P/N 019-1750-200 1.750 OD Model FH Hydraulic Setting Tool
P/N 019-1750-210 1.750 OD Model FH Setting Sleeve Conversion Kit
P/N 005-1750-500 1.750 OD Model FH Sleeve Valve Cement Retainer suitable for 2-3/8 4.6-4.7 PPF Tubing
Also available with poppet check valve or bridge plug.

General Information:

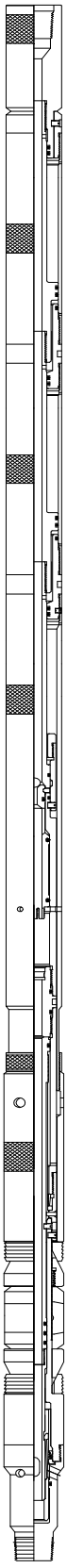
The 1.750 OD Model FH Hydraulic Setting Tool is designed to run and fully set a 1.750 Model FH Sleeve Valve Cement Retainer on coil tubing then squeeze in one trip. No rotation is required. Run the FH-HST/CR tool string below the predetermined setting depth, pick-up to remove slack, drop a 3/8" diameter brass ball then, pressure the workstring to establish a 1,000-psi differential at the tool to begin the setting process. Continue pressuring 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 tubing ID. Continue pressuring the workstring to establish a 2,000-psi differential at the tool to shear the cement retainer 8,000-pound disconnect. Note stinger is pinned 2,000# in cement retainer and is not affected by the setting force.

Size Cement Retainer	Differential Set Pressure @ Tool	Setting Force	Flow Area
1.750 OD FH SVCR	2,000 PSI	8,000 #	.13 Sq In

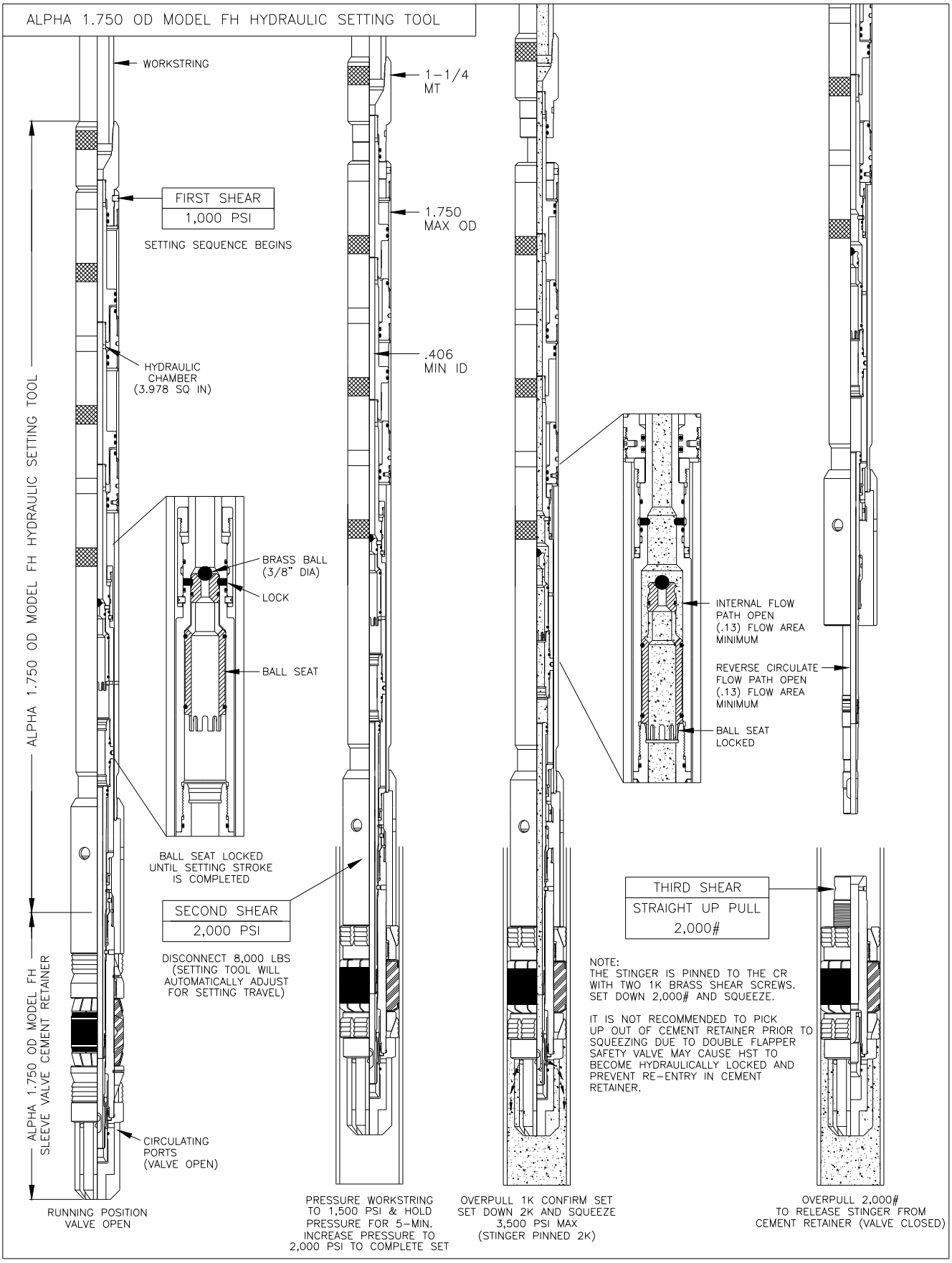
Pick up 1,000 pounds over tubing weight to determine if cement retainer is set. Remain in cement retainer (stinger pinned 2,000#). It is not recommended to pick up out of cement retainer prior to squeezing due to double flapper safety valve may cause HST to become hydraulically locked and prevent re-entry in cement retainer. Set down 2,000 pounds for a 3,500 psi maximum squeeze.

