3.593-4.312 MODEL “B” MECHANICAL SETTING TOOL

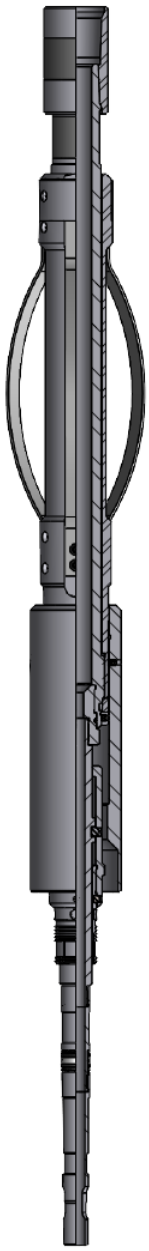
The Model “B” Mechanical Setting Tool is designed to run and set Alpha’s Model B Sleeve Valve Cement Retainer and Model B-1 Bridge Plug. It is easy to operate and has low maintenance.

This tool incorporates both a stinger seal and built-in snap latch allowing the tool to be latched into the retainer with set-down weight and released with up-strain and/or right hand rotation. This tool can be run up to 3-times by moving the drive housing into the running position and installing new shear screws. Disassembly is not required every time. Visually inspect MST after each run.

Applications:
Designed to run and set the Alpha Model B Cement Retainer and Model B-1 Bridge Plug then squeeze or spot cement in one-trip.

CEMENT RETAINERS AND BRIDGE PLUGS
The molded seal must remain in tolerance and *not* be cut or worn after trips. Disassembly is not required between runs on the same location, but is recommended upon returning to the shop. Tool sizes are available from 4-1/2 to 5-1/2” casing. Fewer moving parts and ease of operation make this tool a good addition to your line. The Model B-1 Mechanical Set Bridge Plug can be run with this tool by removing item “Shifter Sub”. Add a ported Tubing Sub for fill up while going in the hole if applicable.

Part Number “Mech Setting Tool”	Pressure Rating
017-3593-000	5,000 ***psi***
017-4312-000	5,000 ***psi***



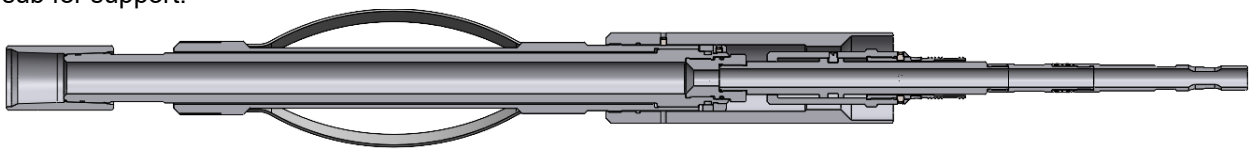
4312 Model “B” Mechanical Setting Tool illustration

GENERAL INFORMATION

1. Use a casing scraper before running any equipment in the well to remove scale and other materials from the casing wall. Any tool that is expected to grip the casing wall has to first reach the casing wall.
2. Circulate the well to clean the well of debris and junk.
3. Drift the casing ID 80-100 feet below setting depth with a full OD gage ring and junk basket to ensure no restrictions or debris exist.
4. Use the correct Sleeve Valve Cement Retainer for the temperature, pressure, casing size, casing weight and environment.
5. Casing should have 100% cement bond before running the cement retainer in the well.
6. Never set the retainer in a casing collar or a location where milling has occurred.
7. Always set the retainer in static well conditions (no fluid or gas movement).
8. When perforating, the cement retainer should be protected with a minimum of ten feet of cement dumped directly on top of the retainer. Cement should be given sufficient time to harden before perforating.
9. Perforating should not be done closer than fifty feet of cement retainer without putting a minimum of 10 ft. of hard cement on top of retainer.

