



Shorty Setting Tool MB Technical Manual

1.500 MB
1.687 MB

MAN-SET-000 (R03)

Owen Oil Tools

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Shorty Setting Tool MB Tech Manual



Description

Owen Single Stage Setting Tools are compact wireline tools. The burning of a power charge produces high-pressure gas for setting bridge plugs cement retainers and packers.

Benefits/Capabilities

- Pressure balanced top and bottom pistons
- Eliminates presetting of plugs and patches, caused by high hydrostatic pressure
- 15,000 psi pressure rating

Operation

An electrically actuated, high temperature rated igniter located at the upper end of the tool is ignited and produces a flash flame which in turn, ignites the power charge that is located directly below the igniter. The power charge is constructed of carefully controlled combustible elements and begins a slow burn of approximately 30 seconds. The resultant gas derived from the burning charge gradually builds up to high pressure and causes the tool to stroke.

This motion anchors the bridge plug to the casing and then pulls the release stud of the plug in half, freeing the setting tool for retrieval from the well.

An oil damper system is built into the tool to control the speed at which the tool strokes. As the tool elongates, this oil is forced through an annular orifice and out of the tool at a controlled rate. This prevents the tool from stroking too fast and damaging the tool once the release stud pulls apart. Excess oil is purged out automatically during the assembly. Likewise, oil expansion caused by high temperature during running is purged in the same manner.



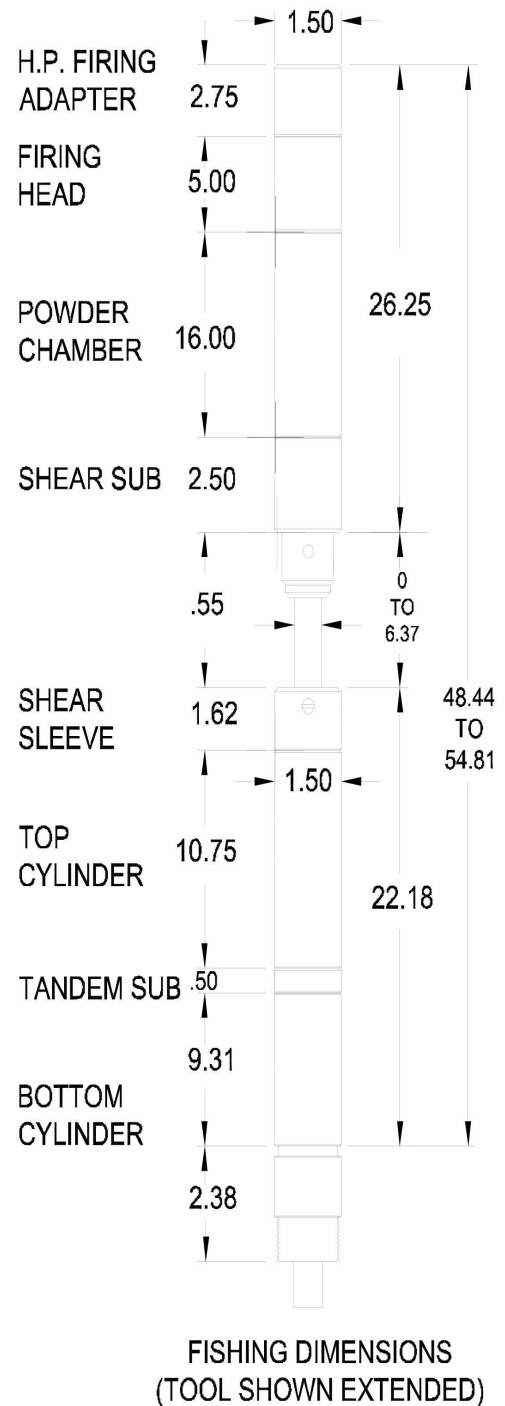
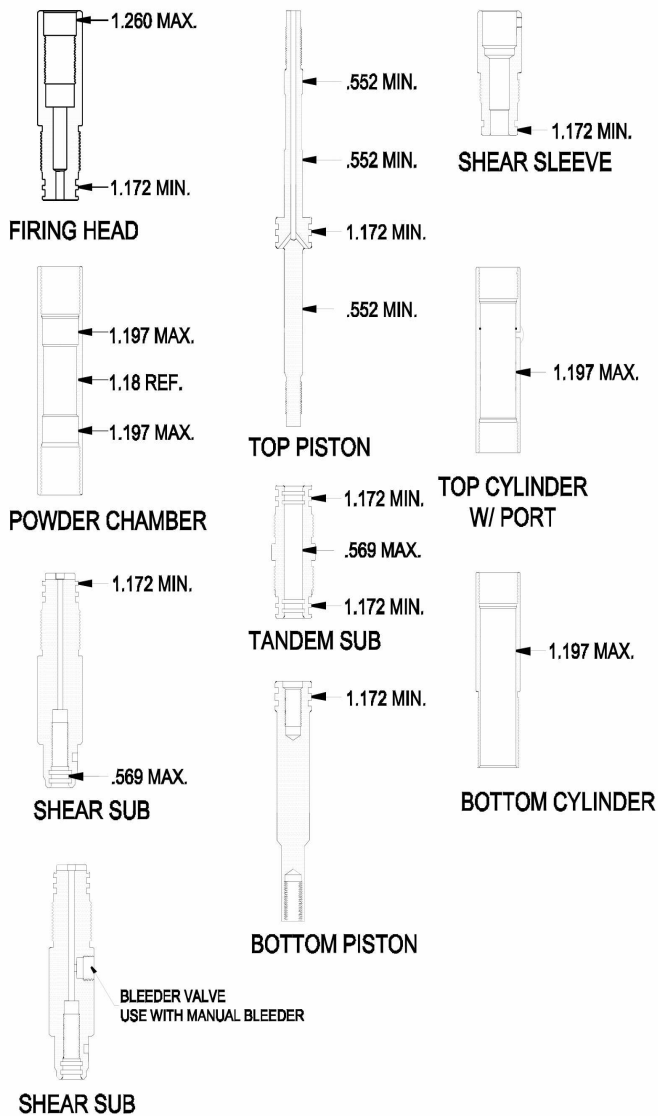
Caution: *It is mandatory that the tool is filled to capacity with oil after each use or damage to the tool will result!*

