
FTI OPERATIONS, MAINTENANCE, AND REPAIR MANUAL

Big Brute Puller Unit

**Part #2720-008, Log #01206
Revision M**

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CE

Original Instruction

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.

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SECTION 1.0: INTRODUCTION

This instruction manual contains information on the operation and maintenance of the Big Brute 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 the manual for future reference. If requested, FTI will provide this manual in the language of the end-user.

1.1 ABOUT THE BIG BRUTE PULLER UNIT

The Big Brute hydraulic puller unit is a powerful, heavy-duty tool specifically designed for use with Fatigue Technology Inc. (FTI) patented Split Sleeve Cold Expansion™ (SsCx™) process. The Big Brute is designed to pull a mandrel through a hole with the pre-lubricated stainless steel split sleeves used in this process. The puller is also compatible with other FTI processes including ForceMate®, FleXmate®, etc.

Big Brute (BB) pullers have a maximum pull force of 38,000 pounds (169,032N) at 10,000 psi (689.5 bar) pump pressure. The Big Brute is available in sizes (models) for cold expanding holes up to 2-1/2 inch (63.5 mm) in diameter and 10 inches (254 mm) deep in aluminum, and 1-1/4 inch (31.7 mm) in diameter and 10 inches (254 mm) deep in steel and titanium. Larger diameters may be evaluated on a case by case basis, contact FTI Sales for application assistance.

The Big Brute is available in various models to accommodate multiple material stack-ups, hose options, and mandrel adapters:

- BB-xx where ‘-xx’ relates to material stack (see Table 1.3-1).
- BB-xx-V where ‘-V’ represents high visibility hoses.
- BB-xx-Hxx where ‘-Hxx’ represents a unique hose length other than the standard 10 feet.
- BB-xx comes with a BB-CA-20 chuck.
- BB-xxA comes with three threaded adapters.
- BB-xxB comes with a BB-CA-16 chuck.
- BB-xxC has a special 7/8 inch piston thread.
- BB-RR and BB-RT, which are specially designed for the railroad industry and are shorter in length.

The Big Brute has a fail-safe air control system that causes the puller retraction cycle to be interrupted and return the puller unit to its original position whenever the operator releases finger pressure on the trigger or in the event of an air hose failure. All puller units operate in conjunction with either of FTI’s PowerPak air-hydraulic power units, the standard FT-200D or FT-200C (and are compatible with older units FT-200B, IW100MF, and IW10MF). The Big Brute has proven to be very reliable and requires minimal maintenance.

Use the puller unit only with FTI tooling and accessories. Refer to the FTI Tooling Catalog for more information or contact the FTI Sales department for assistance.

1.2 GENERAL SPECIFICATIONS

Hydraulic Fluid Requirements	U.S. MIL-Spec #5606
Stackup Capacity (Grip)	Material up to 10 inches (254 mm)
Actuation / Operation.....	Pneumatic / Hydraulic
Compatible PowerPaks	FT-200D or FT-200C
Replacement Seal Kit.....	BB Seal Kit (BB-SK)
Emission sound pressure level at the work station (according to EN ISO 11201:1995) on load	83.1 dB(A)
Weighted hand-arm vibration at the handle (according to EN 28662-1:1993) on load	<2.5 m.S ²

1.3 GENERAL DESCRIPTION

- Air actuated, hydraulic puller capable of cold expanding up to 2-1/2 inch (63.5 mm) in diameter in aluminum and mild steel, and up to 1-1/4 inch (31.7 mm) diameter in titanium and high-strength steel.
- Maximum pull force of 38,000 pounds (169,032 N) at 10,000 psi (689.5 bar) hydraulic pressure.
- Includes a hose assembly, spanner wrench, and open-end wrench. Threaded adapter(s), or chuck(s) are also included depending on model (see Table 1.3-1). All models come packaged in a tool case with foam, except as noted.
- Available in various lengths depending on the model, up to 10.0 inches (254 mm) material stackup capacity.
- Hydraulic pressure provided by the FT-200D or FT-200C PowerPak.



Figure 1.3-1
Big Brute Puller Unit Parts

**Table 1.3-1
Big Brute Specifications**

Model Number	Maximum Stackup	Length	Mandrel Attachment	Approximate Weight (Excluding Hoses)	Stroke	Hose
BB-10	1.0 inch (25.4 mm)	17.8 inch (452.2 mm)	BB-CA-20 Chuck	25.5 lbs (11.6 kg)	4.21 inch (106.9 mm)	Standard 10 foot (3.0 m)
BB-10A	1.0 inch (25.4 mm)	17.8 inch (452.2 mm)	7/8-14 Thread or 1-14 Thread	23.5 lbs (10.7 kg)	4.21 inch (106.9 mm)	Standard 10 foot (3.0 m)
BB-10B	1.0 inch (25.4 mm)	17.8 inch (452.2 mm)	BB-CA-16 Chuck	25.5 lbs (11.6 kg)	4.21 inch (106.9 mm)	Standard 10 foot (3.0 m)
BB-10A-H30	1.0 inch (25.4 mm)	17.8 inch (452.2 mm)	7/8-14 Thread or 1-14 Thread	23.5 lbs (10.7 kg)	4.21 inch (106.9 mm)	Standard 30 foot (9.1 m)
BB-10-V	1.0 inch (25.4 mm)	17.8 inch (452.2 mm)	BB-CA-20 Chuck	25.5 lbs (11.6 kg)	4.21 inch (106.9 mm)	High-Vis 10 foot (3.0 m)
BB-30 ¹	3.0 inch (76.2 mm)	21.8 inch (553.7 mm)	BB-CA-20 Chuck	28.7 lbs (13.0 kg)	6.21 inch (157.7 mm)	Standard 10 foot (3.0 m)
BB-30A	3.0 inch (76.2 mm)	21.8 inch (553.7 mm)	7/8-14 Thread or 1-14 Thread	26.7 lbs (12.1 kg)	6.21 inch (157.7 mm)	Standard 10 foot (3.0 m)
BB-30B	3.0 inch (76.2 mm)	21.8 inch (553.7 mm)	BB-CA-16 Chuck	28.7 lbs (13.0 kg)	6.21 inch (157.7 mm)	Standard 10 foot (3.0 m)
BB-30-H25	3.0 inch (76.2 mm)	21.8 inch (553.7 mm)	BB-CA-20 Chuck	28.7 lbs (13.0 kg)	6.21 inch (157.7 mm)	Standard 25 foot (7.6 m)
BB-30A-H25	3.0 inch (76.2 mm)	21.8 inch (553.7 mm)	7/8-14 Thread or 1-14 Thread	26.7 lbs (12.1 kg)	6.21 inch (157.7 mm)	Standard 25 foot (7.6 m)
BB-30-V	3.0 inch (76.2 mm)	21.8 inch (553.7 mm)	BB-CA-20 Chuck	28.7 lbs (13.0 kg)	6.21 inch (157.7 mm)	High-Vis 10 foot (3.0 m)
BB-30C-H20 ²	3.0 inch (76.2 mm)	21.8 inch (553.7 mm)	7/8-14 Piston Thread	25.0 lbs (11.4 kg)	6.21 inch (157.7 mm)	Standard 20 foot (6.0 m)
BB-30A-V	3.0 inch (76.2 mm)	21.8 inch (553.7 mm)	7/8-14 Thread or 1-14 Thread	26.7 lbs (12.1 kg)	6.21 inch (157.7 mm)	High-Vis 10 foot (3.0 m)
BB-30-737	3.0 inch (76.2 mm)	23.0 inch (584.2 mm)	BB-CA-20 Chuck	28.7 lbs (13.0 kg)	6.21 inch (157.7 mm)	Standard 10 foot (3.0 m)
BB-70	7.0 inch (177.8 mm)	27.6 inch (701 mm)	BB-CA-20 Chuck	33.3 lbs (15.1 kg)	9.09 inch (230.9 mm)	Standard 10 foot (3.0 m)
BB-70A	7.0 inch (177.8 mm)	27.6 inch (701 mm)	7/8-14 Thread or 1-14 Thread	31.3 lbs (14.2 kg)	9.09 inch (230.9 mm)	Standard 10 foot (3.0 m)
BB-70B	7.0 inch (177.8 mm)	27.6 inch (701 mm)	BB-CA-16 Chuck	31.3 lbs (14.2 kg)	9.09 inch (230.9 mm)	Standard 10 foot (3.0 m)
BB-70-V	7.0 inch (177.8 mm)	27.6 inch (701 mm)	BB-CA-20 Chuck	33.3 lbs (15.1 kg)	9.09 inch (230.9 mm)	High-Vis 10 foot (3.0 m)
BB-70A-V	7.0 inch (177.8 mm)	27.6 inch (701.0 mm)	7/8-14 Thread or 1-14 Thread	31.3 lbs (14.2 kg)	9.09 inch (230.9 mm)	High-Vis 10 foot (3.0 m)
BB-100A	10.0 inch (254 mm)	35.8 inch (909.3 mm)	7/8-14 Thread or 1-14 Thread	37.8 lbs (17.2 kg)	13.21 inch (335.5 mm)	Standard 10 foot (3.0 m)
BB-100A-V	10.0 inch (254 mm)	35.8 inch (909.3 mm)	7/8-14 Thread or 1-14 Thread	37.8 lbs (17.2 kg)	13.21 inch (335.5 mm)	Standard 10 foot (3.0 m)
BB-RR	0.90 inch (22.9 mm)	15.4 inch (391.1 mm)	BB-CA-20 Chuck	23.9 lbs (10.9 kg)	3.34 inch (84.8 mm)	Standard 10 foot (3.0 m)
BB-RT ³	0.90 inch (22.9 mm)	15.9 inch (403.9 mm)	1-14 Piston Thread	20.8 lbs (9.5 kg)	3.34 inch (84.8 mm)	Standard 10 foot (3.0 m)

¹ BB-30 is the standard model.