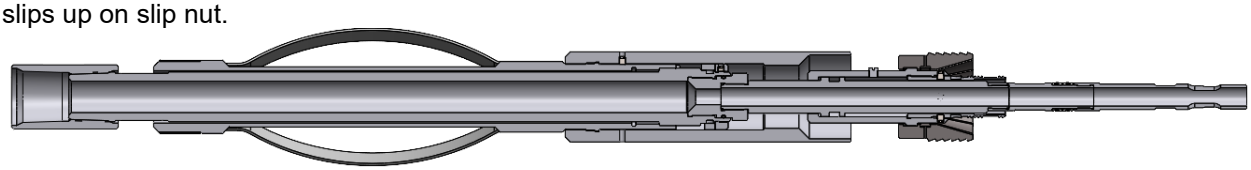
FIELD ASSEMBLY PROCEDURE

STEP 1: Place the mechanical setting tool in vise at the top sub. Place a steady rest under the adjuster sub for support.

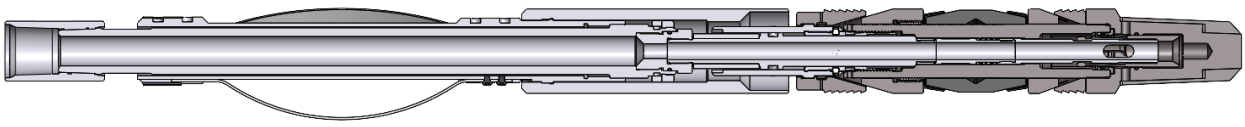


STEP 2: Apply grease to the stinger section of the setting tool.

STEP 3: Rotate drag housing and slip retaining sleeve up off the threads on the lower mandrel. Place slips up on slip nut.



STEP 4: Align Cement Retainer with the setting tool stinger then push the Retainer on setting tool until it engages slotted end of latch thread. Support Cement Retainer with steady rest. Rotate Cement Retainer left hand while pushing it until it bottoms. Back off Right Hand until Shear Screw holes line up. Install Shear Screws. If necessary, place a block of wood across the end of setting tool and strike with a sledge hammer. The stinger needs to go in until the latch threads snap into the retainer threads. Rotate drag housing and slip retaining sleeve over slips. Tighten the set screw in slip retaining sleeve.



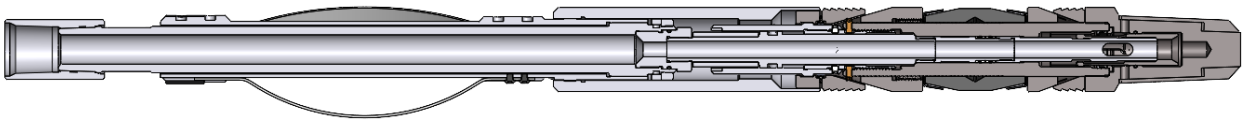


Illustration with 4312 Model “B” Cement Retainer.

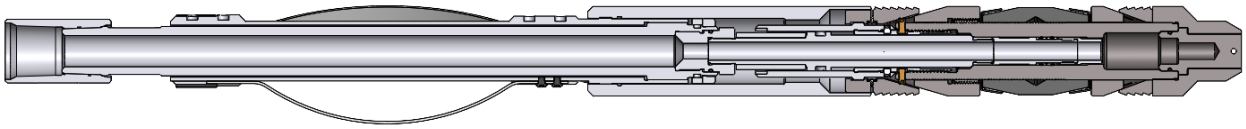
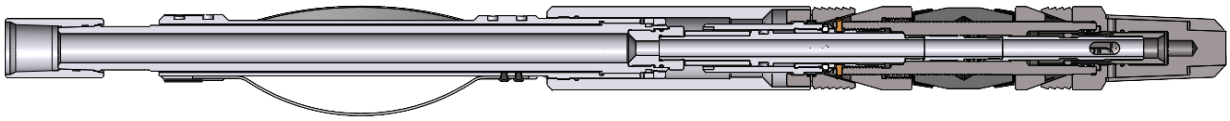


Illustration with 4312 Model “B-1” Bridge Plug.

