

8. Install handle (14).

9. Install back plate (12).

10. Install safety cover (33).

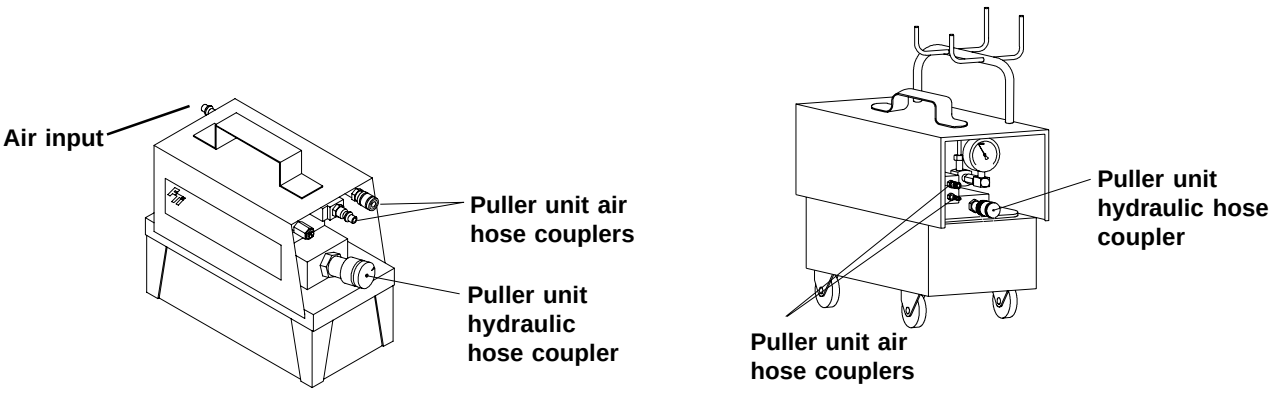
SECTION 5: TROUBLESHOOTING

This section provides solutions to some basic trouble spots. If you cannot solve your maintenance or operational problems with the information provided in this section, please contact your nearest FTI representative (see list inside back cover).

NOTE: Should difficulties originate in the PowerPak, consult the specific PowerPak Operations, Maintenance and Repair Manual.

PROBLEM	CAUSE	SOLUTION
5.1 POWERPAK WILL NOT BUILD FULL HYDRAULIC PRESSURE		
	(a) One or more of the key air or hydraulic lines has not been securely connected.	(a) Check the following hose connections: (1) Main air line quick disconnect fitting from shop air system to PowerPak. (2) Hydraulic quick couplings connecting the hoses to the PowerPak manifold, and the puller to the hydraulic hoses. (3) Two male/female air line quick disconnect fittings connecting the puller to the PowerPak manifold. (4) Check the main air supply has not been interrupted.

CAUTION
Hydraulic oil under extreme pressure may cause serious injuries if not handled carefully. For technical assistance, please contact FTI's Technical Sales Department.