² The BB-30C-H20 is a special model that has a smaller 7/8-14 piston thread.

³ BB-RT is intended for RailTec applications.

1.4 TOOLING SELECTION

Nosecap Selection: The Big Brute Puller Unit is compatible with standard nose caps or extension nose caps (Refer to Section 2.3 of the FTI Tooling Catalog for more information).

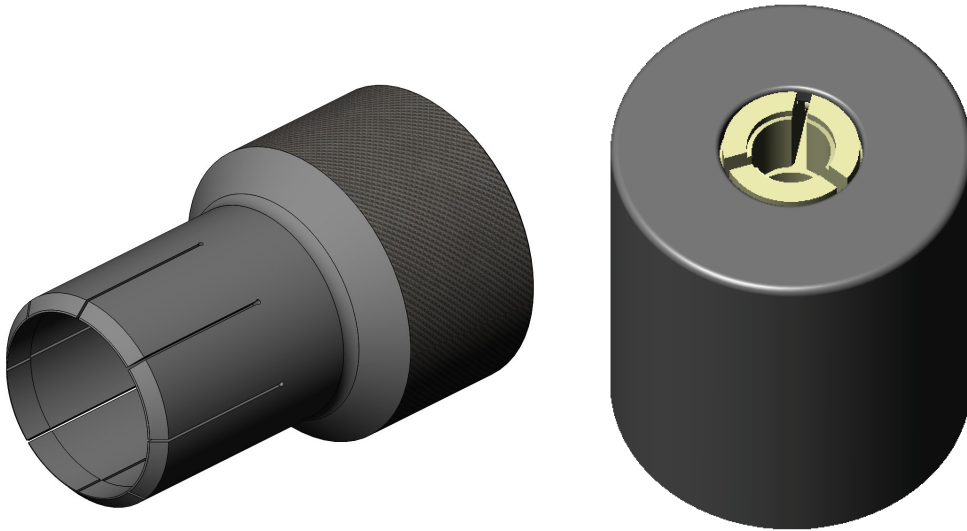


Figure 1.4-1
Big Brute Nosecaps

Mandrel Selection: Models with threaded adapters are directly compatible with standard Type 4 and Type 9 threaded mandrels. Models equipped with chucks are used with tang mandrels (Refer to Section 2.3 of the FTI Tooling Catalog for more information).

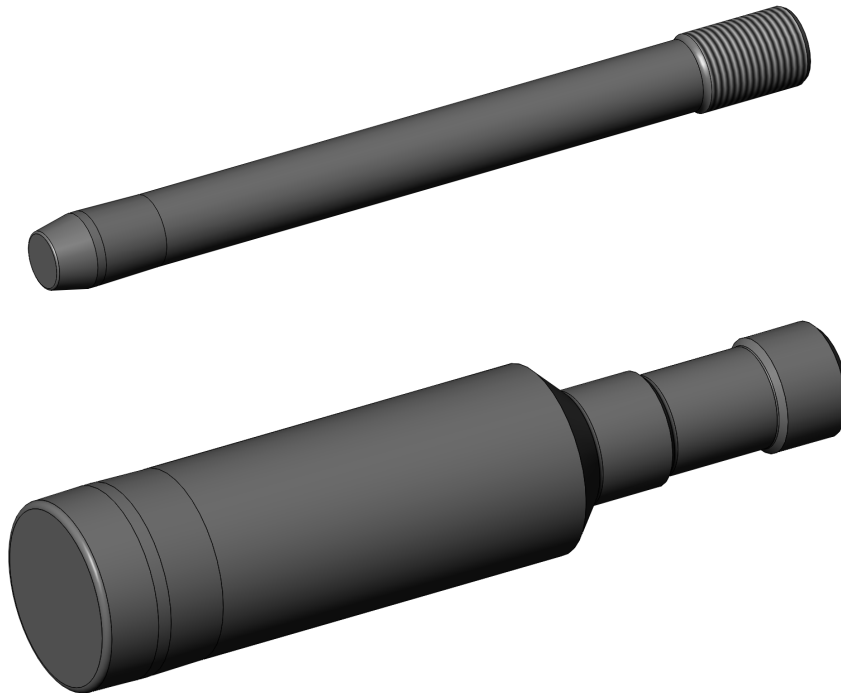


Figure 1.4-2
Big Brute Mandrels

SECTION 2.0: 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 personal safety; however, the following general safety precautions should be observed.

1. Operators must read this manual in its entirety before using the Big Brute. Wear eye and hearing protection when operating the puller unit. Do not strike any part of the tool with a hammer or equivalent object. Keep hands and fingers clear of the nosecap, as they could be crushed between the nosecap and the workpiece. Safety labels on the tool act as a reminder to these instructions and are shown in Figure 2.0-1.

Read manual before using



Always wear eye protection



Always wear hearing protection




Do not strike




Keep fingers away from nosecap



**Figure 2.0-1
Safety Labels**

2.  This puller unit must be used with an FT-200D or FT-200C PowerPak hydraulic pump. This manual does not cover the use and safety precautions of these accessories. Refer to the PowerPak operator manual for the specific pump being used.

3.  The weight of this unit may require a suspension system per the end user's workplace lifting and weight standards. A risk analysis for the suspension is necessary to maintain compliance to end user's standards or directives. All risks involved with the suspension of the Big Brute are the responsibility of the end user. User instructions and training regarding the suspension system are the responsibility of the end user.

The BB-LIFT accessory is available from FTI to provide a lifting bracket for the puller. See Figure 2.0-2. For more information about the BB-LIFT, refer to the appropriate manual (2720-133).

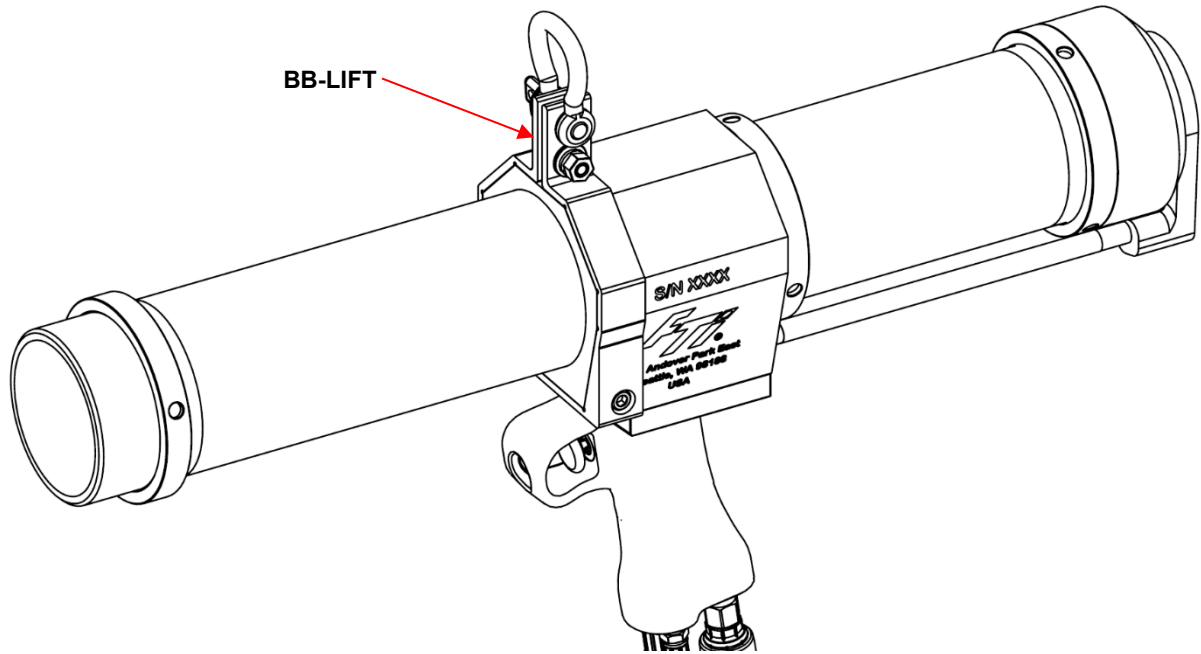


Figure 2.0-2
Optional BB-LIFT Accessory

4. ⚠️ Disconnect the air supply from the PowerPak when:
 - Maintenance is to be performed.
 - Tooling (mandrels, nosecaps, etc.) is to be installed.
 - Hydraulic hose is disconnected.
 - PowerPak is not in use.

