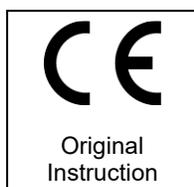

FTI OPERATIONS, MAINTENANCE, AND REPAIR MANUAL

**Instrumented Little Brute Puller Unit
SLB-Series**

**FTI Part #2720-128, Log #36561
Revision Original**

May 31, 2019



About Fatigue Technology Inc.

Fatigue Technology Inc. (FTI) is a world-leading aerospace engineering and manufacturing company. FTI pioneered Cold Expansion (Cx™) technology (which provides solutions to fatigue problems associated with holes in metal structures) back in 1969 and has advanced this science to develop innovative bushing and fastener products. These proprietary products 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 Cold Expansion 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 Sales Department.

FTI's Cold Expansion 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; 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 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

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

This manual can be made available in other languages. Please contact the Sales Department to request a copy.

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SECTION 1.0: INTRODUCTION

This instruction manual contains information on the operation and maintenance of the Instrumented (“Smart”) Little Brute (SLB) 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 INSTRUMENTED LITTLE BRUTE PULLER UNIT

The Instrumented Little Brute hydraulic puller unit is a powerful, small, lightweight tool specifically designed for use with the Fatigue Technology Inc. (FTI) patented Split Sleeve Cold Expansion™ (SsCx™) process. The Instrumented Little Brute Puller Unit is designed to pull a mandrel through a hole with the pre-lubricated stainless steel split sleeves used in this process.

The Instrumented Little Brute puller has a maximum pull force of 8,000 pounds (35,584N) at 10,000 psi (68.95MPa) pump pressure. The Instrumented Little Brute is capable of cold expanding holes up to 1/2 inch (12.7 mm) in diameter and 2 inches (50.8 mm) deep in aluminum, and 3/8 inch (9.53 mm) in diameter and 1-1/2 inches (38.1 mm) deep in steel and titanium.

The Instrumented Little Brute operates in conjunction with FTI’s Instrumented PowerPak electro-hydraulic power unit. This system uses a sophisticated electronic control system to activate and monitor the tooling for the cold expansion process. The Little Brute has proven to be very reliable and requires minimal maintenance.

1.2 GENERAL DESCRIPTION

NOTE: Specifications are the same for all Instrumented Little Brute puller units (current and pending)

Hydraulic Fluid Requirements.....	U.S. MIL-SPEC #5606
Operating Hydraulic Pressure.....	10,000 psi (68.95MPa)
Pull Force Capacity	8,000 pounds (35,584N)
Compatible PowerPaks.....	SMP-100B series
PowerPak AC Power Requirements	115VAC (nominal) 50/60 Hz single-phase, 14.5 amp
Actuation	Momentary-switch (-5 VDC)
Operation	Hydraulic
Fail-Safe.....	Control logic circuit halts mandrel retraction when trigger is released; AC fuses interrupt electricity during voltage spike/ampere surge
Replacement Seal Kit	SLB Seal Kit (SLB-SK)

1.3 GENERAL SPECIFICATIONS

The Instrumented Little Brute puller unit is suitable for most customer requirements since material stack-ups rarely exceed 2 inches (50.8 mm) in the applicable diameter range.

Nosecap Selection: The Instrumented Little Brute is compatible with existing FTI tooling including both the standard nose cap and the flush nose cap. See FTI's comprehensive Tooling Catalog for more information.

Mandrel Selection: The Instrumented Little Brute is directly compatible with standard Type 1, 7/16-20 threaded mandrels. The SLB may also be adapted to tang or pintail mandrels using LB-CA and LB-PC chuck assemblies, respectively. See FTI's comprehensive Tooling Catalog for more information.

Figures 1.3-1 and 1.3-2 show the parts and specifications of the Instrumented Little Brute puller unit.