FT-20 PowerPak* ***FT-200 PowerPak****

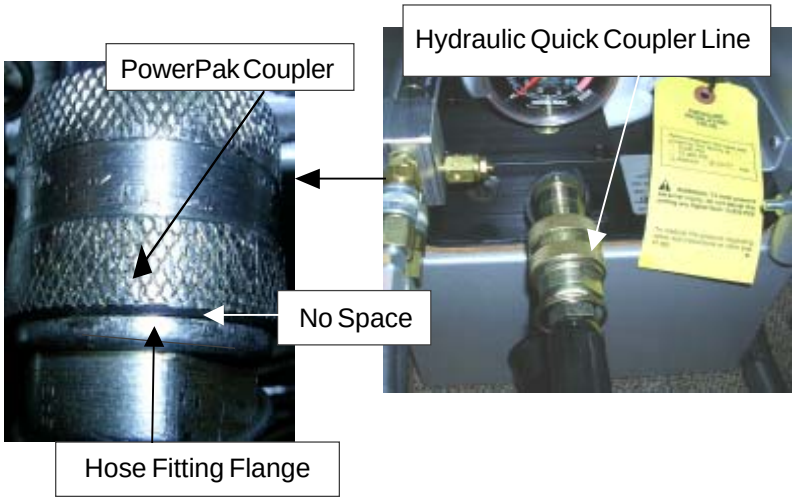
Figure 5.1-1
FT-20 and FT-200 PowerPaks

***Drawings not to scale.**

Uncontrolled if printed

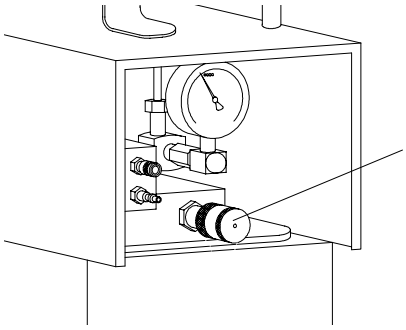
FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

PROBLEM	CAUSE	SOLUTION
5.2 PULLER RETRACTS ON FIRST TRIGGER ACTUATION, BUT WILL NOT RETURN TO START POSITION		
	(a) The new puller unit requires lubrication through the piston and cylinder.	(a) Cycle trigger several times to introduce hydraulic fluid into the cylinder.
(b) As above, AND the hydraulic hose is difficult to bend or coil (indicating unrelieved pressure built up in the hose).	(b The hydraulic quick coupler line has not been completely tightened at the PowerPak manifold (there should be no space between the PowerPak coupler and the hose fitting flange).	(b) Once hydraulic pressure has been introduced to the hydraulic hose, the pressure must be relieved before the coupler can be sufficiently tightened.



Procedure for relieving hydraulic pressure:

(1) Disconnect main air supply.
(2) Disconnect coupler from PowerPak
(3) Wrap the fitting with a rag to absorb the squirting oil and slowly turn the coupler off the hydraulic hose to allow hydraulic oil to bleed out.
(4) Once pressure is relieved, coupler may be tightened and reinstalled onto PowerPak.
(5) Reattach air lines to get puller to return.
(6) Check oil level in PowerPak reservoir.



Hydraulic Quick Coupler (FT-200)*

Figure 5.2-1
Location of Hydraulic Quick Coupler (FT-200)

***Drawings not to scale.**

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

PROBLEM	CAUSE	SOLUTION

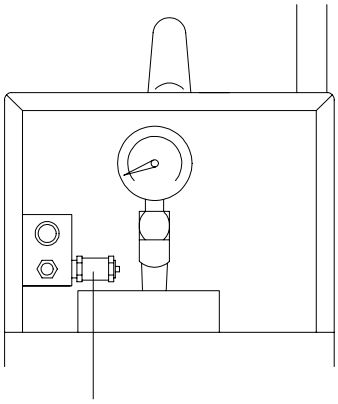
5.3 POWERPAK WILL NOT GENERATE CONSTANT PRESSURE (OR HICCUPS)

(a) Trigger response valve requires adjustment.

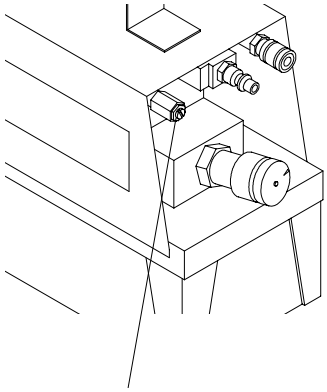
(a) Adjustment procedure:

(1) Loosen locknut on trigger response valve.
(2) Using a screwdriver, open screw counterclockwise until PowerPak will not start when puller trigger is depressed.

> For puller units with the new trigger assembly (see Section 6.1), the trigger response valve should be closed.