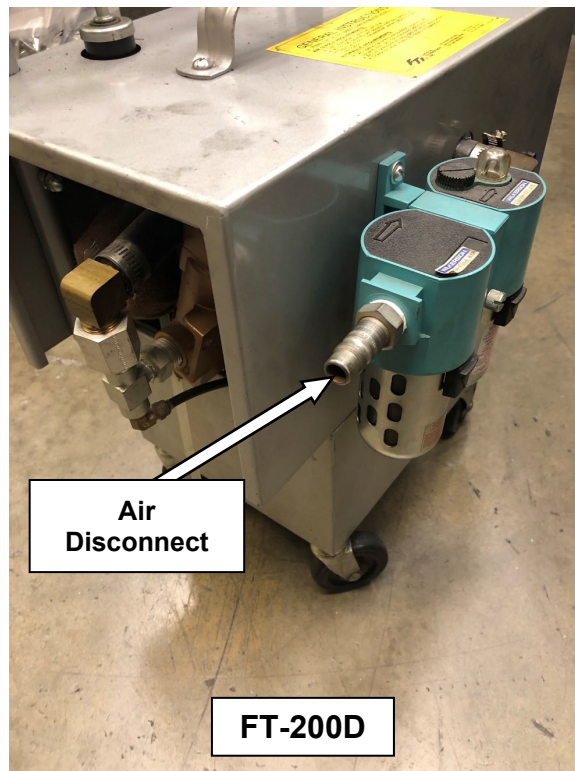


Figure 2.0-3
Location of Air Disconnect

5. ⚠️ In the event of a ruptured or leaking hydraulic hose, IMMEDIATELY RELEASE THE TRIGGER AND DISCONNECT THE AIR LINE from the PowerPak at the air coupler (see Figure 2.0-3). **Never use your hands** to grasp a leaking hose under pressure. The force of escaping hydraulic fluid could cause serious injury. If hydraulic oil should penetrate the skin, medical attention must be sought immediately.
6. ⚠️ DO NOT operate the puller or connect the hoses while any component is disassembled, missing, or loose. Injury may occur.
7. ⚠️ Before operating the pump, ensure all hose couplings are tightened securely by hand. Do not overtighten the connections. Couplings need only be tightened securely and leak-free. See Figure 3.1-2.
8. ⚠️ DO NOT use in potentially explosive atmospheres.

⚠️ 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.

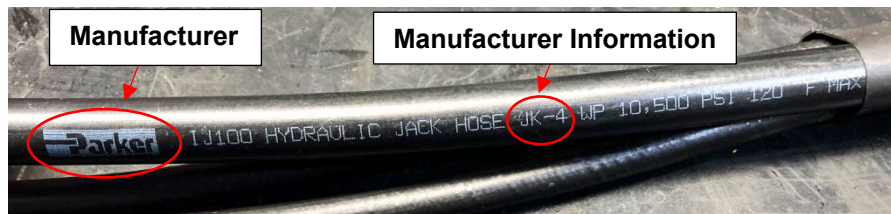
2.1 HYDRAULIC HOSE SAFETY

1. ⚠ Inspect hydraulic hose for signs of wear (cuts, abrasions, or kinks) to the outer shell materials before each use. Pump clean oil through the entire length. Pressurize the hose 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 the hydraulic hose while it is under pressure, without first disconnecting air supply from pump.
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. Inspect the hose and fittings for wear or damage before use that could cause premature failure of the hose or fittings and possibly result in injury. Damaged hoses must be replaced immediately.
5. ⚠ **DO NOT** use the hose to move attached equipment.
6. ⚠ **DO NOT** remove strain reliever from hoses. Hose strain relievers must be placed around hose fittings during use. Hoses with damaged strain relievers must be replaced immediately.



**Figure 2.1-1
Strain Reliever**

7. ⚠ Hose material and coupler seals must be compatible with hydraulic fluid that meets the requirements of U.S. MIL-SPEC #5606.
8. ⚠ Hoses must not 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. To find specific chemical compatibility information, first look at the hose to find the manufacturer and type. The hose manufacturer will be able to provide a chemical compatibility chart, typically on their website. For example, the hose below is from Parker and is type JK; the chart can be found here: <https://www.mfcp.com/technical-info/chemical-compatibility-rubber-hose>.



**Figure 2.1-2
Example Hydraulic Hose Identification**

9. ⚠ Hoses can be a trip hazard. Keep hoses clear of all walkways and footpaths.
10. If hoses require replacement, contact the FTI Sales Department.

SECTION 3.0: PULLER UNIT OPERATING INSTRUCTIONS

Become familiar with these instructions before operating the puller.

3.1 PULLER UNIT SETUP PROCEDURE

Refer to Section 6.0 (Illustrated Parts Breakdown) for parts identification.

1. ⚠️ Ensure that the PowerPak is NOT connected to the air supply. If needed, disconnect the PowerPak from the air supply, following the appropriate operator manual for the pump model being used.
2. Uncoil the hose assembly of the puller unit, and inspect all threads, couplings, and hoses for damage and degradation.
3. If the chuck assembly/adaptor (see Figure 6.1-1, Item Number 25) needs to change, remove the front barrel (Item Number 3) by first removing the screw in the side of the housing (Item Number 24). Thread on the appropriate adaptor, then reattach the barrel.
4. Identify the connection ports on the FTI PowerPak where the puller unit hoses will go. See Figure 3.1-1 below.

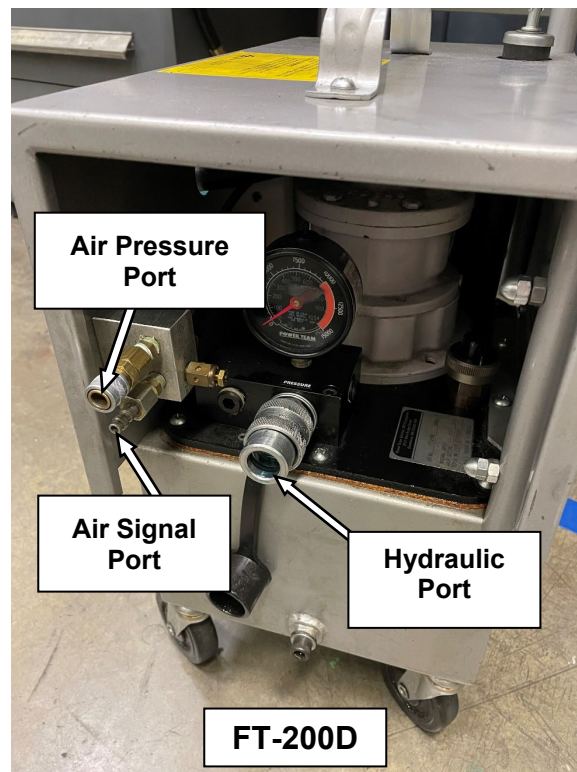


Figure 3.1-1
PowerPak Connection Ports

5. Remove protective caps 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. Make sure to thread couplers completely together, with no gap visible. See Figure 3.1-2 below.

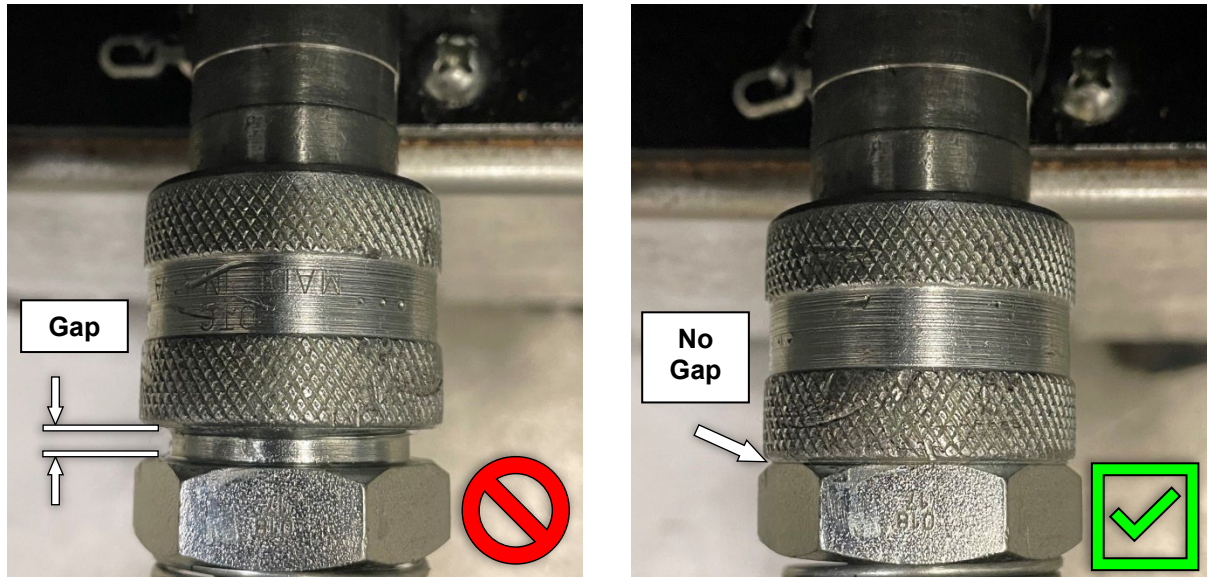


Figure 3.1-2
Hydraulic Coupler Connection

6. Connect the male/female air quick-disconnects from the puller unit to the FTI PowerPak.
7. Install the appropriate mandrel into the threaded adapter (hand tight) or chuck.
8. Install the appropriate nose cap assembly over the mandrel and thread onto the barrel (hand tight).
9. Connect the PowerPak to the air supply, following the appropriate operator manual for the pump model being used.

3.2 ACTUATION OF THE PULLER

1. The puller unit can be activated only when connected to an FTI PowerPak.
2. Activate the puller unit by depressing the trigger on the handle. Hydraulic pressure is transmitted through the hose to the cylinder of the puller unit which then retracts the hydraulic piston.
3. Release the trigger once the mandrel clears the workpiece. This changes pressure at the pilot valve to stop the pull cycle and return the puller unit to its original position.
4. If the puller unit fails to operate as detailed above, refer to Section 5.0 (Troubleshooting).

SECTION 4.0: MAINTENANCE

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

⚠ WARNING
Disconnect the PowerPak from the air supply before performing any maintenance or repair procedures.

4.1 GENERAL CLEANING

1. Keep the outer surfaces of the puller unit free of dirt and grime. If hydraulic hoses require cleaning, refer to Section 2.1 for important safety considerations.
2. Keep all hose connections free of dirt and grime. Install protective caps whenever a hose connection is disengaged.