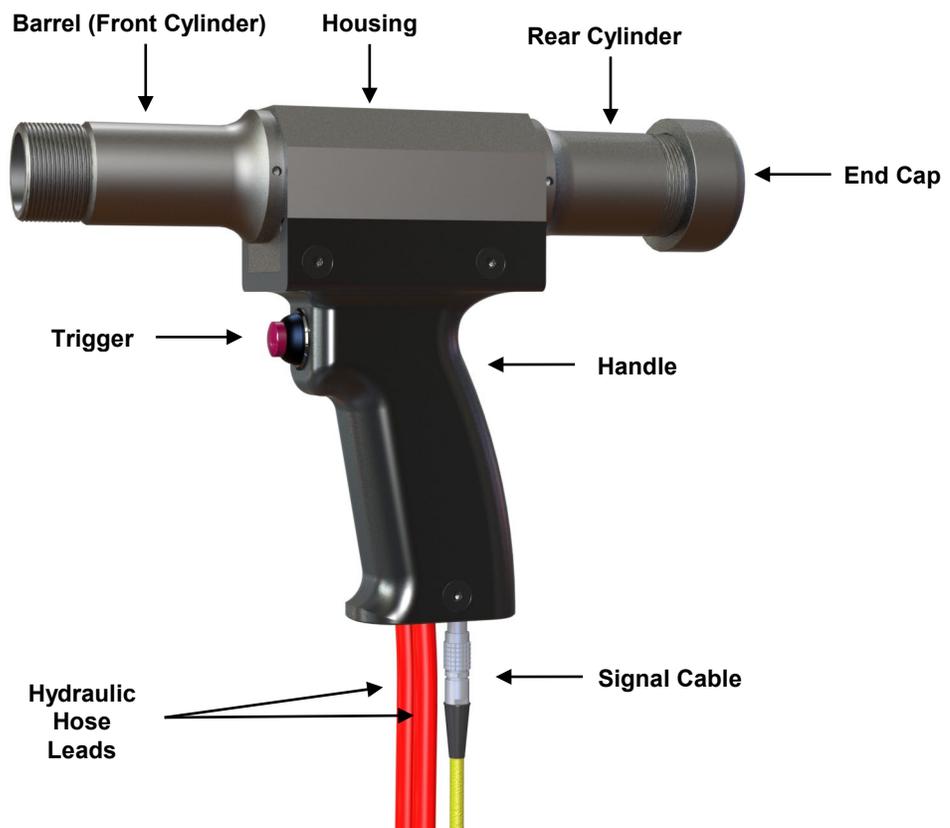
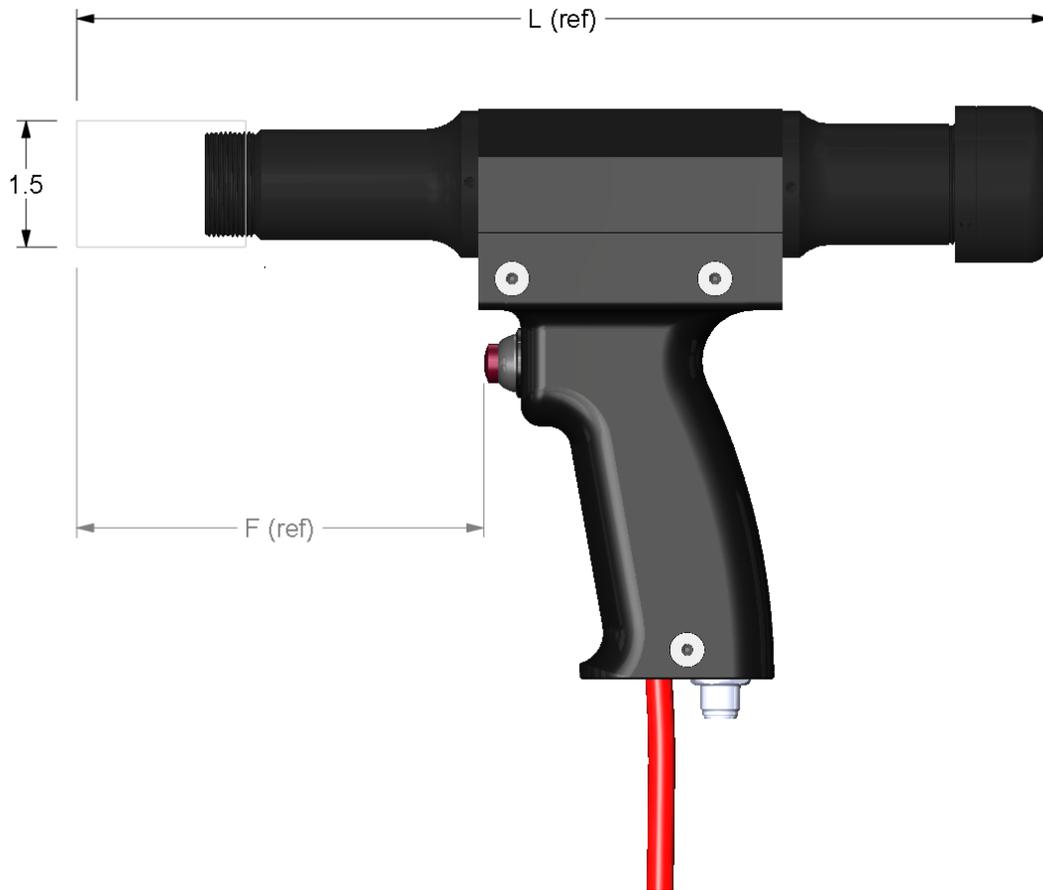


Figure 1.3-1
Instrumented Little Brute Puller Unit Parts



Model Number	Maximum Material Stackup (inch)	L (inch)	F (inch)	Weight (SLB.)	Stroke (inch)
SLB-20	2.0 (50.8 mm)	11.5 (284.5 mm)	4.8 (127.0 mm)	11.25 (50.0N)	3.1 ± 0.1 (78.7 mm)

**Figure 1.3-2
Instrumented Little Brute Puller Unit Specifications**

SECTION 2.0: SAFETY

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

Ultimately, operators are responsible for their own safety; however, the following general safety precautions should be observed.

2.1 SAFETY SYMBOLS AND DEFINITIONS

The safety signal word designates the degree or level of hazard seriousness.



DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION: Used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

IMPORTANT: Used when action or lack of action can cause equipment failure, either immediate or over a long period of time.

2.2 PULLER GENERAL SAFETY PRECAUTIONS

The following procedures must be performed by qualified, trained personnel who are familiar with this equipment. Operators must read and understand all safety precautions and operating instructions included with both the Instrumented Little Brute Puller and the corresponding PowerPak hydraulic pump (i.e. SMP-100). If the operator cannot read these instructions, operating instructions and safety precautions must be read and discussed in the operator's native language.