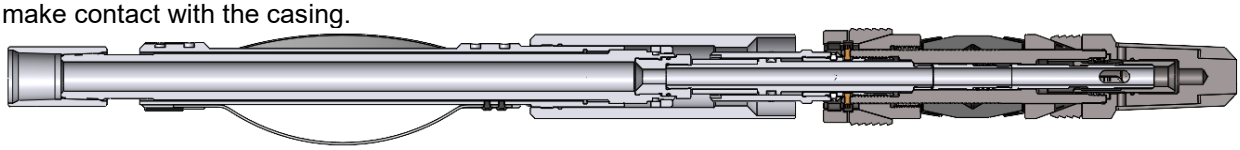
OPERATION PROCEDURE

1. The tool should be run at a moderate speed avoiding sudden stops.

2. Avoid right-hand rotation transmitted to the setting tool. As a precaution, after every 10 stands the tubing or drill pipe can be rotated to the left by hand until torque is felt.

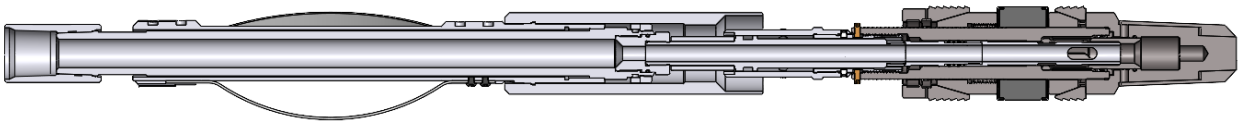


3. At desired setting depth, rotate tubing to the right a minimum of seven turns, releasing the slips to make contact with the casing.



4. Pull into the tubing in one continuous pull. See chart below to view the recommended tension. It is important to calculate this tension through tubing stretch. Do not rely on weight indicators.

Retainer Size	Minimum Tension	Maximum Tension
3.593 – 4.312	22,000 lbs.	30,000 lbs.



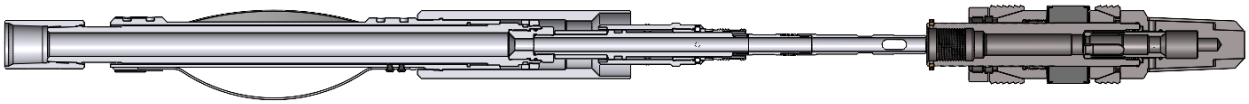
5. After desired pull is reached, lock down the brake on rig to allow setting force to reach retainer. Hold the tension approximately five minutes, then slack off pipe and set approximately to twenty-two thousand pounds weight down insuring retainer or plug is securely set.

TEST OPTIONS

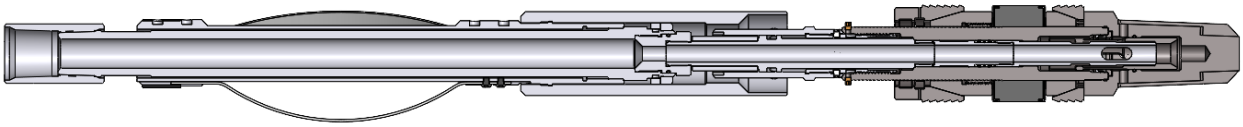
1. The tubing or drill pipe can be pressure tested by simply pulling up five thousand pounds at the tool and applying pump pressure to the tubing.
2. The retainer can now be tested for seal-off by applying pressure down the annulus or by slacking off five thousand pounds weight on retainer and applying pump pressure down the tubing and pumping into formation
3. These tests are performed before the setting tool is released from the retainer
4. If seal-off has not been accomplished, up-strain on the tubing can again be applied and the tools can be retested until seal-off is accomplished

RELEASING RETAINER

1. Hold an up-strain of approximately one thousand pounds on the tubing.
2. Apply torque to the right until torque screws are sheared. Each screw requires 200 - 400 foot/pounds.
3. Continue right-hand rotation for ten turns or until latch is felt releasing



4. After releasing from retainer, the setting tool can be re-latched into the retainer with three to five thousand pounds set-down weight. This stabilizes at two thousand five hundred pounds with repetition.