4.2 PREVENTATIVE MAINTENANCE

1. Whenever the puller is to be stored for longer than 2 weeks, maintain a thin coat of 10-weight oil on the outside of black oxide surfaces to prevent rusting.

4.3 LUBRICATION

1. There is no internal lubrication requirement for the puller unit.

4.4 INSPECTION

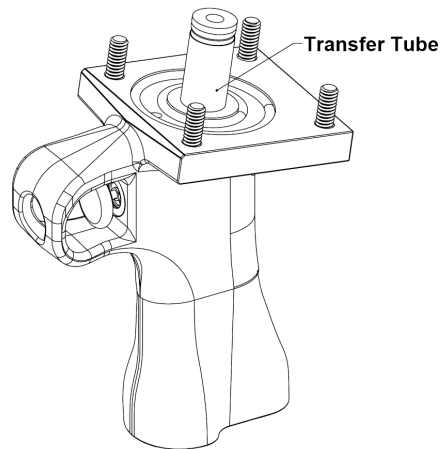
1. Inspect the puller for cracks, leaks, or other damage before each use. Repair and replace immediately.
2. Inspect safety labels (refer to Section 2.0 for required labels) before each use. If any are missing or illegible, replace immediately.

4.5 ASSEMBLY AND DISASSEMBLY

The puller unit may need to be disassembled for replacement of seals. Refer to the Illustrated Parts Breakdown, Section 6.1 for item numbers.

4.5.1 Disassembly

1. Unthread and remove any tooling accessories, such as nose caps and mandrels.
2. Remove the screw (24) using a 3/16" hex driver and pull out the barrel (3).
3. Unthread the chuck or threaded adapter from the piston (25).
4. Remove the two screws at the back of the puller (23) using a 3/16" hex tool. The air adapter (9) can now be removed along with the air tube (10). Discard the three o-rings.
5. Loosen the rear lock ring (11) using the pin spanner wrench (38). Unthread and remove the outer end cap (6) and inner end cap (5). Discard the o-ring.
6. Remove the handle assembly (7) by removing the four socket-head screws, using a 3/16" hex driver. Hydraulic oil will spill out of the assembly, so be prepared with a suitable container.
7. Remove the transfer tube from the handle assembly. Remove and discard the o-rings and backup rings on both ends of the tube. Also remove the two large outer o-rings on the face of the handle.



**Figure 4.5.1-1
Transfer Tube**

8. Loosen the lockring (11) using the pin spanner wrench (38). Unthread the cylinder (2) using a strap wrench.
9. Loosen the set screw (22) using a 3/32" hex driver. Unthread and remove the lock nut (13) as well as the washer (12).
10. Pull the piston assembly (4) out of the back of the puller. Remove and discard the piston seal, taking care not to scratch the brass piston head.
11. Remove the brass sleeve (8). Discard the o-rings, backup rings, and wiper.
12. Discard all used seals before reassembly.

4.5.2 Reassembly

Important: (1) Thoroughly clean all parts prior to reassembly.
(2) Install o-rings toward hydraulic pressure, with backup rings “behind.”
Reference Figure 4.6-1.

1. Replace the 1046-023 o-ring and 1046-024 backup ring on the outside of the brass sleeve (8). Next, replace the 1046-025 inner o-ring and 1046-026 inner backup ring.
2. Replace the 1046-037 wiper and drop the brass sleeve assembly (8) into the housing (1).
3. Replace the 1046-059 and 1046-058 o-rings on the top of the handle (7). Replace the 1046-028 o-rings and 1046-027 backup rings on the transfer tube, then install into the handle.
4. Looking through the hole in the bottom of the housing (1), turn the sleeve (8) until the hole lines up.
5. Install the handle assembly (7) using 4 screws and tighten with a 3/16” hex driver.
6. Replace the 1046-029 piston seal. Install the piston assembly (4) by rotating it clockwise through the sleeve (8) to avoid damaging the seals.
7. Thread the cylinder (2) into the housing (1) and tighten using a strap wrench. The lock ring (11) should still be loose at this point.
8. Replace the 1046-035 o-ring in the inner endcap (5). Thread the outer endcap (6) onto the cylinder (2), capturing the inner endcap between them. Do not tighten yet.
9. Replace the 1046-036 o-rings on both ends of the air tube (10). Insert one end into the housing (1).
10. Replace the 1046-038 o-ring in the air adapter (9). Mount it with two screws (23) using a 3/16” hex driver.
11. Visually align the air tube (10) with the cylinder (2), rotating the air adapter (9) as needed. Tighten the outer end cap (6) using the pin spanner wrench (38).
12. Tighten both lock rings (11) using the pin spanner wrench (38).
13. Slide the washer (12) over the end of the piston. Thread the lock nut (13) on all the way, followed by the chuck or threaded adapter (25). Tighten the lock nut against the chuck or threaded adapter, then secure by tightening the set screw (22) with a 3/32” hex driver.
14. Insert the barrel (3) and secure with screw (24) using a 3/16” hex driver.
15. The puller is now ready for use. Select the appropriate mandrel/nosecap combination and install.

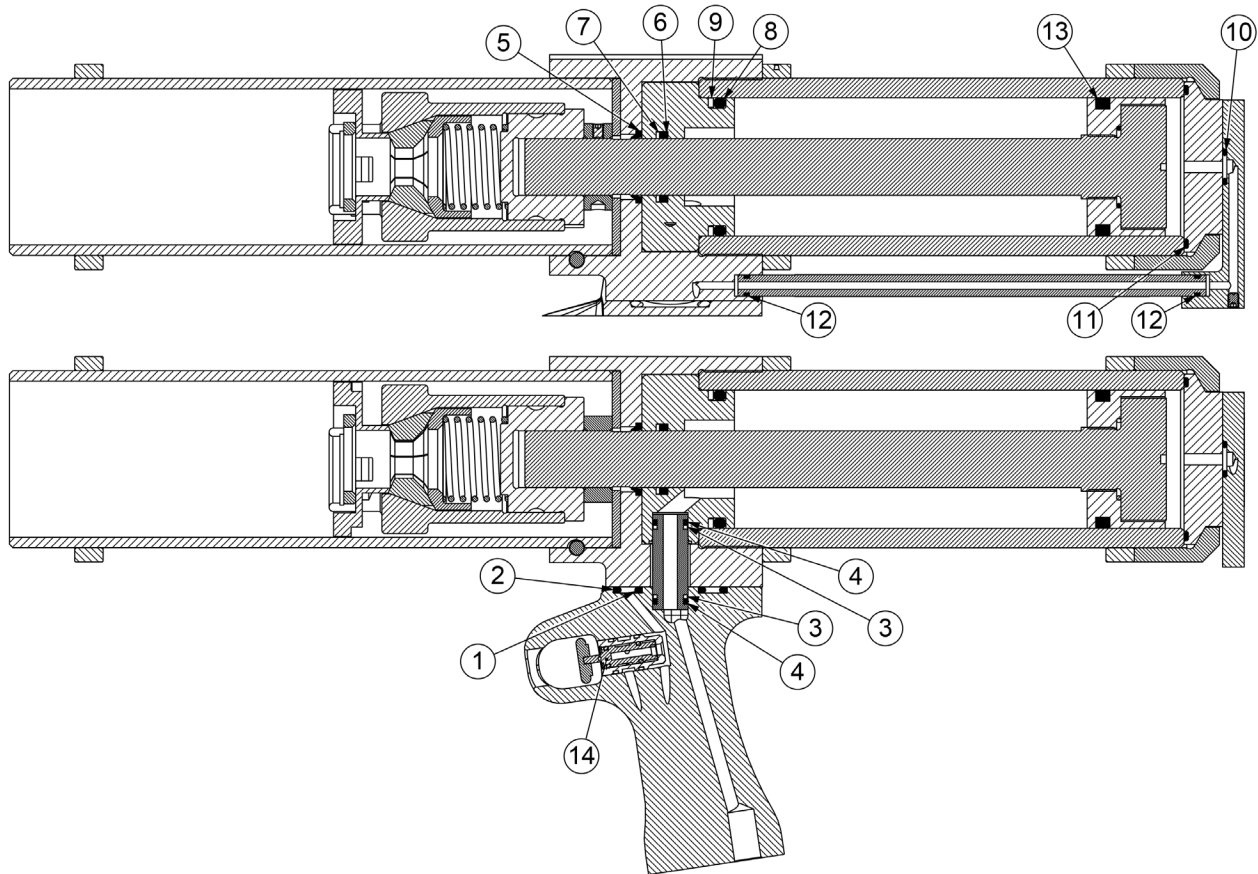
4.6 **BIG BRUTE SEAL KIT (BB-SK)**

This kit is used to replace seals in all Big Brute models. It is also included as part of the Big Brute Rework Kit (see Appendix A.1). Table 4.6-1 is a parts list for the Big Brute Seal Kit.