These products are designed for general use in normal environments. These products are not designed for lifting and moving people, agri-food machinery, certain types of mobile machinery, or in special work environments such as explosive, flammable, or corrosive. Only the user can decide the suitability of this product in these conditions or extreme environments.



WARNING: To prevent personal injury:

1. Appropriate Personal Protection Equipment (PPE) must be worn when operating the puller unit. Safety stickers are shown in Figure 2.0-1.

Read manual before using



Always wear eye protection

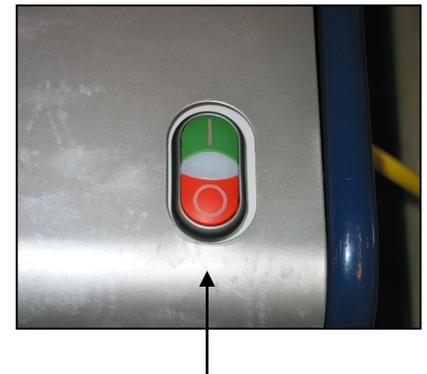


Always wear ear protection



**Figure 2.0-1
Safety Stickers**

2. Turn off the pump when:
 - Hydraulic hoses and/or Puller are disconnected.
 - PowerPak will be left unattended.
 - Mandrel tooling is to be changed or inspected.
3. Turn off the pump and disconnect the power cord when:
 - Service or maintenance is to be performed.
 - PowerPak will not be used for extended periods.
4. In the event of a ruptured or leaking hydraulic hose, **IMMEDIATELY RELEASE THE TRIGGER AND TURN OFF THE PUMP** at the main power switch of the PowerPak (see Figure 2.0-2). **Never use your hands to grasp a leaking hose under pressure.** The force of escaping hydraulic fluid could cause serious injury.
5. Keep hands away from the nosecap assembly when actuating the puller unit.
6. Release the puller unit trigger when the mandrel clears the workpiece or becomes stuck.
7. The end cap must always be in place while in use. Injury may occur if the end cap is removed during operation.
8. Before operating the pump, ensure all push-to-connect hose couplers are properly and securely connected. Couplers need to be fully inserted and locked into the mating coupler. An audible “click” is heard when the coupler makes a complete connection.



**Figure 2.0-2
Main Power Switch**

9. Operators must read this manual in its entirety before using the Instrumented Little Brute puller. Eye and ear protection must be worn while operating the Instrumented Little Brute puller. Three safety stickers on the puller act as a reminder to these instructions. The symbols are defined in Figure 2.0-1.
10. Do not use in potentially explosive atmospheres.

2.3 *HYDRAULIC SAFETY PRECAUTION*



WARNING: To prevent personal injury:

1. Inspect the hydraulic hoses for signs of wear (cuts, abrasions, or kinks) to the outer shell material. Pump clean oil through the entire length. Pressurize the hoses and check for leaks at the crimped connectors, between the hose material and the fitting, and between the fitting and the coupler.
2. DO NOT attempt to disconnect a hydraulic hose while it is under pressure.
3. DO NOT expose hoses to potential hazards such as extreme heat or cold, sharp surfaces, or heavy impact.
4. DO NOT allow hoses to kink, twist, curl, or bend so tightly that the oil flow within the hose is blocked or reduced. Periodically inspect the hoses for wear or damage that could cause premature failure of the hose and possibly result in injury. Damaged hoses must be replaced immediately.
5. DO NOT use the hose assembly to pull or otherwise to move attached equipment.
6. DO NOT remove strain reliever from hoses, if equipped.
7. Note: Some hose assemblies may incorporate strain relievers near hose fittings. Hoses with damaged strain relievers must be replaced immediately.
8. DO NOT use any other hoses or hose assemblies other than those provided by or otherwise approved by FTI.
9. DO NOT allow hose assemblies to come in contact with toxic materials such as creosote-impregnated 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. Damaged hoses must be replaced immediately.
10. Before operating pump, make sure all hose connections are tightened securely.
11. If hoses require replacement, contact FTI's Sales Department.

IMPORTANT: FTI completed a risk assessment on this unit at our factory. Any modifications done by a third party or the final user are excluded from that risk assessment. As a result, modifications done by a third party or the final user nullify the CE marking.

2.4 *ELECTRIC MOTOR SAFETY PRECAUTIONS*



WARNING: To prevent personal injury or damage to the equipment:



1. **ALL** electrical work must be performed and tested by a qualified electrician per local directives and standards.

2. Avoid conditions that can cause damage to the power cord, such as crushing, abrasion, sharp edges, or being in a corrosive environment.

3. Avoid spills, spray or foreign objects getting into the motor at any time.



4. Do not attempt to increase the power line capacity by replacing a fuse with another fuse of higher value. Overheating the power line may result in fire.

5. **NEVER** use an ungrounded power supply with this unit.

6. Changing the voltage is an involved and, if incorrectly performed, hazardous procedure. Consult FTI for specific information before attempting rewiring.

7. Electrical work must be performed and tested by a qualified electrician per local directives and standards. If unit requires electrical work or testing, contact FTI Technical Sales Department.

