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**Alpha 3.500 Model FH Hydraulic Setting Tool for 4-1/2" thru 6-5/8" Tubing**

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### **Specification Guide**

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**SPECIFICATION & GUIDELINES FOR RUNNING :**  
**Alpha 3.500 Model FH Hydraulic Setting Tool for 4-1/2 - 6-5/8 Casing**

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1. Use tubing casing scraper or brush before running any equipment in the well to remove scale and other materials from the tubing/casing wall. The bridge plug / cement retainer must grip the tubing/casing wall.
2. Circulate well to clean well of debris and junk.
3. Drift tubing/casing ID 80-100 feet below setting depth with full OD gage ring and junk basket to insure no restrictions or debris exist.
4. Use the correct FH SVCR for the temperature, pressure, tubing size, tubing weight and environment:

<b>FH HST</b>	<b>Part Number</b>	<b>Pressure</b>	<b>Temperature</b>
3.500 OD Model FH HST Suitable for 4-1/2 - 6-5/8 Casing	019-3500-200	5,000 psi	325°
3.593 OD FH Setting Sleeve Conversion Kit	019-3593-210	NA	NA
3.937 OD FH Setting Sleeve Conversion Kit	019-3937-210	NA	NA
4.312 OD FH Setting Sleeve Conversion Kit	019-4312-210	NA	NA

<b>FH SVCR &amp; Conversion Kit</b>	<b>Part Number</b>	<b>Pressure</b>	<b>Temperature</b>
3.593 OD Model FH Sleeve Valve Cement Retainer Suitable for 4-1/2 9.5-16.6 PPF Casing (3.826-4.090 ID)	005-3593-500	5,000 psi	325° F
3.937 OD Model FH Sleeve Valve Cement Retainer Suitable for 5" 11.5-18 PPF Casing (4.154-4.560 ID)	005-3937-500	5,000 psi	325° F
4.312 OD Model FH Sleeve Cement Retainer Suitable for 5-1/2 13-23 PPF Casing (4.580-5.044 ID)	005-4312-500	5,000 psi	325° F

5. Casing should have 100% cement bond before running cement retainer in the well.
6. Never set retainer in casing collar or where milling has occurred.
7. Always set retainer in static well conditions (no fluid or gas movement).
8. When perforating or cutting pipe, cement retainer should be protected with a minimum of ten feet of cement dumped directly on top at a distance no closer than 50 feet. Cement should be given sufficient time to harden before perforating.

## GENERAL INFORMATION

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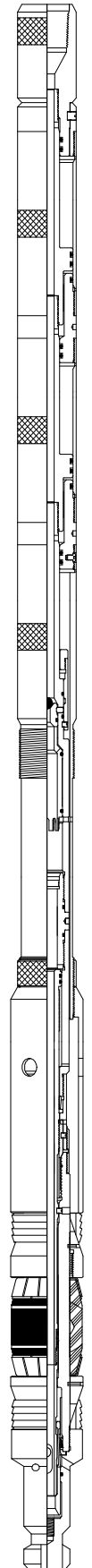


#### General Information:

The Alpha 3.500 OD Model FH Hydraulic Setting Tool is designed to run and fully set an Alpha 3.593-4.937 OD Model FH Sleeve Valve Cement Retainer on coil tubing then squeeze in one trip. This version requires the stinger to be pinned 8,000 pounds to the cement retainer body, enough to perform a 5,000-psi squeeze operation. The cement retainer ports will allow for circulating a maximum rate of 1/4 BPM while going in the hole. **Warning:** The setting sequence will begin at 1,000 psi differential pressure in the tubing "at the tool". No rotation is required; run the FH HST/SVCR tool string below the predetermined setting depth, pick-up to remove slack, drop a 1/2" diameter brass ball. Then, pressure the workstring to establish a 1,000-psi differential at the tool to begin the setting process. Continue pressure the workstring to establish a 1,500-psi differential at the tool and hold for 5-minutes. This allows the cement retainer packing system to conform to the casing ID. Continue pressuring the workstring to establish a 2,200-psi differential at the tool to shear the cement retainer 25,000-pound shear ring. The Alpha Model FH Hydraulic Setting Tool fully sets the cement retainer, unlocks the ball seat, opens the internal flow path for the cement then compensates the setting travel automatically, without loading the 8,000 pound pins keeping the stinger in the cement retainer during the squeeze. After the squeeze operation is performed, pick-up 8,000 pounds over the tubing weight to remove the stinger from the cement retainer and close the valve.