**Table 4.6-1
Big Brute Seal Kit (BB-SK)**

Item Number	Quantity	Part Number	Description
N/A*	1	2040-001	Seal, Trigger
1	1	1046-059	O-Ring MS28775-214
2	1	1046-058	O-Ring MS28775-224
3	2	1046-028	Backup Ring MS28782-9
4	2	1046-027	O-Ring MS28775-111
5	1	1046-037	Wiper 1490N15
6	1	1046-025	O-Ring MS28775-214
7	1	1046-026	Backup Ring MS28782-19
8	1	1046-023	O-Ring MS28775-329
9	1	1046-024	Backup Ring MS28782-32
10	1	1046-038	O-Ring N0552-90 2-111
11	1	1046-035	O-Ring MS28775-147
12	2	1046-036	O-Ring MS28775-010
13	1	1046-029	Piston Seal CP-329
14	1	1187-622	Valve, Cartridge Trigger

*Used with legacy triggers (See Table A.2-1, Item 6)



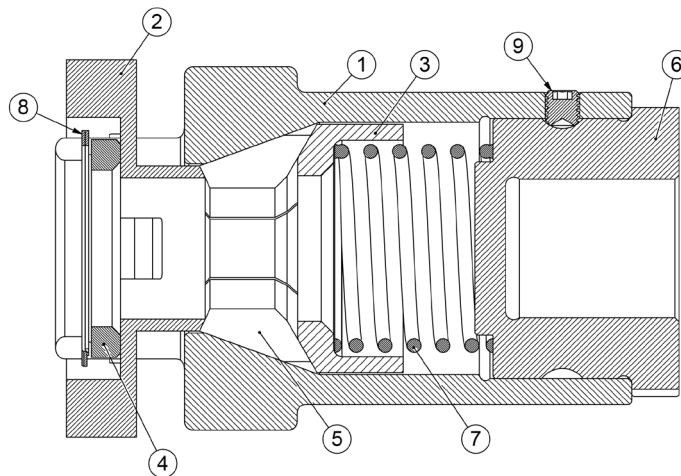
**Figure 4.6-1
Big Brute Seal Locations**

4.7 CHUCK ASSEMBLY

The chuck assembly may need to be taken apart for replacement of jaws. See Figure 4.7-1 below.

**Table 4.7-1
Big Brute Chuck Components**

Item Number	Part Number	Description
1	2315-001	Casing
2	2306-001	Jaw Release </td
3	2307-001	Jaw Follower
4	2308-001	Retaining Ring
5 (BB-CA-16)	2309-001	Jaw Set
5 (BB-CA-20)	2309-002	Jaw Set
5 (BB-CA-11)	2309-003	Jaw Set
6	2314-001	Chuck Adapter
7	1005-005	Spring
8	1045-115	Internal Retaining Ring
9	1045-109	Set Screw, 1/4-28 x 1/4"
10 (Not Shown)	1045-117	2" Open End Wrench
11 (Not Shown)	1045-118	2-1/8" Open End Wrench



**Figure 4.7-1
Chuck Assembly**

1. Loosen the set screw (9) and unscrew the chuck adapter (6) from the casing (1). Take care to not lose the spring (7), jaws (5), or follower (3) out of the end of the unit.
2. Remove the spring (7), follower (3), and jaws (5).
3. Clean the casing (1), release (4), and retainer (8) as a unit, along with the other loose parts. Any solvent that leaves little residue is acceptable.
4. Replace any damaged jaws. Place the chuck assembly in a vertical position with the nose down. In this position, align the jaws around the release (2).
5. Add the follower (3), followed by the spring (7) and adapter (6). Lastly, install the set screw (9) with Loctite 242.

Note: Do not use grease or oil in reassembling the unit. Debris tends to accumulate, preventing proper operation.

SECTION 5.0: 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, contact the nearest FTI representative.

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

5.1 POWERPAK WILL NOT BUILD FULL HYDRAULIC PRESSURE

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
POWERPAK WILL NOT BUILD FULL HYDRAULIC PRESSURE	One or more of the key air or hydraulic lines has not been securely connected.	Check the following hose connections, See Figures 2.0-2, 3.1-1 and 3.1-2: <ol style="list-style-type: none">1. Male 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 that 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 the FTI Sales Department.

5.2 PULLER RETRACTS ON TRIGGER ACTUATION, BUT WILL NOT RETURN TO START POSITION

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
PULLER RETRACTS ON TRIGGER ACTUATION, BUT WILL NOT RETURN TO START POSITION	The puller unit requires hydraulic oil to lubricate the piston and cylinder.	Disconnect the hydraulic line and install the CT-604 Pressure Relief Tool onto the end of the hose. Disconnect the air signal line (see Figure 3.1-1) but leave the air pressure line connected. Leave the pump connected to the air supply. Remove the back end cap on the Big Brute. Use a screwdriver and the screwdriver slot in the piston to push the piston rod all the way forward. This will cause hydraulic fluid to pour out of the line, so be prepared with a suitable container. Reinstall the back end cap. Once forward, cycle the trigger several times – DO NOT bottom it out – to introduce hydraulic fluid into the cylinder (20+ short cycles).
As above, AND the hydraulic hose is difficult to bend or coil (indicating unrelieved pressure built up in the hose).	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). See Figure 3.1-2.	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:
<ol style="list-style-type: none"> 1. Disconnect the main air supply. 2. Disconnect the hydraulic hose from the PowerPak. 3. Connect Enerpac CT-604 to free end of the hose and bleed off hydraulic oil to relieve the built-up pressure. Figure 5.2-2 shows the Enerpac CT-604 Pressure Relief Tool. 4. Once pressure is relieved, reconnect the hydraulic hose to the PowerPak. 5. Re-attach air lines to get the puller unit to return to the forward position.



**Figure 5.2-2
Enerpac CT-604 Pressure Relief Tool
(FTI Part Number 1187-770)**

5.3 MANDREL STICKS IN HOLE WHEN PULLER IS ACTIVATED

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
MANDREL STICKS IN HOLE WHEN PULLER IS ACTIVATED	Not enough pressure used to generate pull forces.	Use the following procedure to analyze the problem: <ol style="list-style-type: none"><li data-bbox="821 352 1438 422">1. Activate the puller unit and observe the pressure reading on the PowerPak pressure gage.<li data-bbox="821 457 1357 527">2. The pressure gage should read 10,000 psi (689.5 bar).<li data-bbox="821 562 1430 653">3. If an increase in pressure is required, refer to the FT-200D or FT-200C operator manual for instructions to adjust the pressure limit.<li data-bbox="821 688 1471 884">4. If the mandrel remains stuck at 10,000 psi (689.5 bar), disconnect all hoses connecting the puller to the pump. Disengage the mandrel from the puller unit, then push the mandrel out using an impact hammer. Contact the FTI Sales Department for additional assistance.