How the Model FH Hydraulic Setting Tool works:

The ball lands on the ball seat which diverts the well fluid into the three hydraulic setting chambers (3.978 total piston area). Pressure the workstring to establish a 1,500-psi differential at the tool and hold for 5-minutes to allow the cement retainer packing system to conform to the tubing ID. Continue pressuring the workstring to 2,000-psi differential pressure (PSI) at the tool shears to disconnect and fully set the cement retainer. The FH-HST continues to stroke and at the end of its 6" stroke it unlocks the ball seat by shearing (1) 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 circulation ports and latch into the tandem sub. The ball seat latch 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 2,000 pounds in the cement retainer body, unaffected by the setting force because the stroke compensation sleeve moves independently from the stinger. Overpull 2,000# and remove stinger from cement retainer. See operational illustration next page.



FH CR SHOWN
W/ PIN DOWN


ALPHA 1.750 OD MODEL FH HYDRAULIC SETTING TOOL
WORKSTRING
1-1/4 MT
FIRST SHEAR
1,000 PSI
SETTING SEQUENCE BEGINS
1.750 MAX OD
.406 MIN ID
HYDRAULIC CHAMBER (3.978 SQ IN)
ALPHA 1.750 OD MODEL FH HYDRAULIC SETTING TOOL
BRASS BALL (3/8" DIA)
LOCK
BALL SEAT
BALL SEAT LOCKED UNTIL SETTING STROKE IS COMPLETED
SECOND SHEAR
2,000 PSI
DISCONNECT 8,000 LBS (SETTING TOOL WILL AUTOMATICALLY ADJUST FOR SETTING TRAVEL)
ALPHA 1.750 OD MODEL FH SLEEVE VALVE CEMENT RETAINER
CIRCULATING PORTS (VALVE OPEN)
RUNNING POSITION VALVE OPEN
PRESSURE WORKSTRING TO 1,500 PSI & HOLD PRESSURE FOR 5-MIN. INCREASE PRESSURE TO 2,000 PSI TO COMPLETE SET