#### How the Model FH Hydraulic Setting Tool works:

The ball lands on the ball seat which diverts the well fluid into the two hydraulic setting chambers (11.8 Square Inches total). Pressuring the workstring to establish a 1,000-psi differential at the tool begins the setting process by shearing (2) 6,000-pound shear screws located at the top of the HST. Pressuring the workstring to 1,500 psi and holding for 5-minutes allows the cement retainer packing system to conform to the casing ID. Continue pressuring the workstring to establish a 2,200-psi differential at the tool shears the 25,000 pound shear ring and fully sets the cement retainer. Pick up 1,000-pounds to confirm FH Cement Retainer is set. The HST continues to stroke and at the end of its 10-1/2" stroke it unlocks the ball seat by shearing (2) 2,000 pound shear screws which positions an undercut over the (2) ball seat locks. These locks are tapered so they cannot enter the cement flow path. The ball seat is now free to move downward, close circulating ports and lock into the tandem sub. The ball seat lock keeps the ball seat from moving upward during the reverse circulation process which keeps the flow path the same as the HST ID. The stinger remains pinned in the cement retainer body, unaffected by the setting force because the stroke compensation sleeve moves independently from the stinger. Set down 4,000-pounds and 5,000 psi max squeeze operation can now be performed. The stinger is only affected by pulling upward on the coil tubing which will engage the lock ring on the stinger buttress thread. After the squeeze operation is completed overpull 8,000 pounds at the tool to disconnect from the cement retainer.