5. The valve will open when the stinger is fully engaged into the retainer and will close with a 2-inch upward stroke at the tool. The stinger will remain sealed in the bore as long as snap-out force is not exceeded.

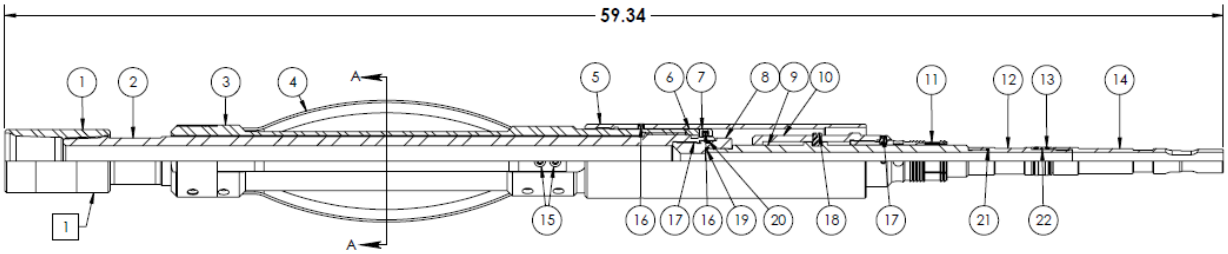
NOTE: The cement retainer body is made of a readily drillable material. Each time the setting tool is snapped out of the retainer, the snap-in and snap-out values will decrease slightly until they reach approximately 2500 (snap-in) and 5000 - 6000 lbs. (snap-out). where they level out. This pattern will occur with each retainer run. Control of the valve is maintained by setting down to open and picking up to close.

ASSEMBLY INSTRUCTIONS FOR MECHANICAL SETTING TOOL

Anti-galling compound should be used on all threads. Downhole grease should be used on all O-rings. To avoid damage to parts, use a soft jaw vise and strap wrenches when tightening connections. Wrench on knurled areas or utilize spanner holes. File away wrench marks.

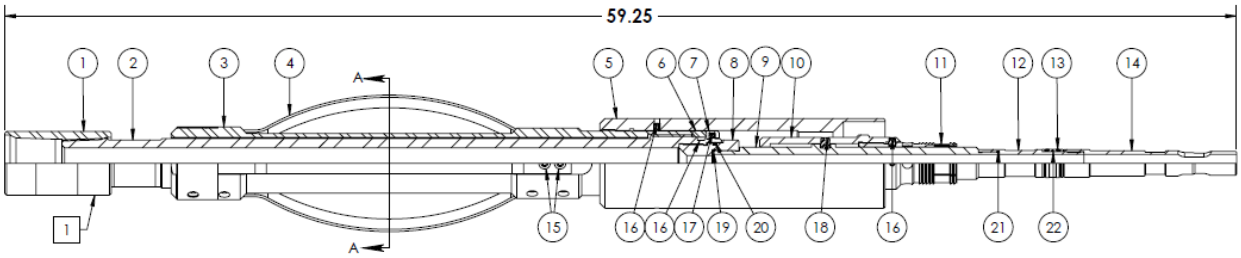
NOTE: Wrench tight means putting your weight on the end of a 24" pipe wrench. Screwdriver tight means hand tight with a medium blade 6" long screwdriver.