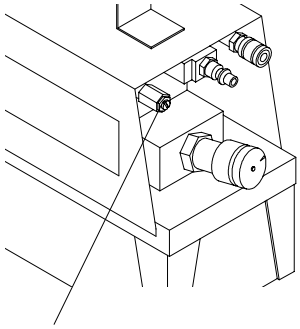


Trigger Response Valve (FT-200)*



Trigger Response Valve (FT-20)*

Figure 5.3-1
Location of Trigger Response Valve (FT-200 and FT-20)



Hydraulic Quick Coupler (FT-20)*

Figure 5.3-2
Location of Hydraulic Quick Coupler (FT-20)

(3) Turn screw clockwise until:
- PowerPak generates constant pressure when puller trigger is depressed, and
- PowerPak starts instantly when puller trigger is depressed and stops instantly when released. When the puller trigger is depressed, the PowerPak should be run at the preset pressure until the trigger is released.

(4) Hold set screw in position and tighten locknut.

(b) Hold set screw in position and tighten locknut until snug.

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

PROBLEM	CAUSE	SOLUTION

5.4 POWERPAK WILL NOT OPERATE OR MAINTAIN SUFFICIENT PRESSURE (6,000 PSI)

(a) Hydraulic pressure requires adjusting (Applicable to FT-200 PowerPak only).	(a) Adjust PowerPak pressure valve: (1) Squeeze trigger on puller unit to activate PowerPak. (2) If pressure does not reach 6,000 psi, loosen wingnut and turn hydraulic pressure control clockwise until pressure reaches 6,000 psi. (3) Tighten locknut to secure available shop air.
(b) Inadequate air supply.	(b) Increase pressure or flow of available shop air. If the PowerPak will not generate or maintain sufficient pressure, the main air line pressure is too low or the PowerPak hydraulic pressure requires adjustment. Air pressure requirements: - 1/2-inch ID air line with 90 to 120 psi for the FT-200. - 3/8-inch ID air line with 90 to 120 psi for the FT-20. Flow requirements: - 40 to 50 cfm for the FT-200 - 20 cfm for the FT-20

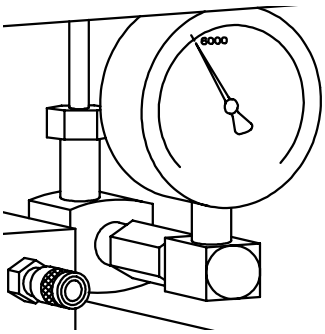


Figure 5.4-1
Pressure Gauge (FT-200)

***Drawings not to scale.**

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

PROBLEM	CAUSE	SOLUTION
5.5 MANDREL STICKS IN HOLE WHEN PULLER ACTIVATED		
	(a) Not enough pressure used to generate pull forces. If Medium Brute is being used with an FT-20 PowerPak, proceed to solution (4).	(a) Use the following procedure to analyze the problem: (1) Activate the puller and observe pressure reading on PowerPak pressure gage. (FT-200 PowerPak only.) (2) Pressure gage should read 6,000 psi. (Note: FT-20 PowerPak is factory set at 10,000 psi.) If an increase in pressure is required, refer to the solution for Problem 5-4 in this section for instructions. (3) Activate puller again. If mandrel remains stuck, increase pressure to 10,000 psi. (4) If mandrel remains stuck at 10,000 psi, immediately disengage the mandrel from the puller. Push the mandrel out using an impact hammer. Contact FTI's Technical Sales Department for additional assistance.

This page intentionally left blank for two-sided printing.

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

SECTION 6: ILLUSTRATED PARTS BREAKDOWN

FTI has redesigned the puller unit trigger assembly. Puller units with serial numbers equal to or greater than the serial numbers in Table 6.0-1 have the new cartridge trigger assembly. The new design will reduce the occurrence of trigger air leaks, perform more reliably (better pump actuation), and be easier to maintain. The previous trigger design as detailed in Section 6.3 can be easily replaced with the Cartridge Trigger Assembly Kit (FTI-CT-RK) or the Medium Brute Hydraulic Offset Rework Kit (MBHO-35-CT-RK or MBHO-20-CT-RK) and the Puller Trigger Rework Tool Kit (FTI-CT-RKT). One FTI-CT-RK or MBHO-XX-CT-RK (as appropriate) is required for each puller converted. Only one FTI-CT-RKT is required regardless of the number of pullers converted. The FTI-CT-RKT kit also includes detailed instructions on how to perform the modification.