SECTION 3.0: PULLER UNIT OPERATING INSTRUCTIONS

Become familiar with these instructions before operating the puller.

3.1 PULLER UNIT SETUP PROCEDURE AND OPERATION

Refer to Section 6 (Illustrated Parts Breakdown) for parts identification.

1. Inspect all hydraulic hose leads, hose couplings and fittings for signs of wear or damage and replace them if necessary.
2. Install the appropriate mandrel in the threaded adapter. Install the proper chuck assembly in place of the threaded adapter if a tang or pintail mandrel is to be used.
3. Install the appropriate nose cap assembly over the mandrel and fully thread it into place.
4. Uncoil the hose assembly and inspect all threads, couplings, cables and hoses for damage and degradation. Any damaged component must be replaced immediately.
5. Inspect hydraulic couplers and wipe away any oil residue or other contaminants. Push each pair of hydraulic hose couplers into the pair of mating couplers at both the Puller hose leads and the PowerPak bulkhead.
6. Ensure couplers are completely and securely connected. There should be audible “click” when the couplers make a complete and secure connection, and the detent pin and notch are not in-line (See Figure 3.0-1)

See Section 5, Problem 2 for more information. Failure to completely connect both of the couplers may cause the puller piston to become locked in place under pressure.

7. Connect both ends of the trigger signal cable to both the Puller and the PowerPak.
8. Verify that the AC power outlet provides the correct voltage and amperage. Plug in the power cable of the PowerPak to the power outlet.

3.2 ACTIVATION OF PULLER UNIT

1. The Instrumented Little Brute puller unit can only be activated when connected to a compatible FTI Smart PowerPak hydraulic pump.
2. The PowerPak must be powered on and the system controller have completed the start-up (boot-up) process before the puller unit is available to activate.
3. Activate the puller unit by pressing the trigger on the handle. The motor-drive of the PowerPak activates and hydraulic pressure is transmitted through the hose to the cylinder of the puller, which then retracts (“pulls” the mandrel into the puller) the hydraulic piston that performs the cold expansion procedure.
4. Releasing the trigger interrupts the hydraulic flow and stops the “pull” cycle. The hydraulic flow is automatically redirected to extend the hydraulic piston (mandrel returns protruding out of the puller) to reset the mandrel to the original, fully-extended position. Once the mandrel is reset, the motor-drive of the pump turns off.
5. If the puller fails to operate as detailed above, refer to Section 5 (Troubleshooting).

SECTION 4.0: PULLER UNIT 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: Before attempting any maintenance operations on the puller unit, disconnect the PowerPak from the power source or disconnect the puller from the PowerPak.

4.1 GENERAL CLEANING

1. Periodically wipe the outer surfaces of the puller unit with a clean, dry cloth or rag.
2. When not in use, ensure tools are stored in a clean, secure location.
3. Keep all hose connections free of dirt and grime. Doing so will dramatically extend the life of pumps and puller seals.

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 threaded fittings, hoses, and strain relievers for cracks, leaks or other damage. Repair and replace immediately.

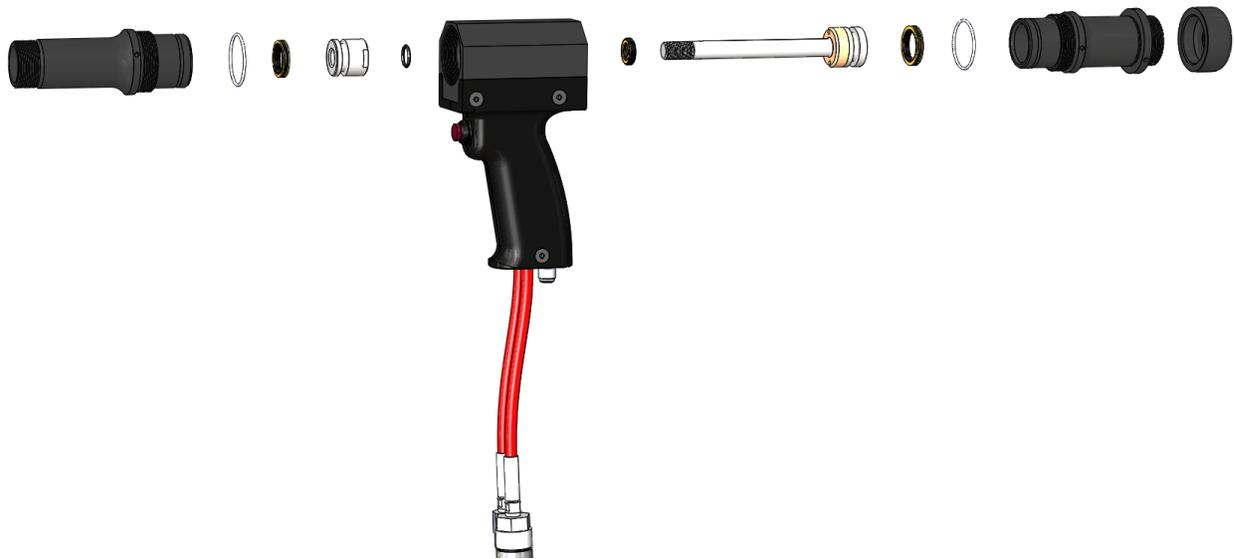
4.4 REPLACING SEALS

Refer to Section 6 for a parts list unless otherwise noted. All numbers in the steps below refer to location numbers in Figures 6.1-1 and 6.2-1. This section provides step-by-step instructions in order to gain access to areas where worn seals occur. The seal part numbers are listed in the parts list as well as in the Seal Kit list. Seals should be replaced every 500,000 cycles or every 24 months, whichever comes first.