OVERPULL 1K CONFIRM SET SET DOWN 2K AND SQUEEZE 3,500 PSI MAX (STINGER PINNED 2K)
INTERNAL FLOW PATH OPEN (.13) FLOW AREA MINIMUM
REVERSE CIRCULATE FLOW PATH OPEN (.13) FLOW AREA MINIMUM
BALL SEAT LOCKED
THIRD SHEAR
STRAIGHT UP PULL
2,000#
NOTE:
THE STINGER IS PINNED TO THE CR WITH TWO 1K BRASS SHEAR SCREWS. SET DOWN 2,000# AND SQUEEZE.
IT IS NOT RECOMMENDED TO PICK UP OUT OF CEMENT RETAINER PRIOR TO SQUEEZING DUE TO DOUBLE FLAPPER SAFETY VALVE MAY CAUSE HST TO BECOME HYDRAULICALLY LOCKED AND PREVENT RE-ENTRY IN CEMENT RETAINER.
OVERPULL 2,000# TO RELEASE STINGER FROM CEMENT RETAINER (VALVE CLOSED)

SPECIFICATION & GUIDELINES FOR RUNNING:
Alpha 1.750 Model FH Hydraulic Setting Tool for 2-3/8 Tubing

GENERAL INFORMATION:

1. Use casing scraper or brush 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 well to clean well of debris and junk.

3. Drift 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, casing size, casing weight and environment:

FH HST	Part Number	Pressure	Temperature
1.750 OD Model FH HST	019-1750-200	3,500 psi	325º
1.750 OD FH Setting Sleeve Conversion Kit	019-1750-210	NA	NA

FH SVCR	Part Number	Pressure	Temperature
1.750 OD Model FH Sleeve Valve Cement Retainer Suitable for 2-3/8 4.6-4.7 PPF Tubing (1.995 ID)	005-1750-500	3,500 psi	325º 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).

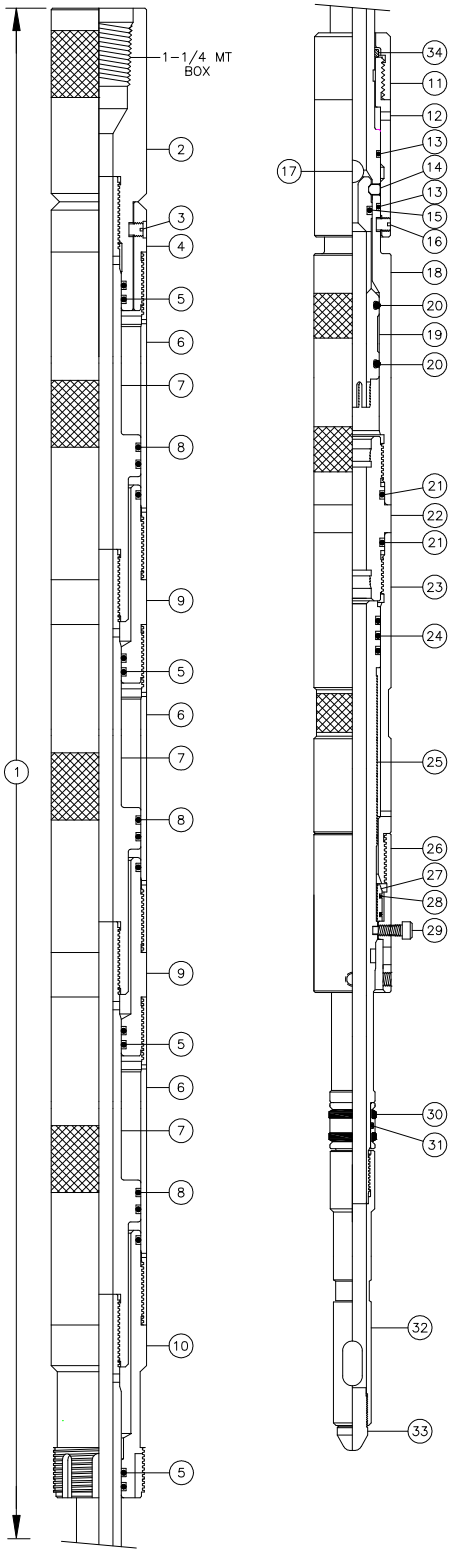
8. When perforating or cutting pipe, cement retainer should be protected with a minimum of ten feet of cement dumped directly on top at a distance no closer than 50 feet. Cement should be given sufficient time to harden before perforating.