Table 6.0-1
Trigger Assembly Conversion

FTI Part Number	**FTI Serial Number**
2354-001, 2354-007, 2354-005, 5209-001	0167
2354-002, 2354-006, 5209-002	0165

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

6.1 MEDIUM BRUTE HYDRAULIC OFFSET REWORK KIT (MBHO-XX-CT-RK)

This kit is used to repair or refurbish older pullers. Table 6.1-1 is a parts list for the Medium Brute Hydraulic Offset Rework Kit and Figure 6.1-1 shows a diagram of the cartridge trigger assembly.

Table 6.1-1
Medium Brute Hydraulic Offset Rework Kit (MBHO-XX-CT-RK)

Piece Number	Quantity MBHO-20	Quantity MBHO-35	Description	FTI Part Number
	4	4	Screw, Socket Head Cap	1035-005
	0	1	Spring, Compression	1005-019
	1	0	Spring, Compression	1005-018
	2	2	Screw, Button	1026-031
	1	1	Plate, Safety Cover	5006-001
	1	1	Guard, Neoprene	2881-001
	1	1	Hydraulic Adapter	2039-005
	4	0	Guide, Wear	2348-001
	0	4	Guide, Wear	2348-002
	1	1	Seal Kit	8000-952
2	1	1	Push Button, Brass	1187-623
3	1	1	Retaining Ring, Internal	1187-624
4	1	1	Sleeve, Puller Handle Trigger	3196-001

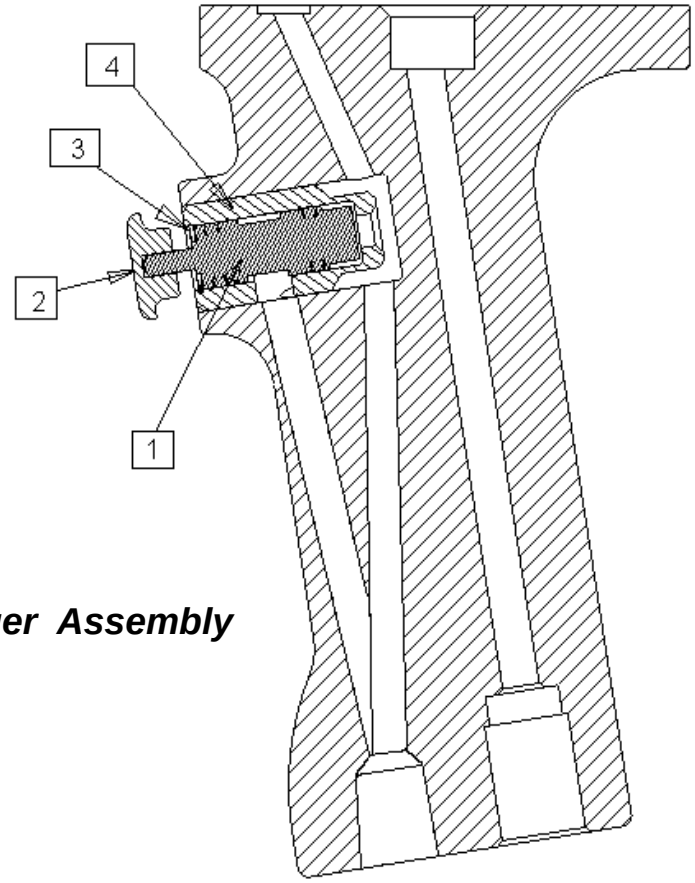


Figure 6.1-1
Diagram of Cartridge Trigger Assembly

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

6.2 MEDIUM BRUTE HYDRAULIC OFFSET SEAL KIT

This kit is used to replace seals. It is included as part of the Medium Brute Hydraulic Offset Rework Kit (see Section 6.1). Table 6.2-1 is a parts list for the Medium Brute Hydraulic Offset Seal Kit.