Units requiring maintenance and/or repair should be sent to FTI or an FTI-certified repair facility qualified to repair the unit.

Refer to Figure 4.4-1 for explode view of puller unit assembly showing general location of seals and orientation with mating parts.

These instructions assume that the piston is in the full-forward position (fully extended) as typical of the tool at rest during normal operation.



**Figure 4.4-1
Explode view of Little Brute Showing Seals**

1. Unthread and remove the nosecap assembly and mandrel tooling, if equipped.
2. Loosen the lock ring (6, Figure 6.2-1) to remove tension from the end cap (5, Figure 6.2-1).
3. Unthread and remove the end cap (5, Figure 6.2-1).
4. Unthread and remove the mandrel adapter or chuck assembly from the end of the piston, as equipped.

NOTE: If it is necessary to hold the piston rod stationary to remove the mandrel adapter or chuck assembly, use a screwdriver in the slot (some models may have a hex wrench hole) in the back end of the piston to keep the piston rod from turning. **DO NOT** scratch the piston shaft during disassembly.

5. Unscrew and remove the rear cylinder (3, Figure 6.2-1) from the housing (1, Figure 6.2-1).
6. Unscrew and remove the front cylinder (2, Figure 6.2-1) from the housing (1, Figure 6.2-1).

NOTE: The front cylinder will be full of hydraulic fluid. Care should be taken to properly capture the fluid and prevent spills. Suggestion is to tip the puller unit forward while unscrewing the front cylinder, and to carefully drain the fluid into an appropriate container once the cylinder is separated from the housing.

7. Remove the spring pin (16) (if present, see Figure 6.2-1). Unthread and remove the front piston head.
8. Remove the piston rod assembly (4, Figure 6.2-1) by pushing on the threaded end (nosecap end) of the piston rod until threads engage the main housing seal (1, Figure 6.1-1). Thread the piston rod threads through the seal and remove the piston rod assembly from the unit.

Normal replacement of seals requires the use of the Instrumented Little Brute Seal Kit (SLB-SK). Refer to Section 6.1 for part number and quantities.

NOTE: The dynamic seals for the piston and rod are Parker T-Seal type. The T-Seals must be properly fitted within the seal groove as shown in Figure 4.4-2. The included backup rings must be installed with the angled faces of the split situated so that the cut ends are properly seated (i.e. not overlapping) and rotated so that the splits in coupled corresponding rings are not aligned.

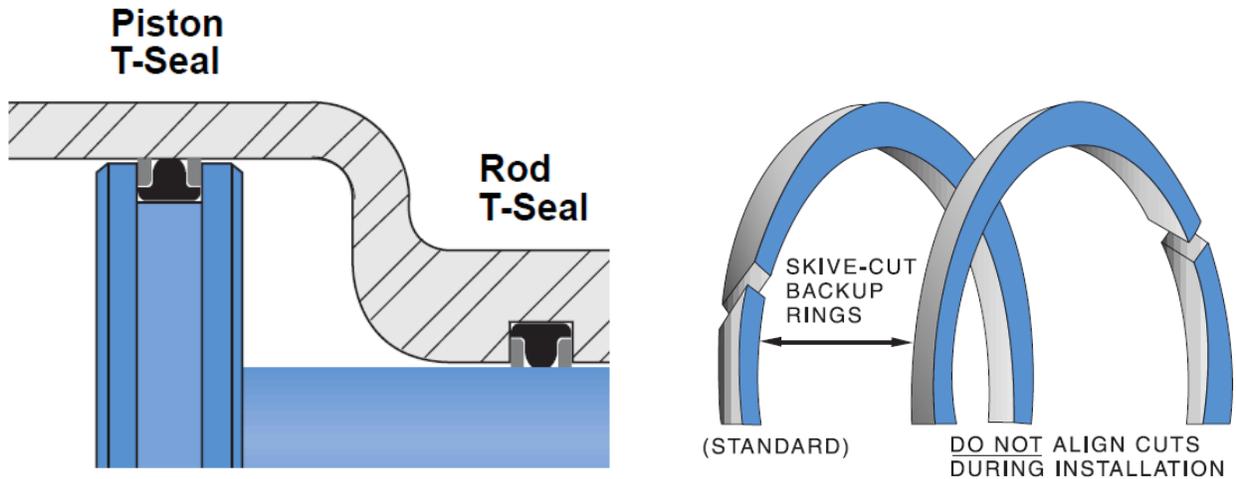


Figure 4.4-2
Proper Orientation of T-Seals and Backup Rings

9. Remove and replace the rod T-Seal (1, Figure 6.1-1) in the center housing (1, Figure 6.2-1).
10. Remove and replace the piston T-Seal (2, Figure 6.1-1) of the piston assembly (3, Figure 6.2-1).
11. Remove and replace the piston T-Seal (3, Figure 6.1-1) of the front piston head (4, Figure 6.2-1).
12. Remove and replace the O-ring and Backup Ring (4 & 5, Figure 6.1-1) of the front piston head (4, Figure 6.2-1).
13. Remove and replace the O-ring and Backup Ring (6 & 7, Figure 6.1-1) of the rear cylinder (2, Figure 6.2-1).
14. Remove and replace the O-ring and Backup Ring (6 & 7, Figure 6.1-1) of the front cylinder (2, Figure 6.2-1).