3.593 MECHANICAL SETTING TOOL ASSEMBLY ILLUSTRATION



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	016-3500-015	TOP COUPLING	1
2	016-3500-016	UPPER MANDREL	1
3	017-3593-017	DRAG HOUSING	1
4	016-3500-021	DRAG SPRING	3
5	017-3593-024	SLIP RETAINING SLEEVE	1
6	016-3500-025	STOP RING	1
7	016-3500-026	LOCK NUT	1
8	016-3500-035	CROSS OVER	1
9	017-3593-028	LOWER MANDREL	1
10	017-3593-029	SLIP NUT	1
11	017-3593-031	LATCH	1
12	017-3593-032	SEAL SUB	1
13	016-3500-033	MOLDED SEAL	1
14	017-3593-034	SHIFTER SUB	1
15	313B18X313	BHCS 5/16-18 X .313	6
16	313S18X250	5/16-18 X .25 SET SCREW	2
17	313S18X375	5/16-18 X .375 SET SCREW	8
18	016-3500-040	7/16-14 X 5/8 SHEAR SCREW	3
19	000-122N-090	122 O-RING	1
20	000-224-090	224 O-RING	1
21	000-023N-090	023 O-RING	1
22	000-024N-090	024 O-RING	1

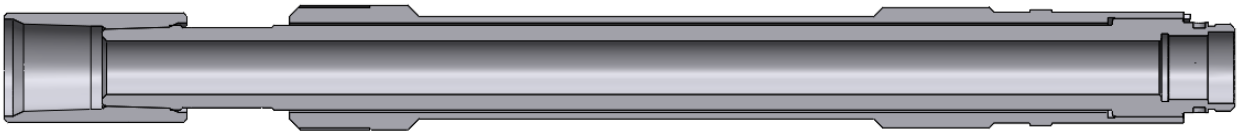
4.312 MECHANICAL SETTING TOOL ASSEMBLY ILLUSTRATION



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	016-3500-015	TOP COUPLING	1
2	016-3500-016	UPPER MANDREL	1
3	017-3593-017	DRAG HOUSING	1
4	016-4240-021	DRAG SPRING	3
5	017-4312-024	SLIP RETAINING SLEEVE	1
6	016-3500-025	STOP RING	1
7	016-3500-026	LOCK NUT	1
8	016-3500-035	CROSS OVER	1
9	017-3593-028	LOWER MANDREL	1
10	017-3593-029	SLIP NUT	1
11	017-3593-031	LATCH	1
12	017-3593-032	SEAL SUB	1
13	016-3500-033	MOLDED SEAL	1
14	017-3593-034	SHIFTER SUB	1
15	313B18X313	BHCS 5/16-18 X .313	6
16	FAS-313S18X375	5/16-18 X .375 SET SCREW	9
17	313S18X250	5/16-18 X .25 SET SCREW	1
18	016-3500-040	7/16-14 X 5/8 SHEAR SCREW	3
19	000-122N-090	122 O-RING	1
20	000-224-090	224 O-RING	1
21	000-023N-090	023 O-RING	1
22	000-024N-090	024 O-RING	1

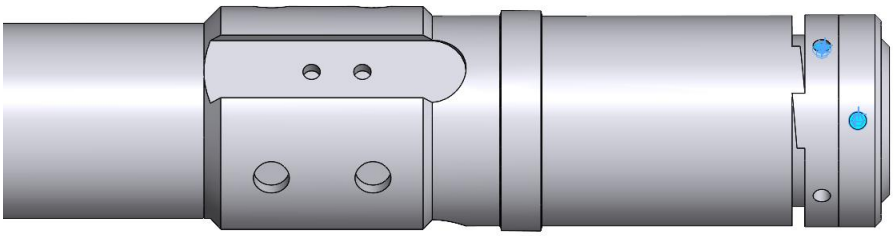
MECHANICAL SETTING TOOL ASSEMBLY STEPS

1. Grease all threads and O-ring surfaces.
2. Slide the Upper Mandrel (item 2) through the Drag Housing (item 3), entering at the end of drag housing with external threads.
3. Screw the Top Coupling (item 1) onto the Upper Mandrel (item 2). Place the Top Coupling in the vise and tighten with wrench placed in the groove on the Upper Mandrel.