SECTION 6.0: ILLUSTRATED PARTS BREAKDOWN

6.1 BIG BRUTE ASSEMBLY DIAGRAMS

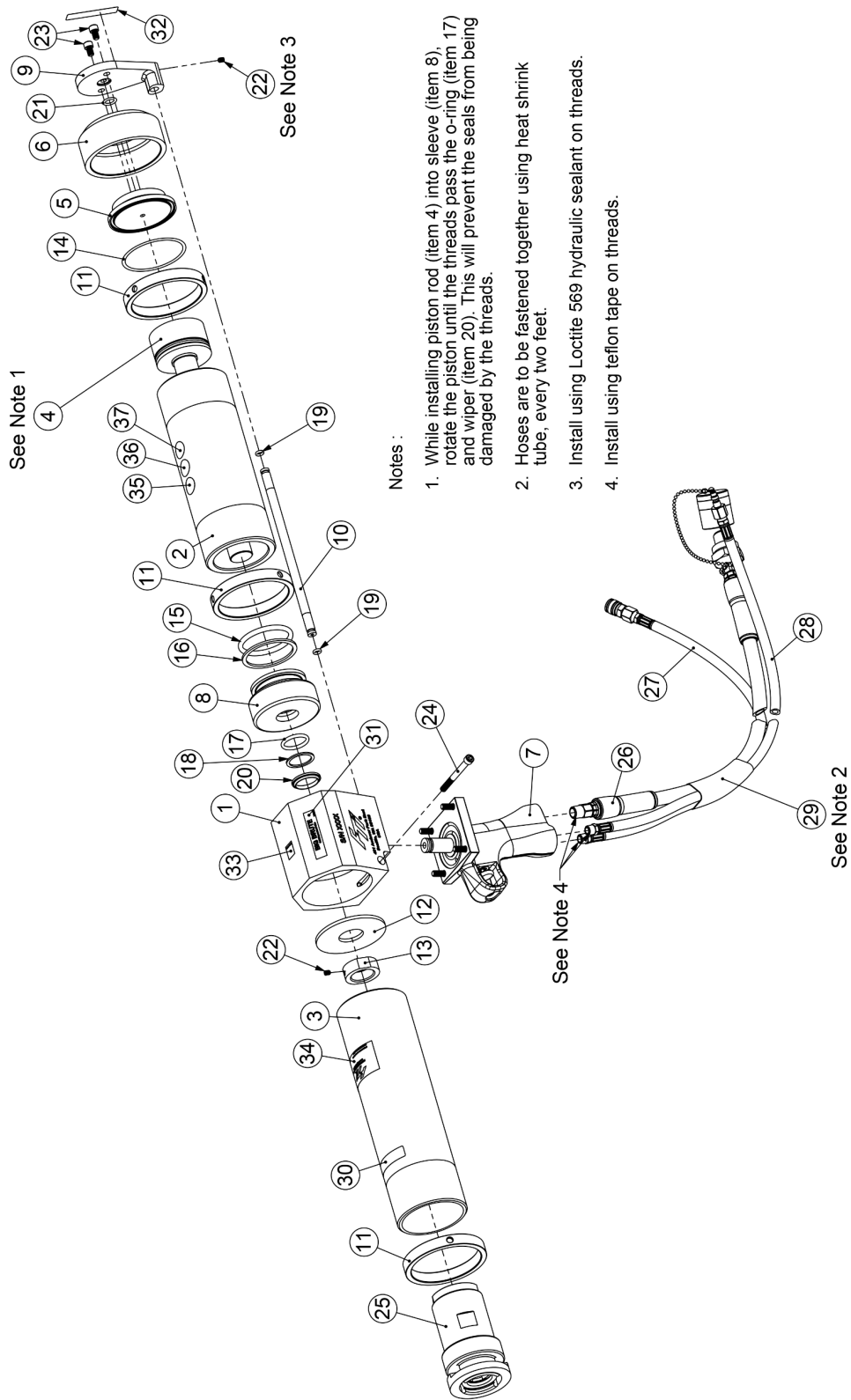


Figure 6.1-1
Big Brute Exploded View

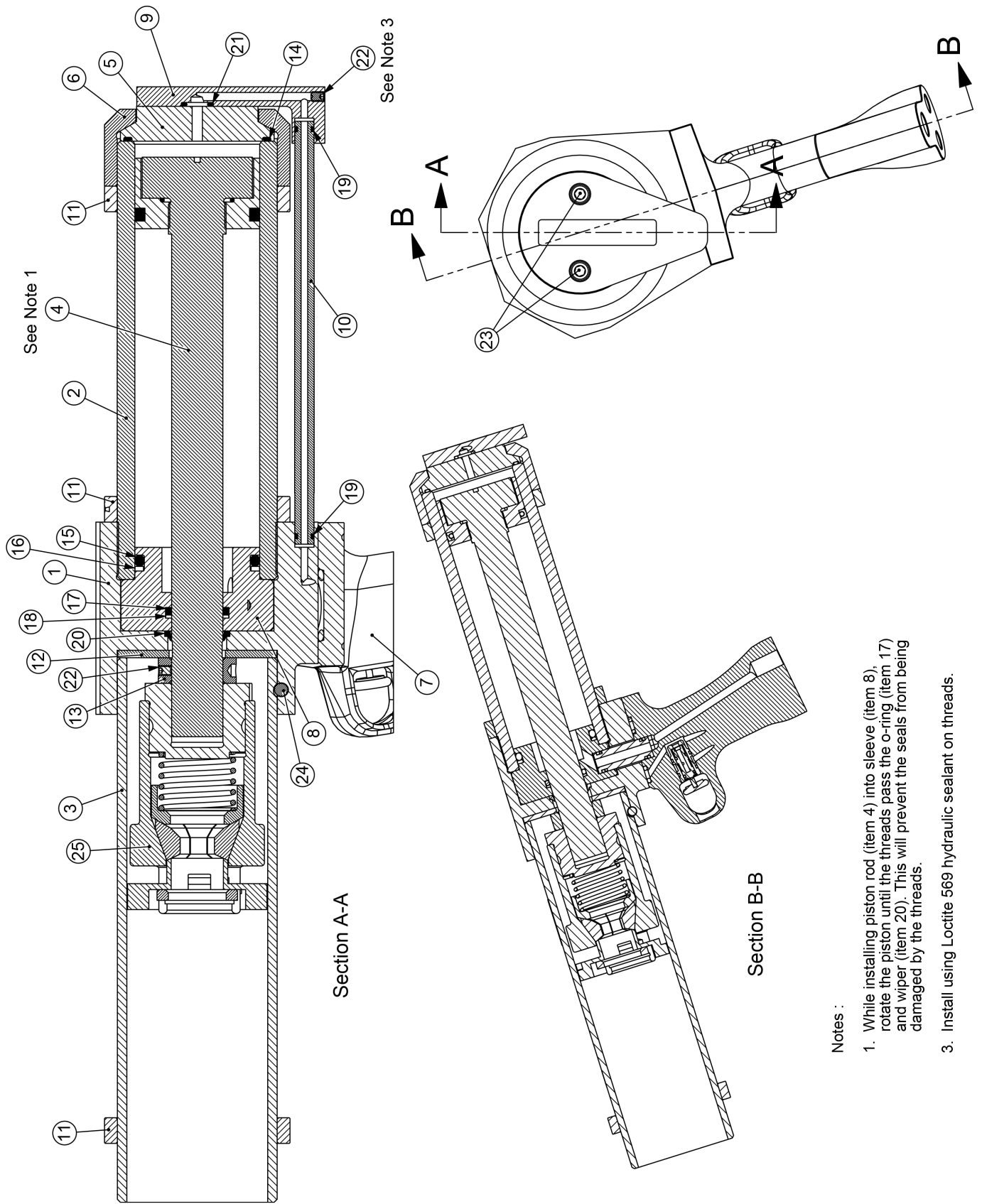


Figure 6.1-2
Big Brute Section View

6.2 ***BIG BRUTE PART LISTS***

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Table 6.2-22	BB-RR Parts List	43
Table 6.2-23	BB-RT Parts List	44

**Table 6.2-1
BB-10 Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-011	Cylinder		
3	1	2187-011	Barrel		
4	1	2105-007	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-005	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-002	BB-CA-20 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-002	Pelican Case	FT-BX-21-16-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-2
BB-10A Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-011	Cylinder		
3	1	2187-011	Barrel		
4	1	2105-007	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-005	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2526-001	7/8"-14 Threaded Adapter	BB-A-D35	
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-002	Pelican Case	FT-BX-21-16-10	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	2526-002	1"-14 Threaded Adapter	BB-B-D35	5
43	1	2526-003	1"-14 Threaded Adapter	BB-C-D35	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-3
BB-10B Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-011	Cylinder		
3	1	2187-011	Barrel		
4	1	2105-007	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-005	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-001	BB-CA-16 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-002	Pelican Case	FT-BX-21-16-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-4
BB-10A-H30 Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-011	Cylinder		
3	1	2187-011	Barrel		
4	1	2105-007	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-005	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2526-001	7/8"-14 Threaded Adapter	BB-A-D35	
26	1	2107-003	Assembly, 30' Hydraulic Hose		2, 4
27	1	2106-006	Assembly, 30' Air Hose (Female)		2, 4
28	1	2106-005	Assembly, 30' Air Hose (Male)		2, 4
29	14	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-002	Pelican Case	FT-BX-21-16-10	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	2526-002	1"-14 Threaded Adapter	BB-B-D35	5
43	1	2526-003	1"-14 Threaded Adapter	BB-C-D35	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-5
BB-10-V Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-011	Cylinder		
3	1	2187-011	Barrel		
4	1	2105-007	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-005	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-002	BB-CA-20 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	8	2638-025	Yellow Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-002	Pelican Case	FT-BX-21-16-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every one foot.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-6
BB-30 Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-003	Cylinder		
3	1	2187-003	Barrel		
4	1	2105-002	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-002	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-002	BB-CA-20 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-7
BB-30A Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-003	Cylinder		
3	1	2187-003	Barrel		
4	1	2105-002	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-002	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2526-001	7/8"-14 Threaded Adapter	BB-A-D35	
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	2526-002	1"-14 Threaded Adapter	BB-B-D35	5
43	1	2526-003	1"-14 Threaded Adapter	BB-C-D35	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-8
BB-30B Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-003	Cylinder		
3	1	2187-003	Barrel		
4	1	2105-002	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-002	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-001	BB-CA-16 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-9
BB-30-H25 Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-003	Cylinder		
3	1	2187-003	Barrel		
4	1	2105-002	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-002	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-002	BB-CA-20 Chuck		
26	1	2107-008	Assembly, 25' Hydraulic Hose		2, 4
27	1	2106-016	Assembly, 25' Air Hose (Female)		2, 4
28	1	2106-015	Assembly, 25' Air Hose (Male)		2, 4
29	12	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-10
BB-30A-H25 Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-003	Cylinder		
3	1	2187-003	Barrel		
4	1	2105-002	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-002	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2526-001	7/8"-14 Threaded Adapter	BB-A-D35	
26	1	2107-008	Assembly, 25' Hydraulic Hose		2, 4
27	1	2106-016	Assembly, 25' Air Hose (Female)		2, 4
28	1	2106-015	Assembly, 25' Air Hose (Male)		2, 4
29	12	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	2526-002	1"-14 Threaded Adapter	BB-B-D35	5
43	1	2526-003	1"-14 Threaded Adapter	BB-C-D35	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-11
BB-30-V Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-003	Cylinder		
3	1	2187-003	Barrel		
4	1	2105-002	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-002	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-002	BB-CA-20 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	8	2638-025	Yellow Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every one foot.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-12
BB-30C-H20 Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-003	Cylinder		
3	1	2187-003	Barrel		
4	1	2105-005	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-002	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-002	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	-	-	N/A		
26	1	2107-002	Assembly, 20' Hydraulic Hose		2, 4
27	1	2106-004	Assembly, 20' Air Hose (Female)		2, 4
28	1	2106-003	Assembly, 20' Air Hose (Male)		2, 4
29	9	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-13
BB-30A-V Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-003	Cylinder		
3	1	2187-003	Barrel		
4	1	2105-002	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-002	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2526-001	7/8"-14 Threaded Adapter	BB-A-D35	
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	8	2638-025	Yellow Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	2526-002	1"-14 Threaded Adapter	BB-B-D35	5
43	1	2526-003	1"-14 Threaded Adapter	BB-C-D35	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every one foot.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-14
BB-30-737 Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-003	Cylinder		
3	1	2187-003	Barrel		
4	1	2105-002	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-002	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-002	BB-CA-20 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	3003-003	ForceMate Cap	FMC-B	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-15
BB-70 Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-004	Cylinder		
3	1	2187-004	Barrel		
4	1	2105-003	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-003	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-002	BB-CA-20 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-16
BB-70A Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-004	Cylinder		
3	1	2187-004	Barrel		
4	1	2105-003	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-003	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2526-001	7/8"-14 Threaded Adapter	BB-A-D35	
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	2526-002	1"-14 Threaded Adapter	BB-B-D35	5
43	1	2526-003	1"-14 Threaded Adapter	BB-C-D35	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-17
BB-70B Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-004	Cylinder		
3	1	2187-004	Barrel		
4	1	2105-003	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-003	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-001	BB-CA-16 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-18
BB-70-V Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-004	Cylinder		
3	1	2187-004	Barrel		
4	1	2105-003	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-003	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-002	BB-CA-20 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	8	2638-025	Yellow Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every one foot.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-19
BB-70A-V Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-004	Cylinder		
3	1	2187-004	Barrel		
4	1	2105-003	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-003	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2526-001	7/8"-14 Threaded Adapter	BB-A-D35	
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	8	2638-025	Yellow Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-003	Pelican Case	FT-BX-28-17-10	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	2526-002	1"-14 Threaded Adapter	BB-B-D35	5
43	1	2526-003	1"-14 Threaded Adapter	BB-C-D35	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every one foot.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-20
BB-100A Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-010	Cylinder		
3	1	2187-010	Barrel		
4	1	2105-006	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-004	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2526-001	7/8"-14 Threaded Adapter	BB-A-D35	
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-005	Pelican Case	FT-BX-34-24-12	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	2526-002	1"-14 Threaded Adapter	BB-B-D35	5
43	1	2526-003	1"-14 Threaded Adapter	BB-C-D35	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-21
BB-100A-V Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-010	Cylinder		
3	1	2187-010	Barrel		
4	1	2105-006	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-004	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2526-001	7/8"-14 Threaded Adapter	BB-A-D35	
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	8	2638-025	Yellow Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-005	Pelican Case	FT-BX-34-24-12	5
41	1	2720-008	Big Brute Operator Manual		5
42	1	2526-002	1"-14 Threaded Adapter	BB-B-D35	5
43	1	2526-003	1"-14 Threaded Adapter	BB-C-D35	5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every one foot.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-22
BB-RR Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-001	Cylinder		
3	1	2187-002	Barrel		
4	1	2105-001	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	5442-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-001	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	1	2313-002	BB-CA-20 Chuck		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-002	Pelican Case	FT-BX-21-16-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