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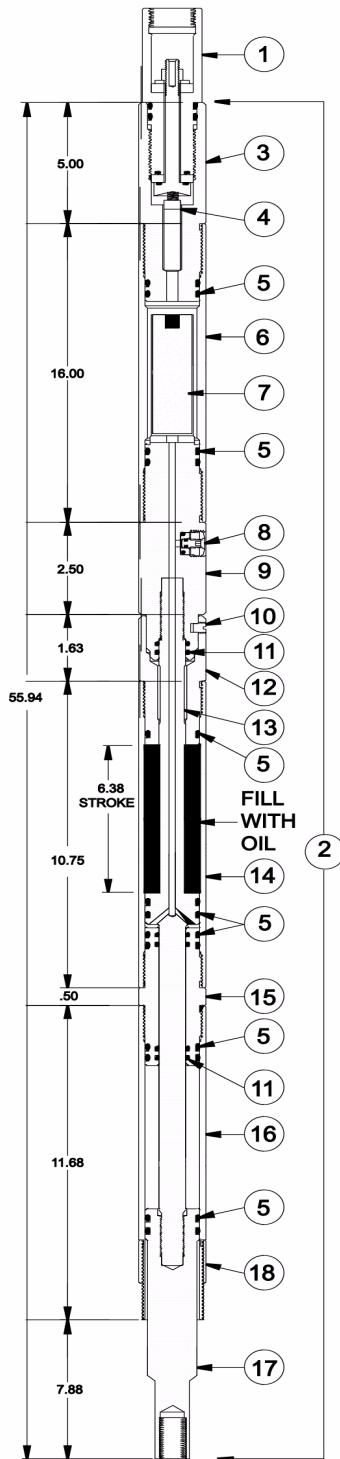