Table 6.2-1
Medium Brute Hydraulic Offset Seal Kit (MBHO-SK)

Quantity	Description	FTI Part Number
1	Valve, Cartridge Trigger (See Figure 6.1-1, Piece Number 1)	1187-622
1	Seal, LB Handle (See Table 6.3-1, Piece Item 6)	2040-001
1	O-Ring	1046-059
1	O-Ring	1046-006
1	O-Ring	1046-041
1	O-Ring	1046-012
1	Seal, K	1046-011
1	O'Ring	1046-040
1	T-Seal	1046-111
1	O'Ring	1046-058

6.3 PREVIOUS TRIGGER ASSEMBLY

The previous trigger design (serial numbers smaller than those listed in Table 6.0-1) detailed here can be easily replaced with the improved trigger assembly detailed in Section 6.1. Table 6.3-1 is a parts list for the old-style trigger assembly.

Table 6.3-1
Parts List for Previous Trigger Assembly

Quantity	Line Item	Description	FTI Part Number
1	1	Trigger, LB Handle	2042-001
1	2	Spring, LB Handle	1005-003
1	3	Retainer, LB Handle	2043-001
1	4	Ball, .250 Diameter stl.	1045-025
1	5	Pin, 1/8 x 3/4 stdl. Spring	1045-026
1	6	Seal, LB Handle	2040-001
1	7	Sleeve, LB Handle	2044-001

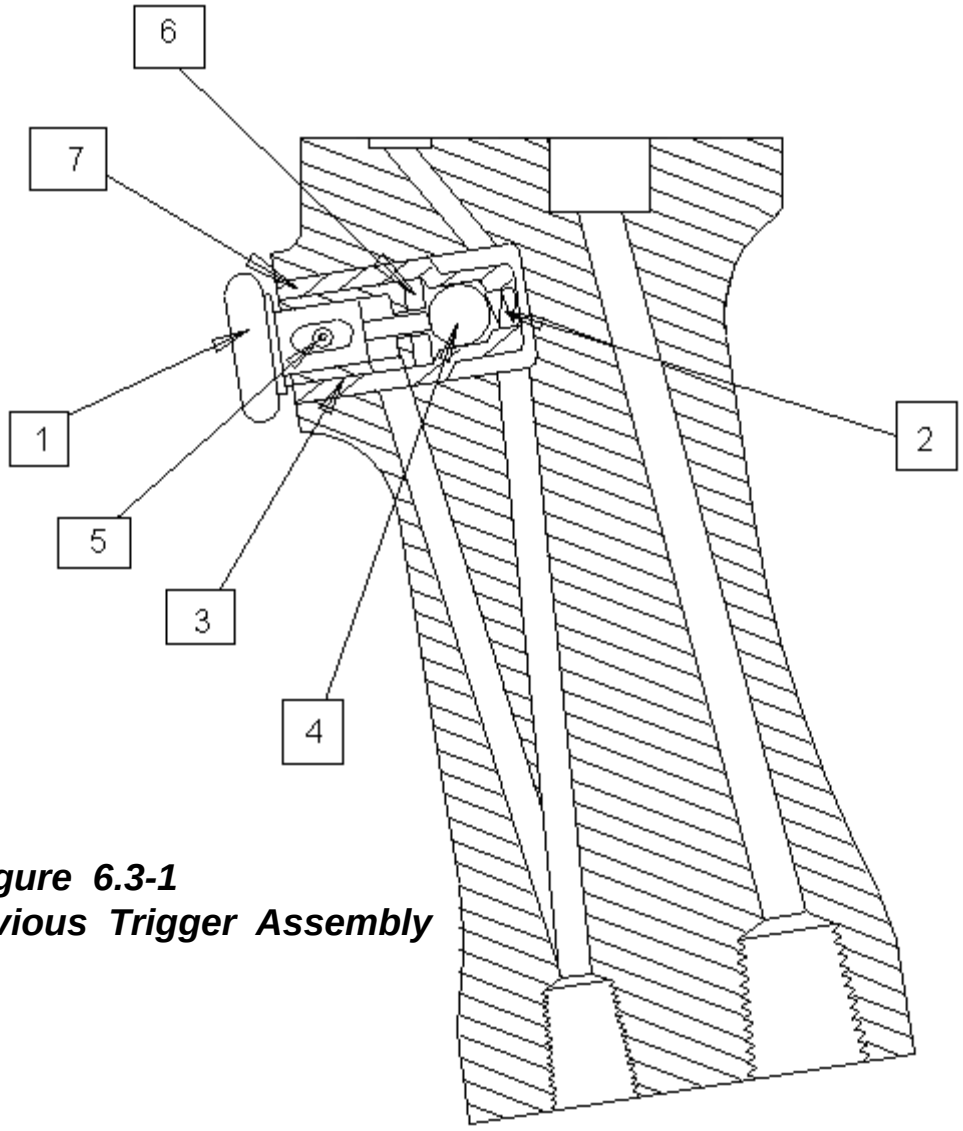
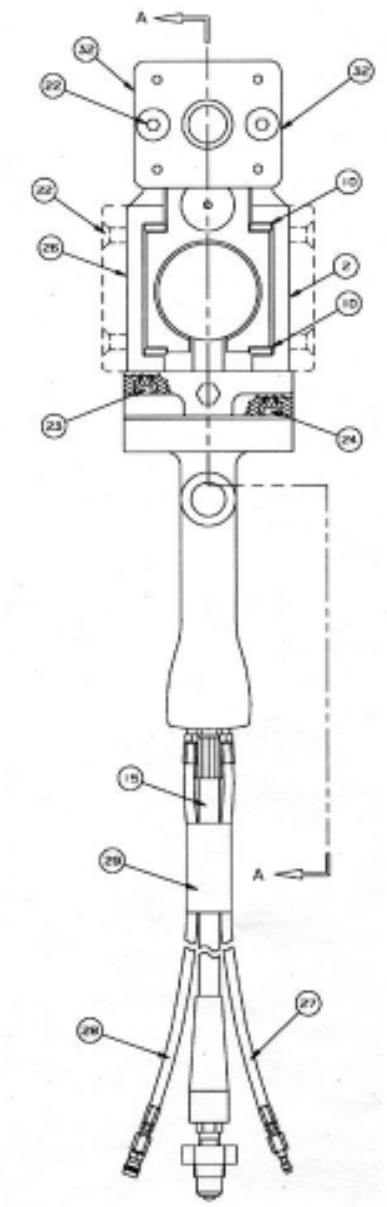