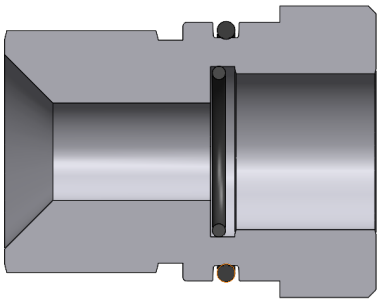


4. Slide on Stop Ring (item 6) then screw on Lock Nut (item 8). Install the Set Screw (item 9) but leave loose.

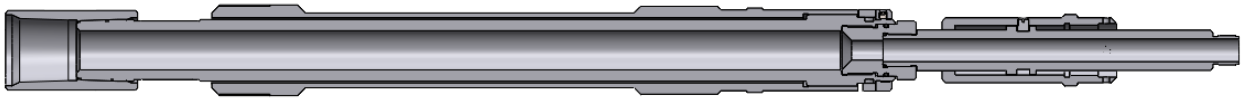
5. Screw the Drag Housing (item 3) toward the Stop Ring (item 6). Turn the Stop Ring with the Drag Housing until maximum surface engagement is obtained. Make certain it will not jam by backing off the Drag Housing one round. If holes in the Stop Ring and the Upper Mandrel are not aligned at this point, turn the Stop Ring to the right until alignment is obtained. Install the Set Screws (item 7). Tighten set crew (item 9).



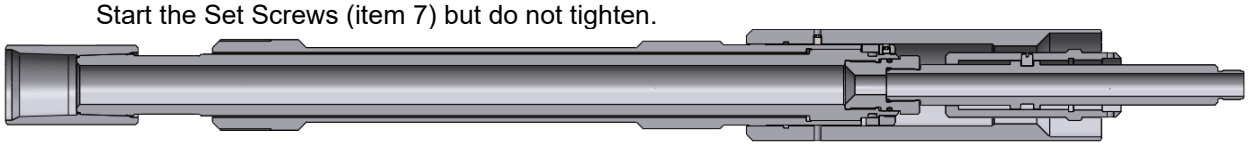
6. Place the O-rings (item 11 and 12) on the outside and inside of the Crossover (item 10).



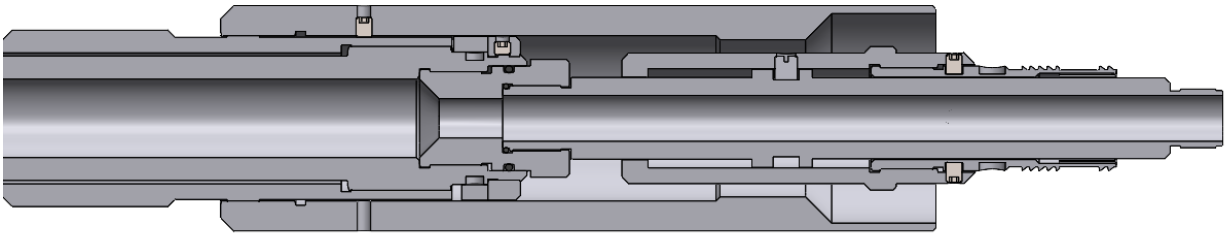
7. Slide the Slip Nut (item 14) over the Lower Mandrel (item 13) and install shear screws (item 15). Screw the Lower Mandrel into Crossover. Screw the Crossover into the Upper Mandrel and tighten



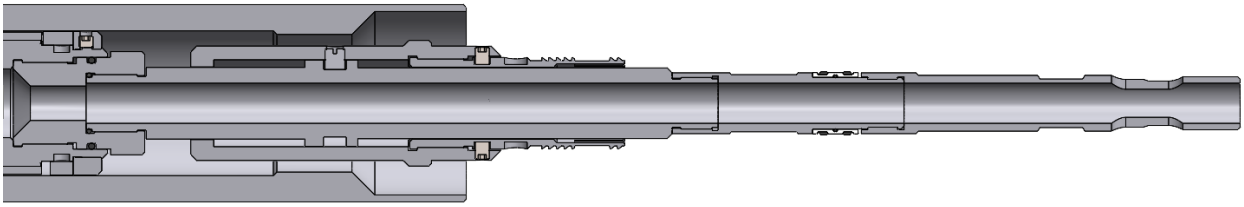
8. Screw the Slip Retaining Sleeve (item 22) onto the Drag Housing (item 3) as far as it can go. Start the Set Screws (item 7) but do not tighten.