PARTS LIST:

Alpha 1.750 Model FH Hydraulic Setting Tool for 2-3/8” Tubing
Alpha 1.750 Model FH SVCR

Date: April 15, 2005

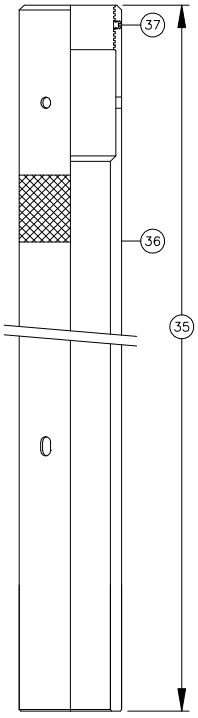
Rev: 1 (11-28-19)



ITEM	DESCRIPTION	QTY	1.750 OD
1	ALPHA 1.750 OD MODEL FH "BASIC" HYDRAULIC SETTING TOOL	1	019-1750-200
2	TOP SUB - 1-1/4 MT BOX UP	1	019-1750-220
3	BRASS SHEAR SCREW (2,000 LBS)	2	062-4500-127
4	CYLINDER CAP	1	019-1750-221
5	O-RING (70 DURO NITRILE)	8	-210
6	CYLINDER	3	019-1750-222
7	PISTON	3	019-1750-223
8	O-RING (70 DURO NITRILE)	9	-218
9	UPPER CONNECTOR	2	019-1750-224
10	LOWER CONNECTOR	1	019-1750-225
11	LOCK RETAINER NUT	1	019-1750-231
12	LOCK RETAINER	1	019-1750-230
13	O-RING (70 DURO NITRILE)	2	-117
14	BALL SEAT LOCK	2	019-1750-229
15	O-RING (90-DURO NITRILE)	1	-204
16	BRASS SHEAR SCREW (2,000 LBS)	1	062-4500-127
17	BRASS BALL (.375 DIA)	1	019-1750-236
18	BALL SEAT HOUSING (WITHOUT PORTS)	1	019-1750-227
19	BALL SEAT	1	019-1750-228
20	O-RING (70 DURO NITRILE)	2	-210
21	O-RING (90-DURO NITRILE)	2	-214
22	TANDEM SUB	1	019-1750-242
23	STROKE COMPENSATION HOUSING	1	019-1750-243
24	O-RING (70 DURO NITRILE)	3	-210
25	STINGER/STROKE COMPENSATION PISTON	1	019-1750-244
26	LATCH HOUSING	1	019-1750-240
27	STINGER LATCH	3-PC	019-1750-241
28	O-RING (90 DURO NITRILE)	2	-021
29	SOCKET HEAD "ALIGNMENT" CAP SCREW	1	1/4-20 x 1" LG
30	MOLDED STINGER SEAL	1	019-1750-233
31	O-RING (70 DURO NITRILE)	1	-015
32	SHIFTER SUB	1	019-1750-234
33	SHIFTER SUB GUIDE	1	019-1750-235
34	SNAP RING	1	019-1750-232

ITEM	DESCRIPTION	QTY	1.750 OD
35	ALPHA 1.750 OD SETTING SLEEVE CONVERSION KIT	1	019-1750-210
36	SETTING SLEEVE	1	019-1750-247
37	SOCKET HEAD SET SCREW	2	1/4-20 x 1/4 LG

ALL DIMENSIONS ARE GIVEN IN INCHES.