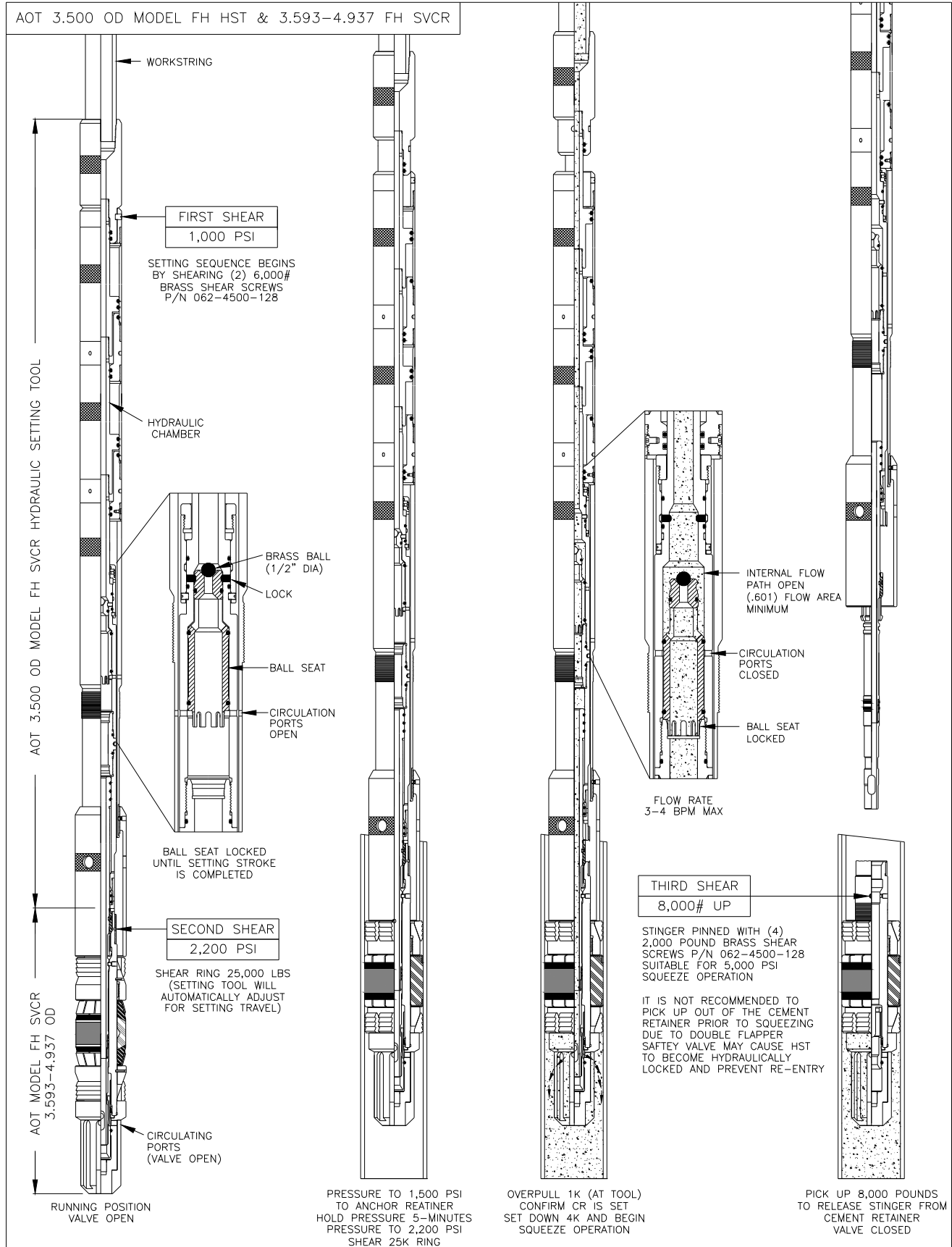
# GENERAL INFORMATION

## Alpha 3.500 Model FH Hydraulic Setting Tool for 4-1/2" - 5-1/2" Tubing

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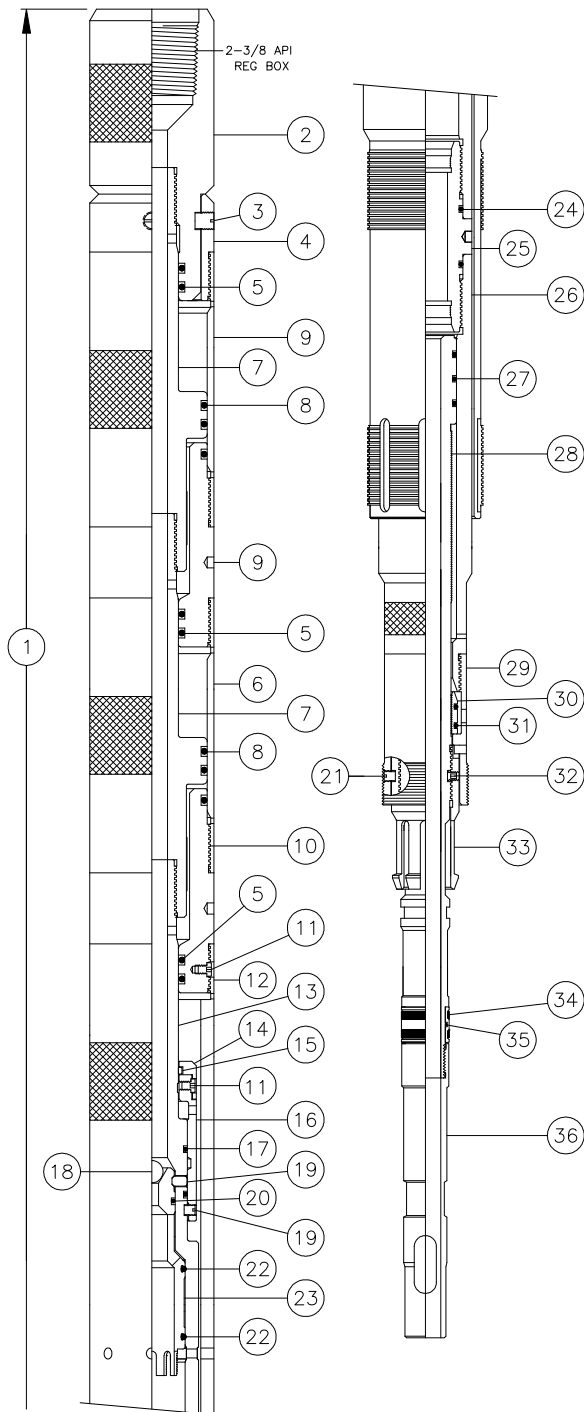
# ASSEMBLY DRAWING & PARTS LIST