4.5 RE-ASSEMBLY

Refer to Section 6.0 for parts lists. All numbers below refer to location numbers in Figure 6.2-1.

IMPORTANT: 1. Thoroughly clean all parts prior to reassembly.
2. Verify that O-rings and T-Seals are properly installed and fully seated, with backup rings in the proper orientation.

1. Install the piston assembly (3) into the housing (1) by gently threading the piston through the housing rod T-Seal. Then push the piston (3) to the full forward position. Lubricating the piston rod and threads with hydraulic oil will help prevent damage to the seal.
2. Install the front piston head (4) on the piston rod assembly (3) by gently threading the piston head over the end of the piston. Install the spring pin (19) if present. Lubricating the piston rod and threads with hydraulic oil will help prevent damage to the seal.
3. Reinstall the rear cylinder (2) to the housing (1) and torque until fully-seated and tight. Lubricating the cylinders and piston head with hydraulic oil will help prevent damage to the seals.
4. Connect a hand pump or similar to the male hydraulic coupler (17) of the puller hose leads. Pump clean, new hydraulic oil to retract the piston into the puller (thereby priming the rear cylinder with oil and limiting the ingress of air into the hydraulic system and reducing the effort needed to purge air later).
5. Install the mandrel adapter or chuck assembly.
6. Reinstall the front cylinder (5) to the housing (1) and torque until fully-seated and tight. Lubricating the cylinders and piston head with hydraulic oil will help prevent damage to the seals.
7. Install the end cap (6) and tighten the lockring (7).
8. Reconnect the puller and PowerPak per Section 3.1.
9. Place the puller on the ground with the PowerPak on a bench or other secure elevated position so that the puller is several feet below the pump. Orient the handle pointing up and the hydraulic lines uncoiled and as straight as possible to the PowerPak. Activate the system per Section 3.2 for 15-20 full-cycle repetitions, building full pressure with each cycle, to purge any remaining air from the hydraulic lines.
10. Disconnect and inspect puller assembly for signs of leaking hydraulic fluid.

SECTION 5.0: TROUBLESHOOTING

This section provides solutions to some basic trouble spots. If you cannot solve your operational problems with the information provided in this section, please contact your nearest FTI representative.

NOTE: Should difficulties originate in the PowerPak, consult the specific PowerPak Operations, Maintenance, and Repair Manual. Remember, always disconnect the PowerPak main power supply before performing any repair or maintenance.

PROBLEM	CAUSE	SOLUTION
1. Nothing happens when the trigger is pressed.	(a) The PowerPak is not on.	(a) Turn on the PowerPak.
	(b) The connection between the Puller and the PowerPak is not connected.	(b) Check the following connections: (1) All hydraulic line quick-disconnect couplers from Puller to PowerPak. Check at both ends of hose assembly. (2) Signal cable connecting the Puller to the PowerPak. Check at both ends of the hose assembly
		(c) The PowerPak is not in the correct operation mode.
	(d) Tool cycle count is zero.	(d) Replace tooling and reset counter.
	(e) Trigger is faulty.	(e) Replace trigger.
2. Puller retracts mandrel when trigger is held, but will not return to start position.	(a) One of the hydraulic hoses is not connected.	(a) Verify that all hydraulic lines are fully connected at both ends of the hose assembly.
	(b) The PowerPak is not in the correct operation mode.	(b) Check that SmartCx control box is set to RUN mode.

PROBLEM	CAUSE	SOLUTION
3. Actuator completes a cold expansion cycle, but hole was not expanded.	(a) Incorrect tooling selection. (b) Incorrect starting hole diameter.	(a) Verify correct mandrel tooling is installed. (b) Verify starting holes have been prepared correctly.
4. PowerPak will not build full hydraulic pressure.	(a) The PowerPak or hoses have a leak. (b) One or more of the hydraulic lines have not been securely connected. (c) Inadequate electrical supply.	(a) Inspect pump and hoses for evidence of hydraulic oil leak. Discontinue use immediately if a hydraulic oil leak is suspected and contact FTI's Technical Sales Department for assistance. (b) Check the following hose connections: (1) Main hydraulic lines and couplers connecting hose assembly to PowerPak. (2) Main hydraulic lines and couplers connecting hose assembly to Puller. (c) Check the main AC power source meets minimum voltage and current requirements (110 VAC @ 50 Hz single-phase, 14.5A).



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

SECTION 6.0: ILLUSTRATED PARTS BREAKDOWN

The following section provides FTI part numbers for individual parts on the Instrumented Little Brute puller. The first section identifies the parts necessary to perform basic maintenance of replacing hydraulic seals in the puller. The second section provides a sectional cut of the puller unit along with corresponding numbers (Item Number) associated with the parts list.