Inspection and Fishing Dimensions

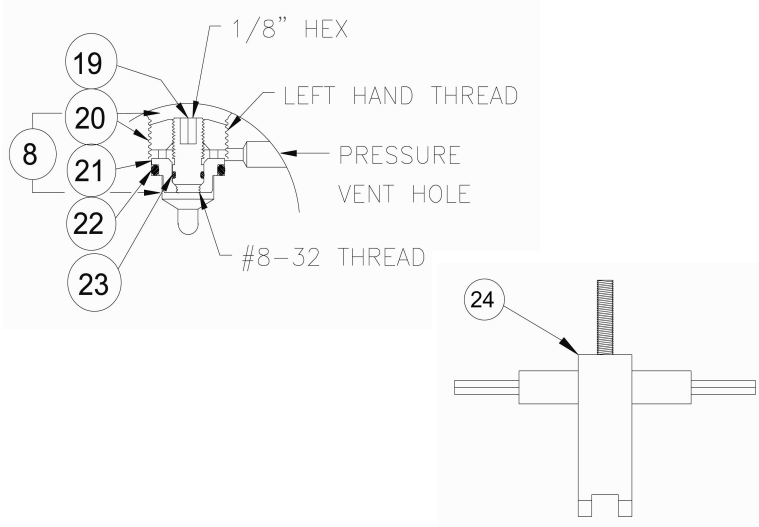
Note: Dimensions shown are critical. When setting tool components wear to a point approaching these figures, they must be replaced. Do not use a component whose dimensions exceed the maximum wear dimensions given below