**Table 6.2-23
BB-RT Parts List**

Item Number	Quantity	Part Number	Description	Reference Information	Notes
1	1	2127-001	Housing		
2	1	2184-001	Cylinder		
3	1	2952-001	Barrel		
4	1	2105-001	Piston Assembly		1
5	1	2323-001	Inner End Cap		
6	1	2197-001	Outer End Cap		
7	1	5211-003	Handle Assembly		
8	1	2192-001	Sleeve		
9	1	2324-001	Air Adapter		
10	1	2328-001	Air Tube		
11	3	2120-005	Lock Ring		
12	1	2007-007	Washer		
13	1	2201-001	Lock Nut		
14	1	1046-035	O-Ring	MS28775-147	
15	1	1046-023	O-Ring	MS28775-329	
16	1	1046-024	Backup Ring	MS28782-32	
17	1	1046-025	O-Ring	MS28775-214	
18	1	1046-026	Backup Ring	MS28782-19	
19	2	1046-036	O-Ring	MS28775-010	
20	1	1046-037	Wiper	1490N15	
21	1	1046-038	O-Ring	N0552-90 2-111	
22	2	1045-027	Set Screw, 10-32 x 1/4"		3
23	2	1035-002	Socket Head Cap Screw, 1/4-20 x 3/8"		
24	1	1035-013	Socket Head Cap Screw, 1/4-20 x 2-1/2"		
25	-	-	N/A		
26	1	2107-001	Assembly, 10' Hydraulic Hose		2, 4
27	1	2106-002	Assembly, 10' Air Hose (Female)		2, 4
28	1	2106-001	Assembly, 10' Air Hose (Male)		2, 4
29	4	2638-001	Heat Shrink Tube, 3" Piece		2
30	1	1009-185	Nosecap Warning Label		
31	2	1009-188	Big Brute Label		
32	1	1009-184	Do Not Strike Label		
33	1	1166-001	CE Label		
34	1	1009-094	FTI Logo Label		
35	1	1187-105	Ear Protection Label		
36	1	1187-106	Eye Protection Label		
37	1	1187-107	Read Manual Label		
38	1	1045-015	Pin Spanner Wrench	5472A5	5
39	1	1199-691	7/8" Open End Wrench, Thin	5551A33	5
40	1	6575-002	Pelican Case	FT-BX-21-16-10	5
41	1	2720-008	Big Brute Operator Manual		5

Notes:

1. While installing piston rod (item 4) into sleeve (item 8), rotate the piston until the threads pass the o-ring (item 17) and wiper (item 20). This will prevent the seals from being damaged by the threads.
2. Hoses are to be fastened together using heat shrink tube, every two feet.
3. Install set screw (item 22) in air adapter (item 9) using Loctite 569 hydraulic sealant on threads.
4. Install indicated items using teflon tape on threads.
5. Indicated items are included as part of assembly but are not installed into puller.

APPENDIX A: LEGACY UNITS

Various design changes and improvements have been made to the Big Brute series. These older units can be upgraded or refurbished to the new configuration if desired.

A.1 TRIGGER REWORK (FTI-CT-RK AND BB-CT-RK)

FTI redesigned the puller unit trigger assembly to a cartridge system in 2005. The new design reduces the occurrence of trigger air leaks, performs more reliably (better pump actuation), and is easier to maintain.

The legacy trigger design detailed in Section A.2 can be easily replaced with this improved trigger assembly detailed in Section A.1. Two part numbers are needed for replacement:

- Either the Cartridge Trigger Assembly Kit (FTI-CT-RK) or the Big Brute Rework Kit (BB-CT-RK) – (see kit differences in Table A.1-2 and A.1-3), and
- Puller Trigger Rework Tool Kit (FTI-CT-RKT) – (see kit in Table A.1-1).

One FTI-CT-RK or BB-CT-RK kit is required for each puller unit converted. Only one tool kit (FTI-CT-RKT) is required regardless of the number of pullers converted. The FTI-CT-RKT kit includes the tools (punch, tap, etc.) required and detailed instructions on how to perform the modification.

Table A.1-1
FTI-CT-RKT Trigger Assembly Replacement Tool Kit

Item Number	Quantity	Part Number	Description
1	1	1199-029	Hex Head Cap Screw, fully threaded, 3 inches long, 1/2-13UNC
2	1	1045-464	Hex nut, 1/2-13UNC
3	1	1187-633	Flat washer, 9/16 inch ID, 1 3/16 inches OD
4	1	1199-028	Metal Tubing, 1.5 inches long, 7/8 inch ID
5	1	1187-634	Hand tap, 1/2 x 13UNC, HSS, Class H2, Plug
6	1	3471-001	Hand punch, piloted, .35 inch pilot dia.
7	1	2720-072	Puller Trigger Replacement Instructions (DM #160918) – not shown