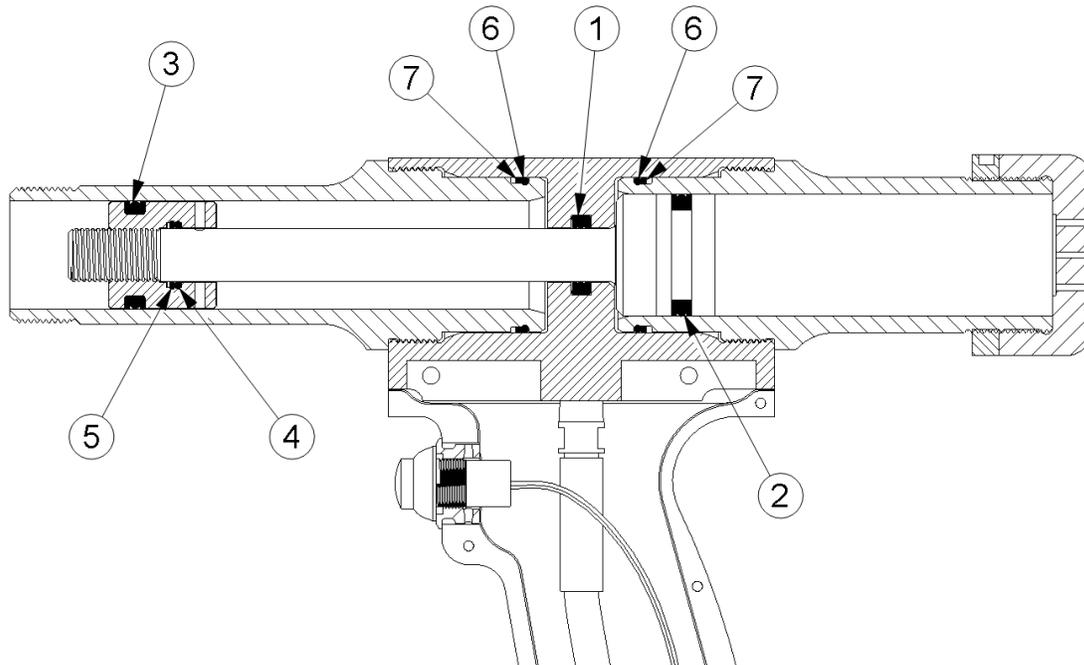
6.1 INSTRUMENTED LITTLE BRUTE SEAL KIT; PARTS LIST AND DIAGRAM

All Little Brute Puller Units will require periodic replacement of hydraulic seals as part of preventative, scheduled maintenance. There is a quantity of 6 seals that will need to be replaced. Refer to Section 4.4 for replacement procedure.

A diagram of the Instrumented Little Brute Puller Unit is shown in Figure 6.1-1, with parts for the Seal Kit corresponding to Table 6.1-1.

**Table 6.1-1
Instrumented Little Brute Seal Kit (SLB-SK)**

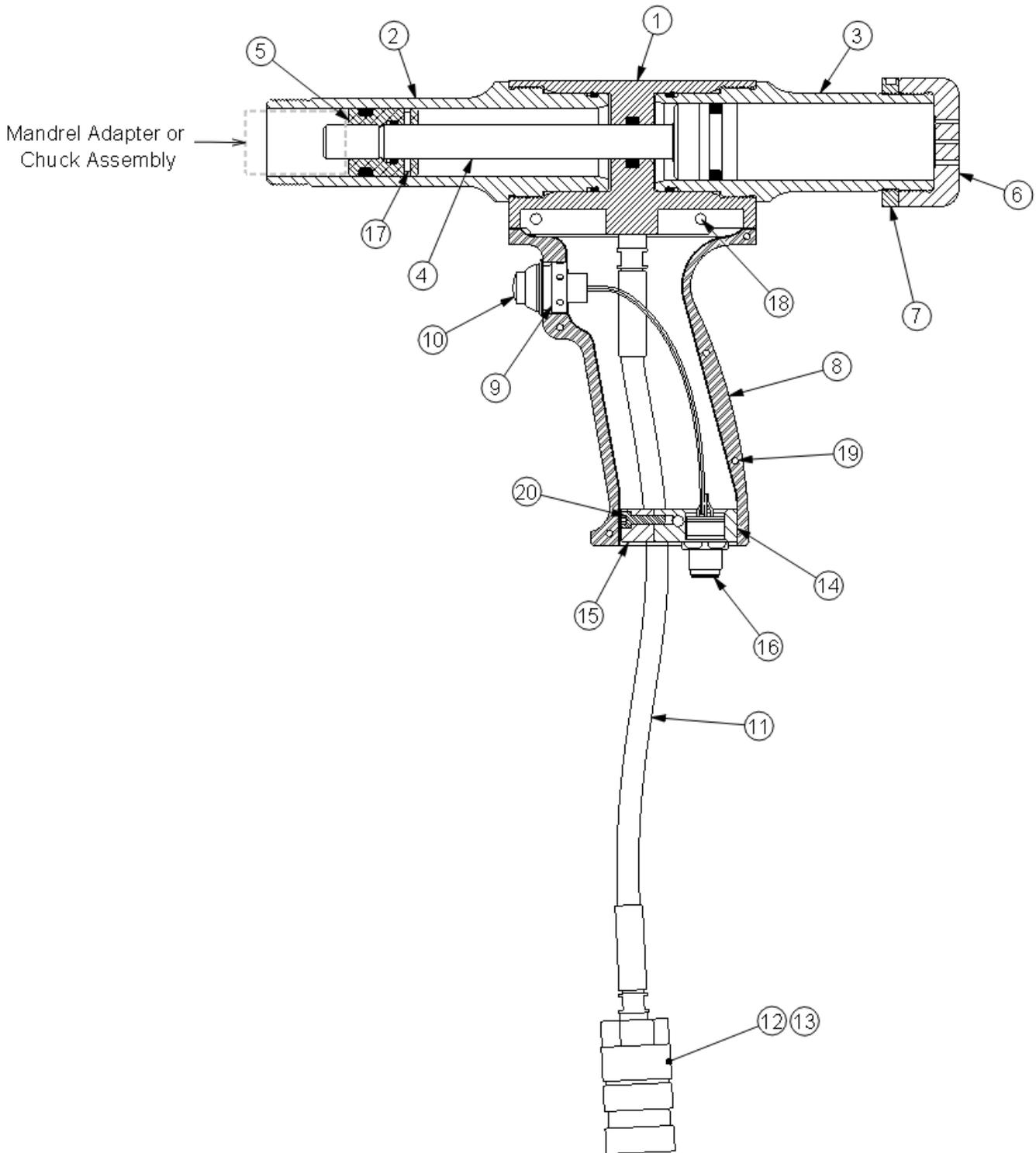
Piece Number	Description	Part Number	Quantity
1	T-Seal, Rod	1199-476	1
2	T-Seal, Piston	1199-477	1
3	T-Seal, Piston	1199-478	1
4	O-Ring	1046-056	1
5	Backup Ring	1046-154	1
6	O-Ring	1046-107	2
7	Backup Ring	1046-155	2