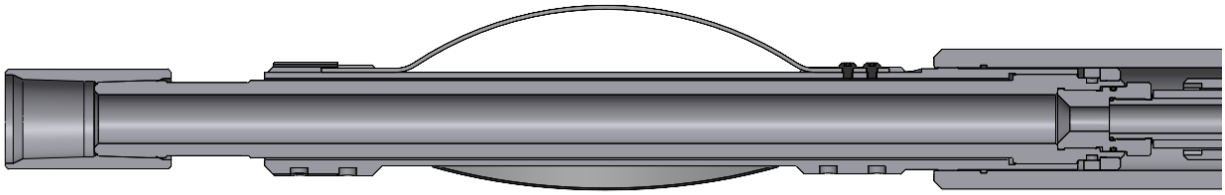
9. Screw the Latch (item 16) into the Slip Nut (item 14) and install Set Screws (item 7).



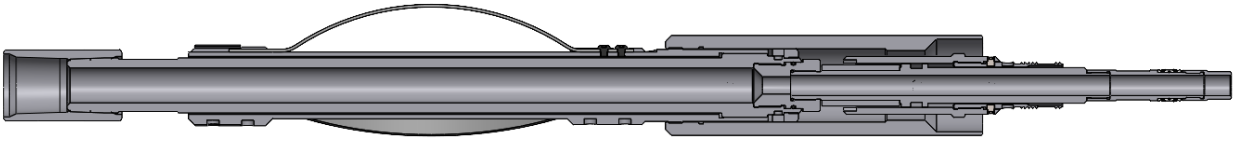
10. Place O-Ring (item 18) on the Seal Sub (item 17) and screw onto the Lower Mandrel. Place the O-Ring (item 20) in the Molded Seal (item 19) and slide onto Seal Sub. Screw the Shifter Sub (item 21) onto Seal Sub and tighten. Pipe wrench placement for shifter sub is just above groove.



11. Slide the Drag Spring (item 4) under the cover on the top Drag Housing (item 3) and then align holes in the Drag Spring and the bottom of Drag Housing. Install Button Head Cap Screws (item 5) in each Drag Spring.



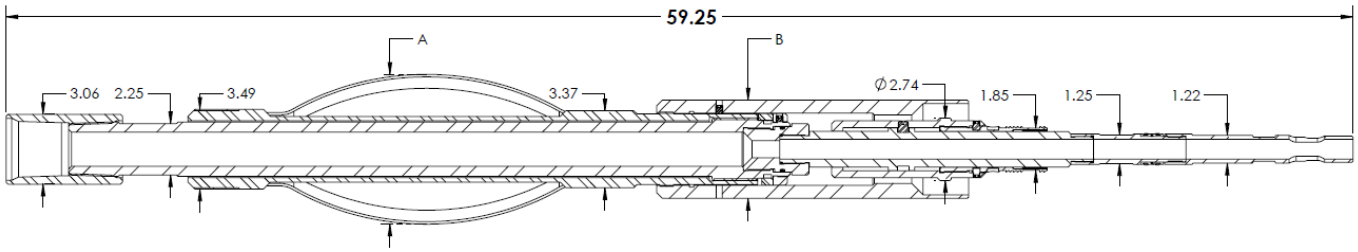
12. When running a B-1 bridge plug remove shifter sub (item 17) and install thread protector (017-3593-050) on Seal Sub (item 16).



DISASSEMBLY OF THE MECHANICAL SETTING TOOL

1. Follow the assembly steps in reverse order.

3.593-4.312 MECHANICAL SETTING TOOL DIMENSIONAL DATA



Part Number "Mech Setting Tool"	"A" (*inches*)	"B" (*inches*)
017-3593-000	6.25	3.59
017-4312-000	6.99	4.31