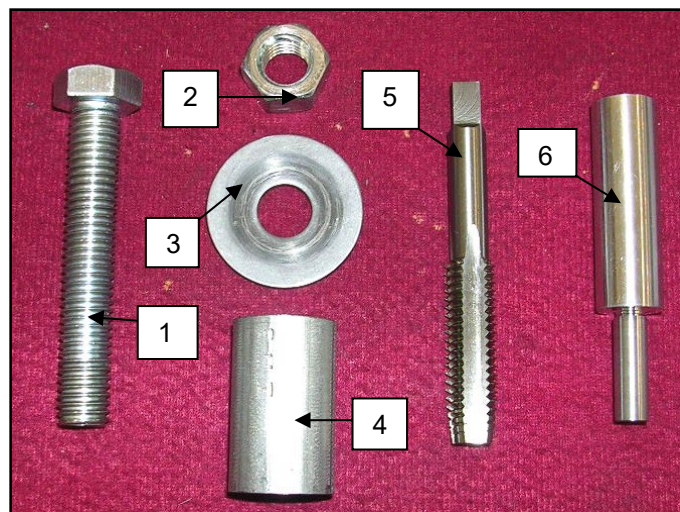


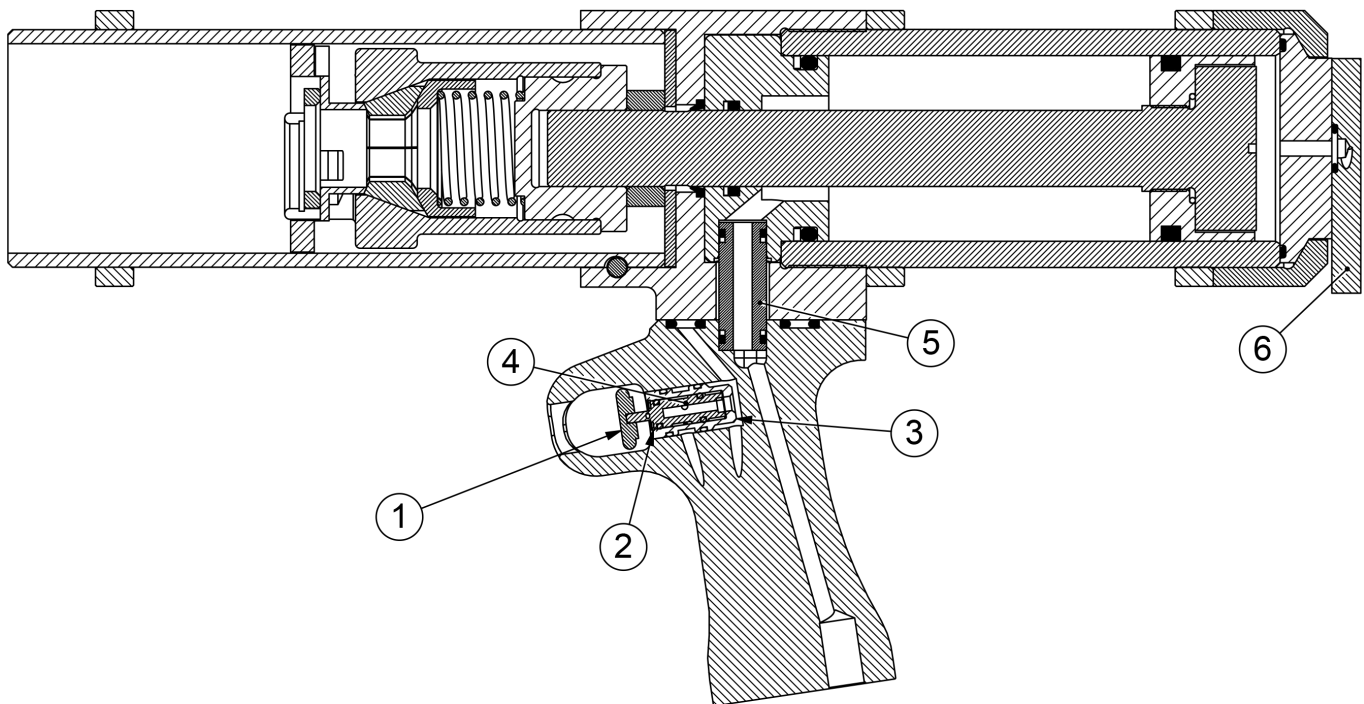
Figure A.1-1
FTI-CT-RKT Tool Kit Pieces

**Table A.1-2
FTI-CT-RK Trigger Rework Kit**

Item Number	Quantity	Part Number	Description
1	1	1187-623	Push Button, Brass
2	1	1187-624	Retaining Ring, Internal
3	1	3196-001	Sleeve, Puller Handle Trigger
4	1	1187-622	Cartridge Valve

**Table A.1-3
BB-CT-RK Big Brute Rework Kit**

Item Number	Quantity	Part Number	Description
Not Pictured	4	1035-005	Screw, SHC (1/4-20UNC X 3/4")
1	1	1187-623	Pushbutton, Brass
2	1	1187-624	Retaining Ring, Internal
3	1	3196-001	Sleeve, Puller Handle Trigger
4	1	1187-622	Cartridge Valve
5	1	2039-003	BB Transfer Tube
6	1	2324-001	Air Adapter
See Section 4.6	1	8000-484	Big Brute Seal Kit (BB-SK)



**Figure A.1-2
Diagram of FTI-CT-RK and BB-CT-RK Rework Kits**

A.2 LEGACY TRIGGER ASSEMBLY

The legacy trigger design detailed here can be easily replaced with the improved trigger assembly detailed in Section A.1. Table A.2-1 is a parts list for the old-style trigger assembly.

Table A.2-1
Parts List for Legacy Trigger Assembly

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

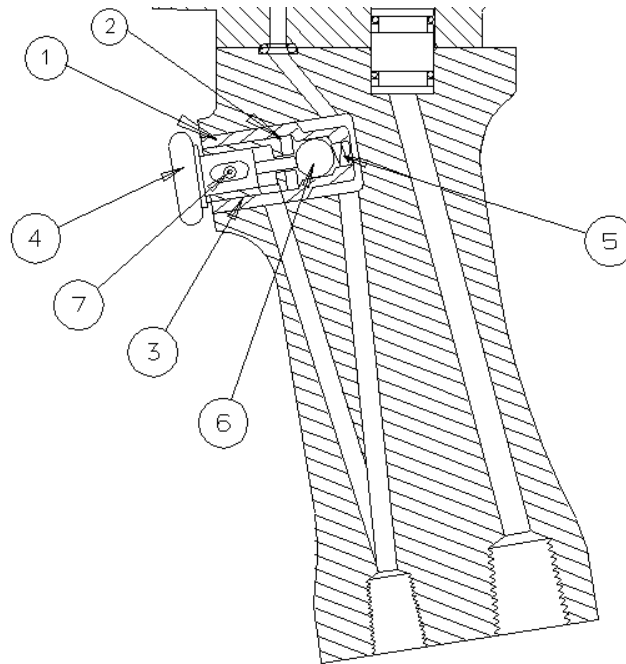
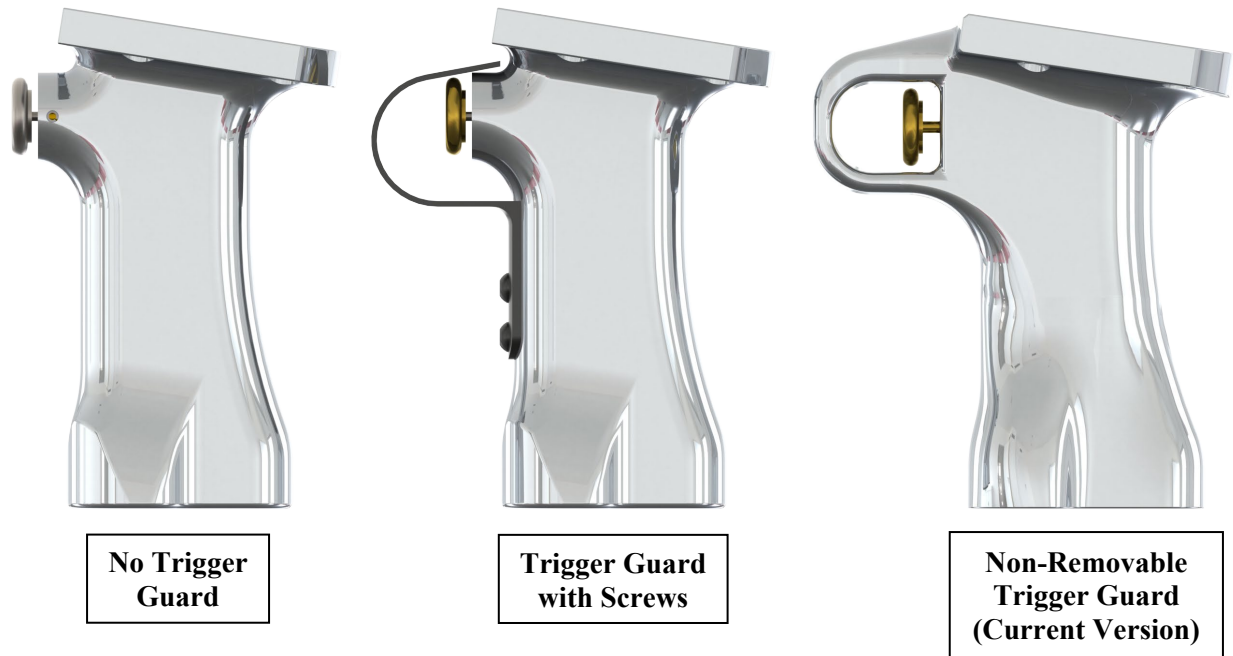


Figure A.2-1
Diagram of Legacy Trigger Assembly

A.3 HANDLE REVISIONS

There have been two major variations of the handle design before the current model. See Figure A.3-1.



**Figure A.3-1
Handle Revisions**

The trigger guard is an important safety feature that was added to minimize the chances of accidental activation. A sheet metal guard attached with screws was originally available as an option but was made a standard feature in 2013.

In 2019 this design was replaced by an integrated trigger guard that is non-removable. This prevents the operator from removing the guard and causing an unsafe condition. The design also improves operator comfort since the protruding screw heads are removed.

If desired, the older model handles can be replaced by purchasing the new version. The sub-assembly (5211-003) also includes an installed trigger, so the rework options described in Appendix A.1 are not necessary.

APPENDIX B: E.C. DECLARATION OF CONFORMITY

FATIGUE TECHNOLOGY
401 Andover Park East
Seattle, Washington 98188-7605
USA



E.C. DECLARATION OF CONFORMITY

Manufacturer: Fatigue Technology
401 Andover Park East
Seattle, WA 98188-7605

Telephone: (206) 246-2010
Fax: (206) 244-9886

The undersigned declares that the machinery described:

- Type:** BB-xx, where "xx" relates to material stack.
BB-xx-V, where "V" represents high visibility hoses.
BB-xx-Hxx, where "-Hxx" denotes a unique hose length not 10ft in length.
BB-xx, comes with a BB-CA-20 chuck.
BB-xxA, comes with three threaded adapters.
BB-xxB, comes with a BB-CA-16 chuck.
BB-xxC, comes with a special 7/8" piston thread.
BB-RR and BB-RT, designed for the railroad industry and shorter in length.

For a full list of applicable model numbers, see Table 1.3-1 in the operator manual.

Conforms to the following Directive(s), Regulation(s), and/or Normative Document(s):

2006/42/EC	EU Machinery Directive
ISO 11148-1	Hand-Held Non-Electric Power Tools – Safety Requirements – Part 1
ISO 12100-1	Safety of machinery - General Principles for design - Risk assessment and risk reduction
ISO 4413	Hydraulic fluid power – General rules and safety requirements for systems and their components
ISO 4414	Pneumatic fluid power – General rules and safety requirements for systems and their components
ISO 7010	Graphical symbols — Safety colours and safety signs — Registered safety signs

Responsible Person in E.C.:

Permaswage SAS
Boitelle, Sevara
5 Rue des Dames
78344 Les Clayes Sous Bois
France
Telephone: 33 (0)6-76-61-83-90

Signature: Sevara Boitelle

Date: March 5, 2026