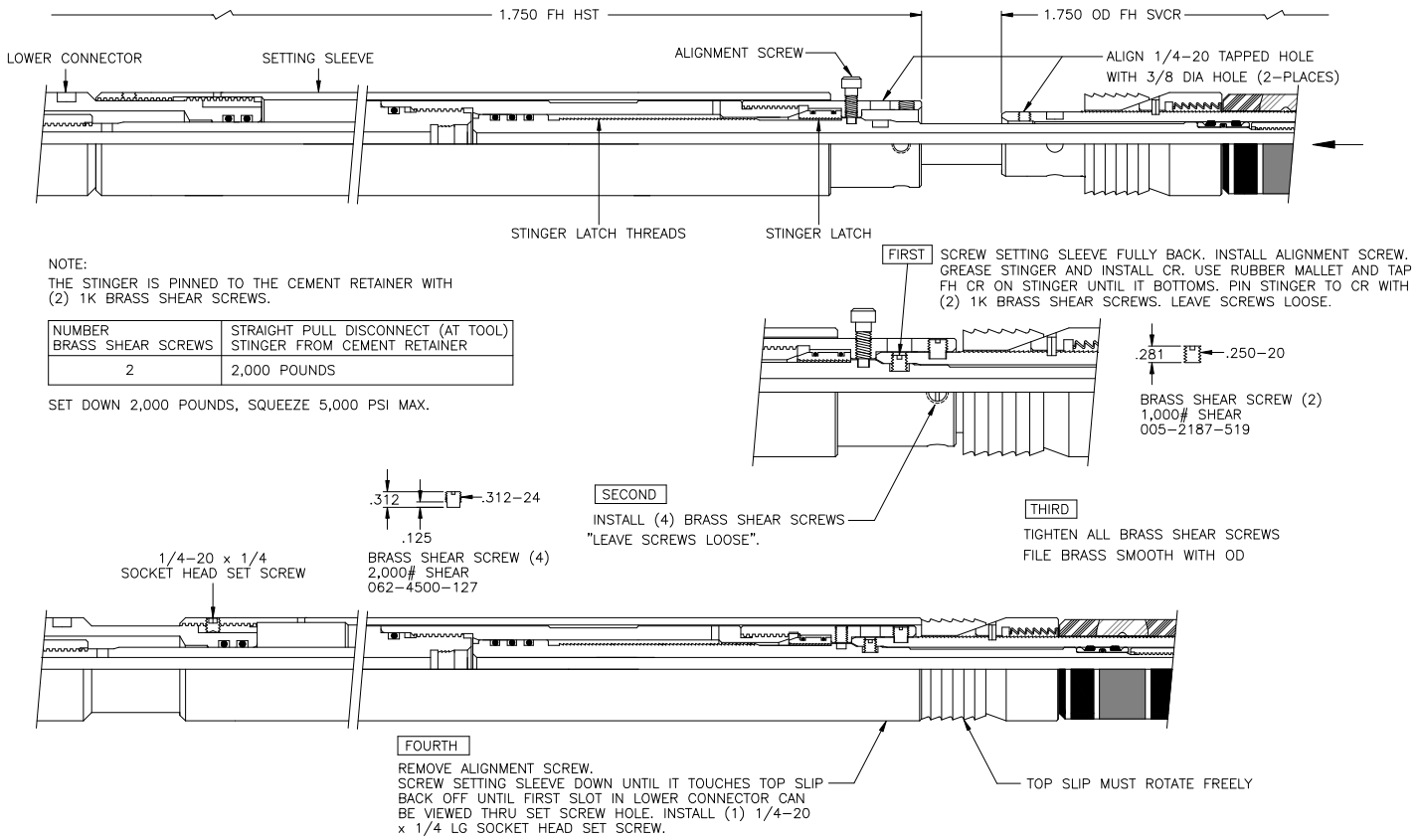


FIELD ASSEMBLY PROCEDURE :