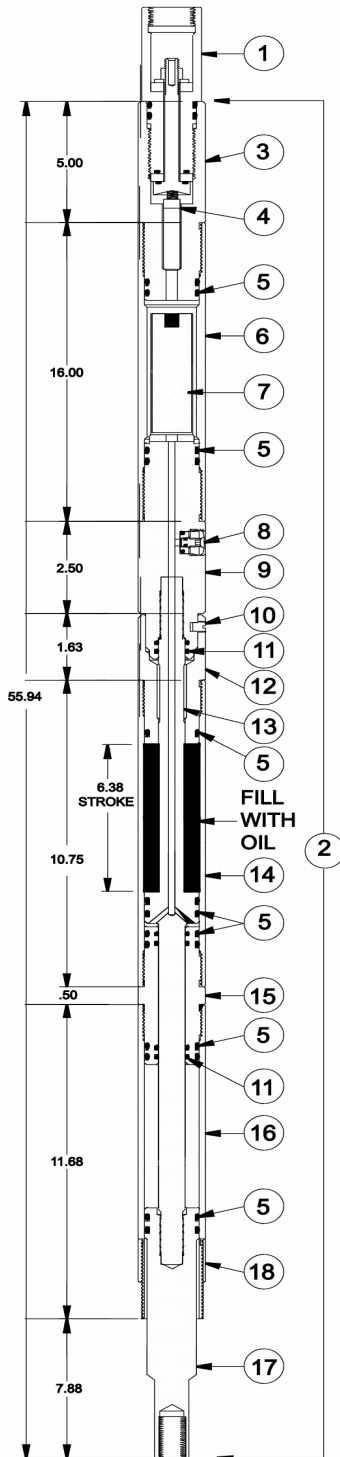
1.500 Schematic and Bill of Materials



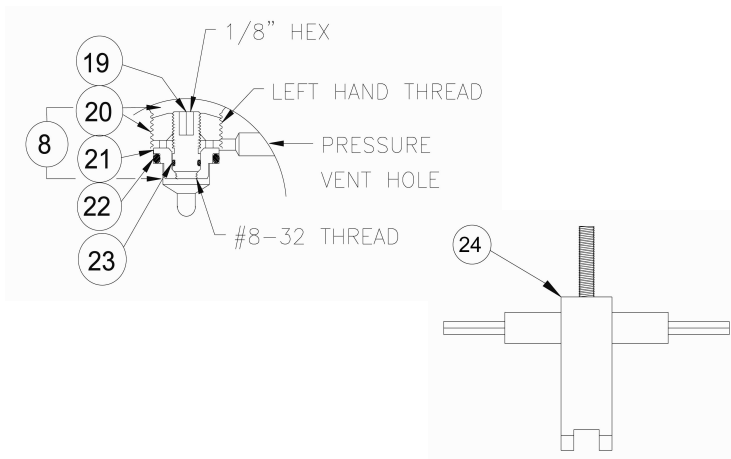
| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|----------------|---|
| 1 | | AES-AS80005 | ASSY. - 1-1/2" O.D. HIGH PRESSURE FIRING ADAPTER |
| 2 | | SET-1500-000MB | ASSY. - 1-1/2" O.D. SHORTY SETTING TOOL ALL TEMP ITEMS 1,4,7 AND 24 NOT INCL. IN EITHER ASSY. |
| 3 | 1 | SET-1500-010 | FIRING HEAD - HIGH PRESSURE |
| 4 | 1 | DET-5306-074 | IGNITOR ASSY. - POWER CHARGE |
| 5* | 13 | OOO-V569-213 | O-RING |
| 6 | 1 | SET-1500-002 | POWDER CHAMBER |
| 7 | 1 | JEC-5302-041 | POWER CHARGE - HIGH TEMP. - 400°F |
| 8 | 1 | SET-1687-025 | ASSY. - BLEEDER VALVE - ITEMS 19 THRU 23 |
| 9 | 1 | SET-1500-003 | SHEAR SUB - PORTED FOR BLEEDER VALVE ITEM 8 |
| 10* | 1 | SET-2125-020 | BRASS SHEAR SCREW, 2,000 lbs |
| 11* | 6 | OOO-V569-113 | O-RING |
| 12 | 1 | SET-1500-004 | SHEAR SLEEVE |
| 13 | 1 | SET-1500-005 | TOP PISTON |
| 14 | 1 | SET-1500-006 | TOP CYLINDER |
| 15 | 1 | SET-1500-011 | TANDEM SUB |
| 16 | 1 | SET-1500-007 | BOTTOM CYLINDER |
| 17 | 1 | SET-1500-008 | BOTTOM PISTON |
| 18 | 1 | SET-1500-009 | LOCK RING |
| 19 | 1 | SET-1687-026 | STEM |
| 20 | 1 | SET-1687-028 | RETAINER NUT |
| 21 | 1 | SET-1687-027 | SEAT |
| 22* | 1 | OOO-V569-111 | O-RING |
| 23* | 1 | OOO-V569-006 | O-RING |
| 24 | 1 | SET-1687-029 | BLEEDER WRENCH |
| * | | SET-1500-016 | O-RING KIT - ALL TEMP. (ITEMS 5,10,11,22,23) |
| | | MAN-SET-000 | MANUAL |



1.687 Schematic and Bill of Materials



| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|----------------|---|
| 1 | | AES-AS80005 | ASSY. - 1-11/16" O.D. HIGH PRESSURE FIRING ADAPTER |
| 2 | | SET-1687-000MB | ASSY. - 1-11/16" O.D. SHORTY SETTING TOOL ALL TEMP ITEMS 1,4,7 AND 24 NOT INCL. IN EITHER ASSY. |
| 3 | 1 | SET-1687-010 | FIRING HEAD - HIGH PRESSURE |
| 4 | 1 | DET-5306-074 | IGNITOR ASSY. - POWER CHARGE |
| 5* | 13 | OOO-V569-216 | O-RING |
| 6 | 1 | SET-1687-002 | POWDER CHAMBER |
| 7 | 1 | JEC-5302-041 | POWER CHARGE - HIGH TEMP. - 400°F |
| 8 | 1 | SET-1687-025 | ASSY. - BLEEDER VALVE - ITEMS 19 THRU 23 |
| 9 | 1 | SET-1687-003 | SHEAR SUB - PORTED FOR BLEEDER VALVE ITEM 8 |
| 10* | 1 | SET-2125-020 | BRASS SHEAR SCREW, 2,000 lbs |
| 11* | 6 | OOO-V569-115 | O-RING |
| 12 | 1 | SET-1687-004 | SHEAR SLEEVE |
| 13 | 1 | SET-1687-005 | TOP PISTON |
| 14 | 1 | SET-1687-006 | TOP CYLINDER |
| 15 | 1 | SET-1687-011 | TANDEM SUB |
| 16 | 1 | SET-1687-007 | BOTTOM CYLINDER |
| 17 | 1 | SET-1687-008 | BOTTOM PISTON |
| 18 | 1 | SET-1687-009 | LOCK RING |
| 19 | 1 | SET-1687-026 | STEM |
| 20 | 1 | SET-1687-028 | RETAINER NUT |
| 21 | 1 | SET-1687-027 | SEAT |
| 22* | 1 | OOO-V569-111 | O-RING |
| 23* | 1 | OOO-V569-006 | O-RING |
| 24 | 1 | SET-1687-029 | BLEEDER WRENCH |
| * | | SET-1687-016 | O-RING KIT - ALL TEMP. (ITEMS 5,10,11, 22 & 23) |
| | | MAN-SET-000 | MANUAL |





1.0 Pre-Assembly



Warning: *Make sure all tool parts and components have been thoroughly cleaned or serious damage and/or injury could occur!*