Figure 6.3-1
Diagram of Previous Trigger Assembly

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

6.4 MEDIUM BRUTE HYDRAULIC OFFSET PULLER ASSEMBLY; PARTS LIST AND DIAGRAM



See Parts List Next Page

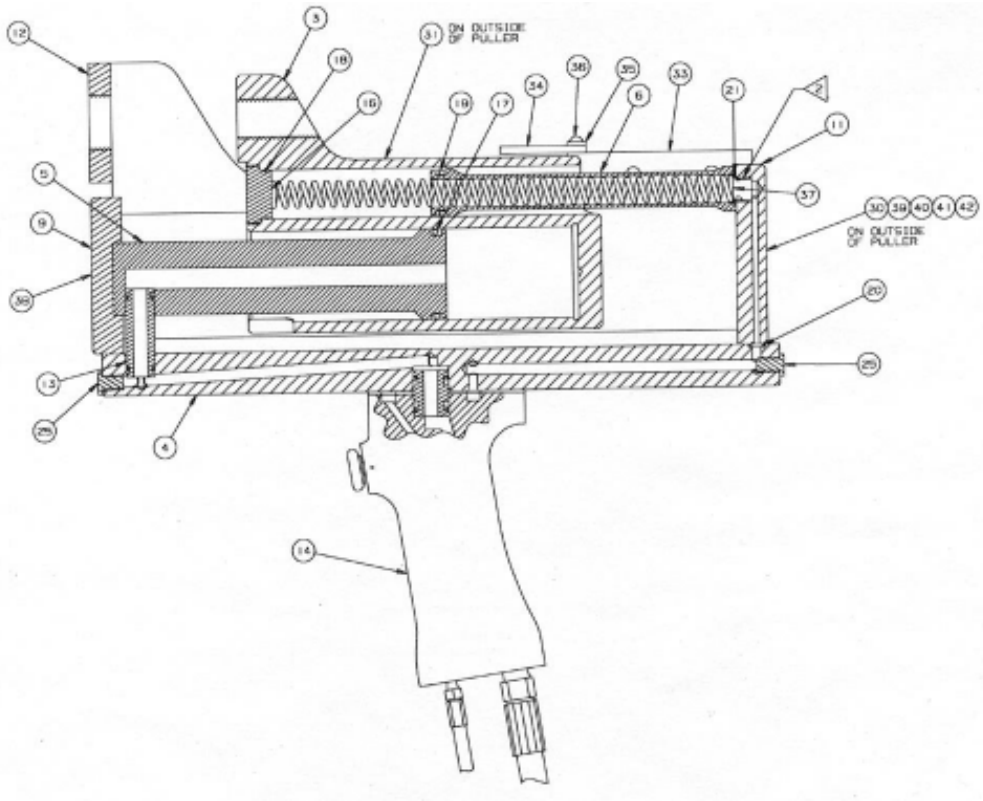


Figure 6.4-1
Medium Brute Hydraulic Offset Assembly

Uncontrolled if printed

FATIGUE TECHNOLOGY INC. 401 Andover Park East Seattle, WA 98188-7605 USA
Telephone (206) 246-2010 www.fatiguetech.com Fax: (206) 244-9886

Table 6.4-1
Medium Brute Hydraulic Offset Puller Assembly Parts List

Quantity				
MBHO-35	**MBHO-20**	**Dash No./Part No.**	**Piece No.**	**Description**
1	1	1009-242	38	Label
1	—	1005-019	37	Spring, Compressionn
—	1	1005-018	37	Spring, Compression
8	8	1026-031	36	Screw, Button (Black)
1	1	5006-001	35	Plate, Safety Cover
1	1	2881-001	34	Guard, Neoprene
1	—	2869-002	33	Cover, Safety
—	1	2869-001	33	Cover, Safety
2	2	1009-247	32	Label
1	1	1009-184	31	Label
2	2	1009-094	30	Label
4	4	2638-001	29	Tube, Heat Shrink
1	1	2106-002	28	Assembly, Air Hose (Female)
1	1	2106-001	27	Assembly, Air Hose (Male)
1	—	2351-002	26	Housing, Right
—	1	2351-001	26	Housing, right
2	2	1047-014	25	Plug, Hollow Hex
4	4	1029-005	24	Screw, Cap (Black)
8	6	1029-003	23	Screw, Cap (Black)
10	10	1029-019	22	Screw, Flat Head
1	1	1046-041	21	O'Ring
1	1	1046-012	20	O'Ring
1	1	1046-011	19	Seal, K
1	1	1046-040	18	O'Ring
1	1	1046-111	17	T-Seal
1	1	2355-001	16	Plug, Slide
1	1	2107-001	15	Assembly, Hydraulic Hose
1	1	2049-004	14	Assembly, Handle
1	1	2039-005	13	Adapter, Hydraulic
1	1	2363-001	12	Plate, Block
1	1	2346-001	11	Cover, Back
4	—	2348-002	10	Guide, Wear
—	4	2348-001	10	Guide, Wear
1	1	2347-001	9	Cover, Front
1	—	2341-002	6	Piston, Pneumatic
—	1	2341-001	6	Piston, Pneumatic
1	—	2342-002	5	Piston, Hydraulic
—	1	2342-001	5	Piston, Hydraulic
1	—	2345-002	4	Manifold
—	1	2345-001	4	Manifold
1	—	2344-002	3	Slide
—	1	2344-001	3	Slide
1	—	2343-002	2	Housing, Left
—	1	2343-001	2	Housing, Left
*	—	2354-002	—	Assembly, MBHO-35
—	*	2354-001	—	Assembly, MBHO-20