**Figure 6.1-1
Diagram of Instrumented Little Brute Assembly Seal Kit (SLB-SK)**

6.2 INSTRUMENTED LITTLE BRUTE PULLER ASSEMBLY; PARTS LIST AND DIAGRAM

A diagram of the Instrumented Little Brute Puller Unit is shown in Figure 6.2-1, which corresponds to the parts list in Table 6.2-1 on the following page.



**Figure 6.2-1
Instrumented Little Brute Assembly**

The following parts list, Table 6.2-1, corresponds to the drawing in Figure 6.2-1 on the previous page.

**Table 6.2-1
Instrumented Little Brute Parts List**

Reference #	Description	Puller Unit	Part Number
1	Center Housing	All	60017-001
2	Front Cylinder	SLB-20	60018-001
3	Rear Cylinder	SLB-20	60019-001
4	Piston Rod Assembly	SLB-20	60022-001 ⁽¹⁾
5	Front Piston Head	All	60020-001 ⁽²⁾
6	End Cap	All	2136-001
7	Lock Ring	All	2120-003
8	Handle Assembly	All	6593-001
9	Trigger Bushing	All	6610-001
10	Trigger Button	All	1199-479
11	Hydraulic Lines (qty. 2)	All	1199-336
12	Hydraulic Coupler (Male)	All	1199-332
13	Hydraulic Coupler (Female)	All	1199-333
14	Handle Bulkhead	All	6607-002
15	Handle Bulkhead Clamp	All	6606-001
16	M12 Cable Connector	All	1199-480
17	Spring Pin	All	1187-093 ⁽²⁾
18	Flat Head Screw	All	1029-018
19	Dowel Pin (qty. 5)	All	1199-342
20	Socket Head Cap Screw	All	1029-018

* Part numbers dependent on applicable puller unit (-10, -20, -25, etc.).

(1) Piston Rod Assembly includes piston rod, piston wear ring, front piston head, associated seals and spring pin.

(2) Contained as part of the Piston Rod Assembly, part number 60022-001.

**Table 6.2-2
Hose Assembly
(Not Shown in Figure 6.2-1)**

Model Number	Part Number	Description
SPHA-15-1	6959-001	Hydraulic Hose Assembly – 15 foot



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E.C. DECLARATION OF CONFORMITY

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The undersigned declares that the machinery described:

Type: **SLB-20 / SMP-100**

Serial Number:

conforms to the following directives:

Council Directive 2006/42/EC (the Machinery Directive)

EN60204-1:2010 "Safety of Machinery-Electrical Equipment of Machines, Part 1, General Requirements"

EN/ISO 4413 "Hydraulic Fluid Power – General Rules and Safety Requirements for Systems and their Components"

EMC Directive 2004/108EC

EN 61326-1, Class A Electrical Equipment for Measurement, Control and Laboratory Use. EMC Requirements.

EN61000-4-2 Immunity

EN61000-4-3 Immunity

EN61000-4-4 Immunity

EN61000-4-5 Immunity

EN61000-4-6 Immunity

EN61000-4-8 Immunity

EN61000-4-11 Immunity

CISPR 16-1 Emissions

CISPR 16-2 Emissions

and complies with the relevant health and safety requirements.

Jeff Sageman
Logistics Manager

6/7/2019

Date