Warning: *Personal Protective Equipment (PPE) such as steel toed footwear, safety glasses, etc..., should be worn at all times!*



Note: *Verify that the correct O-Ring redress kit and quantities are used as specified on the Bill Of Materials (for example, 5 each etc....). Lay out all redress kit components on a clean surface.*



Note: *Make sure to lubricate all O-Rings and threaded surfaces.*



Caution: *Make sure to wrench only on wrenching surfaces (knurled areas) provided! Always file wrench marks and burrs and clean off debris!*

2.0 Assembly

2.1 Install and lubricate all O-Rings.

2.2 Place the Top Cylinder (item #14) into the vise , then screw the Tandem Sub (item #15) into the Top Cylinder.

2.3 Slide the Top Piston (item #13) fully down, inside the Top Cylinder and Tandem Sub.



Note: *Ports in the piston should be positioned towards the bottom of the tool.*

2.4 Screw the Bottom Cylinder (item #16) onto the Tandem Sub (item #15).

2.5 Screw the Bottom Piston (item #17) onto the lower end of the Top Piston, until you see the top of the Top Piston rotate (this assures a proper connection).

2.6 Remove the tool from the vise and stand up vertically. Fill the annular cavity of the Top Cylinder with SAE 10-40 oil, until oil level reaches the bottom of the thread in the upper end of the cylinder.



Caution: *Do not attempt to fire a setting tool that has not had oil installed, because serious damage will occur!*

2.7 Screw the Shear Sleeve (item #12) into the upper end of the Top Cylinder.

2.8 Screw the Shear Sub (item #9) onto the Top Piston. Put the tool back into the vise on the Top Cylinder. Make Shear Sleeve wrench tight on Top Cylinder. Place a back-up wrench on the Bottom Piston and make the Shear Sub wrench tight. Rotate the Shear Sub clockwise until the spot face lines up with the tapped hole in the Shear Sleeve. Now, install the Brass Shear Screw (item #10) into the Shear Sub.

2.9 Install the Bleeder Valve Assembly (item #8) into the Shear Sub as follows:

A. First, install 1 O-Ring (item #22) on the shoulder inside the port, then insert the Seat (item #21).

B. Next, install 1 O-Ring (item #23) onto the Stem (item #19), thread the Stem into the bottom of the Retainer Nut (item #20) until it shoulders out.

C. Lastly, screw the Retainer Nut into the left-hand threaded port and make wrench tight. Now screw the Stem **clockwise**, being careful not to over torque.

2.10 Move the tool down in the vise to the Shear Sub. Now, screw the Powder Chamber (item #6) into the Shear Sub (item #9) and make wrench tight.

2.11 Next, remove the plastic end caps from the Power Charge and install into the Powder Chamber, with the open end of charge positioned towards the top of the tool.



Note: *The above statement is a suggested step, as always, please refer to your company's procedures for handling and installation of power charges (explosives or propellants).*

2.12 Screw the Firing Head (item #3) into the Powder Chamber.

2.13 Attach the Setting Tool Assembly to a Firing Adapter Assembly and Casing Collar Locator. Attach appropriate setting sleeve, adapter rod and bridge plug to be run.



Warning: *Always follow American Petroleum Institute (API) RP-67 guidelines when handling and operating power charges!*



Warning: *Never pre-load, pre-dress or leave an assembled tool for extended periods. Redress and clean tool prior to use. Never store a loaded tool!*



Note: *Clean and lubricate all parts immediately after each use.*



Note: *Visually inspect tool for swelling after each use. Damaged or swelled components **must be** replaced.*



Note: *It is recommended that a Magnetic Particle Inspection (MPI) be completed on all components at least every 20 runs.*

3.0 Pre-Disassembly



Warning: *Personal Protective Equipment (PPE) such as steel toed footwear, safety glasses, etc..., should be worn at all times!*



Caution: *Make sure to wrench only on wrenching surfaces (knurled areas) provided! Always file wrench marks and burrs and clean off debris!*



Warning: *After the setting tool has been fired, very high gas pressure will be trapped inside the tool and must be bled off before disassembly is begun!*