## Alpha 3.500 Model FH Hydraulic Setting Tool for 4-1/2" thru 5-1/2" Tubing

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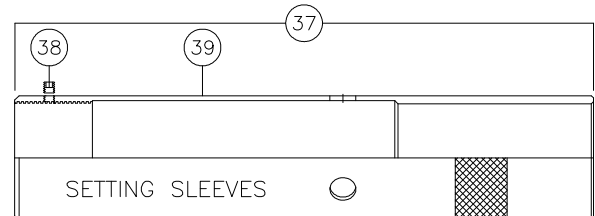
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### PARTS LIST

ITEM	DESCRIPTION	QTY	PART NUMBER
1	AOT 3.500 OD MODEL FH "BASIC" HYDRAULIC SETTING TOOL	1	019-3500-200
2	TOP SUB - 2-3/8 API REG BOX UP	1	019-3500-220
3	BRASS SHEAR SCREW (6,000 LBS)	2	062-4500-128
4	CYLINDER CAP	1	019-3500-221
5	O-RING (70 DURO NITRILE)	6	000-325N-070
6	CYLINDER	2	019-3500-222
7	PISTON	2	019-3500-223
8	O-RING (70 DURO NITRILE)	6	000-335N-070
9	UPPER CONNECTOR	1	019-3500-224
10	LOWER CONNECTOR	1	019-3500-225
11	LOW HEAD SOCKET CAP SCREW	4	.250-20 x .250 LG
12	PUSH SLEEVE	1	019-3500-226
13	BALL SEAT HOUSING (WITH CIRC. PORTS)	1	019-3500-237
14	LOCK RETAINER NUT	1	019-3500-231
15	SNAP RING	1	019-3500-232
16	LOCK RETAINER	1	121-3500-230
17	O-RING (70 DURO NITRILE)	2	000-224N-070
18	BRASS BALL (.625 DIA)	1	120-3812-236
19	BALL SEAT LOCK	2	121-3500-229
20	O-RING (90 DURO NITRILE)	1	000-215N-090
21	BRASS SHEAR SCREW (2,000 LBS)	3	062-4500-127
22	O-RING (70-DURO NITRILE)	2	000-223N-070
23	BALL SEAT	1	019-3500-228
24	O-RING (90-DURO NITRILE)	2	000-225N-090
25	TANDEM SUB	1	019-3500-242
26	STROKE COMPENSATION HOUSING	1	019-3500-243
27	O-RING (70-DURO NITRILE)	3	000-222N-070
28	STINGER/STROKE COMPENSATION PISTON	1	019-3500-244
29	LATCH HOUSING	1	019-3500-240
30	STINGER LATCH	3-PC	019-3500-241
31	O-RING (90 DURO NITRILE)	2	000-129N-090
32	SOCKET HEAD SET SCREW	1	.250-20 x .250 LG
33	SNAP LATCH	1	019-3500-250
34	MOLDED STINGER SEAL	1	016-3500-033
35	O-RING (90 DURO NITRILE)	1	000-024N-090
36	SHIFTER SUB	1	017-3593-034



### PARTS LIST

ITEM	DESCRIPTION	QTY	3.593	3.937	4.312
37	SETTING SLEEVE CONVERSION KIT FH HYDRAULIC SETTING TOOL	1	019-3593-210	019-3937-210	019-4312-210
38	SOCKET HEAD SET SCREW	2	.312-18 x .312 LG	.312-18 x .500 LG	.312-18 x .500 LG
39	SETTING SLEEVE	1	019-3593-247	019-3937-247	019-4312-247