4.0 Manually Bleeding the Tool

4.1 This tool can be bled at three places;

- A. at the Bleeder Valve (item #8); preferred 1st method

B. at the connection of the Firing Head (item #3) and Firing Adapter (item #1);
2nd method

C. at the connection of the Shear Sub (item #9) and Top Piston (item #13); 3rd
method



Warning: *Use the 2nd or 3rd method only if pressure cannot be bled off at the Bleeder Valve!*

4.2 Bleeding through the Bleeder Valve- Rotate the setting tool so that the Stem (item #19) of the Bleeder Valve Assembly (item #8) is facing up and the side hole pressure vent is pointing away from you. Using the Owen Bleeder Wrench (item #24), slowly turn the Stem **counter-clockwise** until it shoulders out on the Retainer Nut (item #20). The gas pressure should bleed off through the side hole pressure vent

4.3 Bleeding at the Firing Adapter/Firing Head- Hold a back up wrench on the Firing Adapter (item #1) while wrenching on the Firing Head (item #3) and turning **counter-clockwise**. After about 6 turns, pressure should bleed off at the threaded connection of the Firing Head/Top Piston.



Warning: *Do not back off the Firing Head more than 8 turns or serious damage and/or injury could occur!*

4.4 Bleeding at the Shear Sub/Top Piston- Hold a back up wrench on the Shear Sub (item #9), while wrenching on the Top Cylinder (item #14) and turning **counter-clockwise**. The pressure should bleed past the O-Ring (item #11) in less than 7 turns.



Note: *If at 7 turns pressure has not bled off tool, turn tool back and repeat process until the O-Ring unseats from Shear Sub and pressure bleeds off.*



Warning: *Do not back off the Shear Sub more than 10 turns or serious damage and/or injury could occur!*



Note: *Once all of the gas pressure has been bled from the tool, it should be completely disassembled as soon as possible.*

5.0 Disassembly

5.1 First, place the tool in a vise on the middle of the Top Cylinder (item #14).

5.2 After the gas pressure has been bled off, remove as one piece/section, the Shear Sub (item #9), Powder Chamber (item #6), Firing Head (item #3), and Firing Head Adapter (item #1) from the Top Piston (item #13). Set to the side for later disassembly in step 7.

5.3 Remove the Shear Sleeve (item #12), then screw in the Brass Shear Screw (item #10) until the screw falls out.

5.4 Next, to remove the Bottom Piston (item #17), place a back up on the undercut of the Top Piston (item #13), by turning counter-clockwise and remove from Bottom Cylinder (item #16).



Note: You may have to bump up the Top Piston to gain access to the undercut. **Do not** wrench on the O-Ring area of the Piston.

5.5 Move the tool down in vise to the Top Cylinder/Tandem Sub connection. Remove the Lock Ring (item #18) from the Bottom Cylinder, then remove the Bottom Cylinder (item #16), by turning counter-clockwise.

5.6 Take the tool out of the vise, then pickup the cylinder/piston, and drop on wood block or aluminum strike plate to drive the piston out of cylinder.

5.7 Place the Top Cylinder (item #14) back into the vise and remove the Tandem Sub (item #15), by turning counter-clockwise.

5.8 Next, put the assembly from step 2 into the vise on the Powder Chamber (item #6). Remove the Bleeder Valve Assembly (item #8) from Shear Sub (item #9), by using the Owen Bleeder Wrench (item #24). Place the hex end of the wrench into Stem (item #19) and turn **counter-clockwise**.

5.9 Next, remove Retainer Nut (item #20) by turning **clockwise** with the forked end of the Bleeder Wrench. Then, run the thread end of the Bleeder Wrench into the Seat (item #21) and pull to remove. Now remove Shear Sub (item #9) from the Powder Chamber (item #6). Now remove Firing Head (item #3) from the Powder Chamber. Now remove the used Power Charge (item #7) from the Powder Chamber.

5.10 Remove the Igniter by turning the Firing Head (item #3) upside down and dropping it on wood block or aluminum strike plate.



Note: *Remove and discard all O-Rings.*



Note: *Clean and lubricate all parts immediately after each use.*



Note: *Visually inspect tool for swelling after each use. Damaged or swelled components **must be** replaced.*



Note: *It is recommended that a Magnetic Particle Inspection (MPI) be completed on all components at least every 20 runs.*



Warning: *Always follow American Petroleum Institute (API) guidelines when handling and operating power charges!*



Warning: *Never pre-load, pre-dress or leave an assembled tool for extended periods. Redress and clean tool prior to use. Never store a loaded tool!*