1. Position HST in vise at the center connector (do not place Cylinder in vise). Screw Setting Sleeve fully on Lower Connector then push back against shoulder. Rotate HST in vise until 3/8-diameter hole in Latch Housing is facing up. Install alignment screw.

2. Lubricate CR Seal Bore and HST Stinger. Slide CR on Stinger then align 1/4-20 tapped hole in CR Body with 3/8 diameter hole in Latch Housing. Install (2) Brass Shear Screws through Latch Housing and into Stinger (Stroke Compensation Piston). Leave screw loose. Remaining (4) Brass Shear Screw holes will automatically align. Install remaining (4) Brass Shear Screws. Leave all screws loose. Tighten all (6) Brass Shear Screws.

3. Remove alignment screw. Screw Setting Sleeve down until it touches CR Top Slip. Back off until first slot in lower connector can be viewed thru set screw hole. Install (1) 1/4-20 x 1/4 long socket head set screw.



4. Screw Alpha 1.750 OD Model FH Hydraulic Setting Tool on end of workstring. Hold back-up on HST Top Sub and thread workstring connector in power tight. Do not rotate HST / CR tool string during make-up. Incorporate in workstring a Hydraulic Disconnect and Tubing Centralizer above HST. The 1.750 OD Model FH Hydraulic Setting Tool uses a 3/8 diameter Brass Ball to activate the CR.

OPERATIONAL PROCEDURE :

1. Run the Alpha Model FH Hydraulic Setting Tool and Cement Retainer several feet below the setting depth. The HST circulation ports located below the ball seat and in the CR valve shoe for circulating a maximum rate of ¼ BPM while going in the hole. Well fluid must clean and free of debris (sand) for the HST to work properly. Warning: The setting sequence will begin at 1,000 psi differential pressure in the tubing "at the tool" (see step 4).

2. Pick up slowly to setting depth to remove slack from tubing string.

3. Drop a 3/8" diameter brass ball and slowly pump down until it has seated (pressure increase).

4. Slowly pressure workstring to establish a 1,000 psi (1,500 psi max) differential pressure inside the tubing "at the tool" to begin the setting sequence.

5. Continue pressuring workstring to establish a 1,500 psi differential pressure inside the tubing "at the tool" to anchor the cement retainer against the casing wall. Pick up coil to the neutral position. Hold pressure for 5 minutes**.**

6. Continue pressuring workstring to establish a 2,000 psi (3,000 psi max) differential pressure inside the tubing "at the tool" to complete the set (weight indicator will drop off). Pick up 1,000# on coil to confirm CR is set.

7. Set down 2,000# on cement retainer and squeeze 5,000 psi maximum (stinger pinned 2K).

TROUBLE SHOOTING :

1. If HST does not set CR
   Pressure workstring to establish a 2,000 psi (3,000 max) differential pressure inside the tubing "at the tool" to release from cement retainer.

   If unsuccessful, then bleed off pressure and reverse circulate capacity of the tubing (+10 BBL) to remove debris that may be inside the tubing and tool. Circulate Ball back to the Ball Seat and attempt pressuring tubing again to 3,000 psi max. Note: The Ball Seat cannot be pumped out until the setting stroke has been completed.

   Carefully remove workstring from well.

2. If HST does not disconnect from CR

   Pull 1,000 pounds over tubing weight and pressure workstring to establish a 2,000 psi (3,000 max) differential pressure inside the tubing "at the tool" to release from cement retainer.

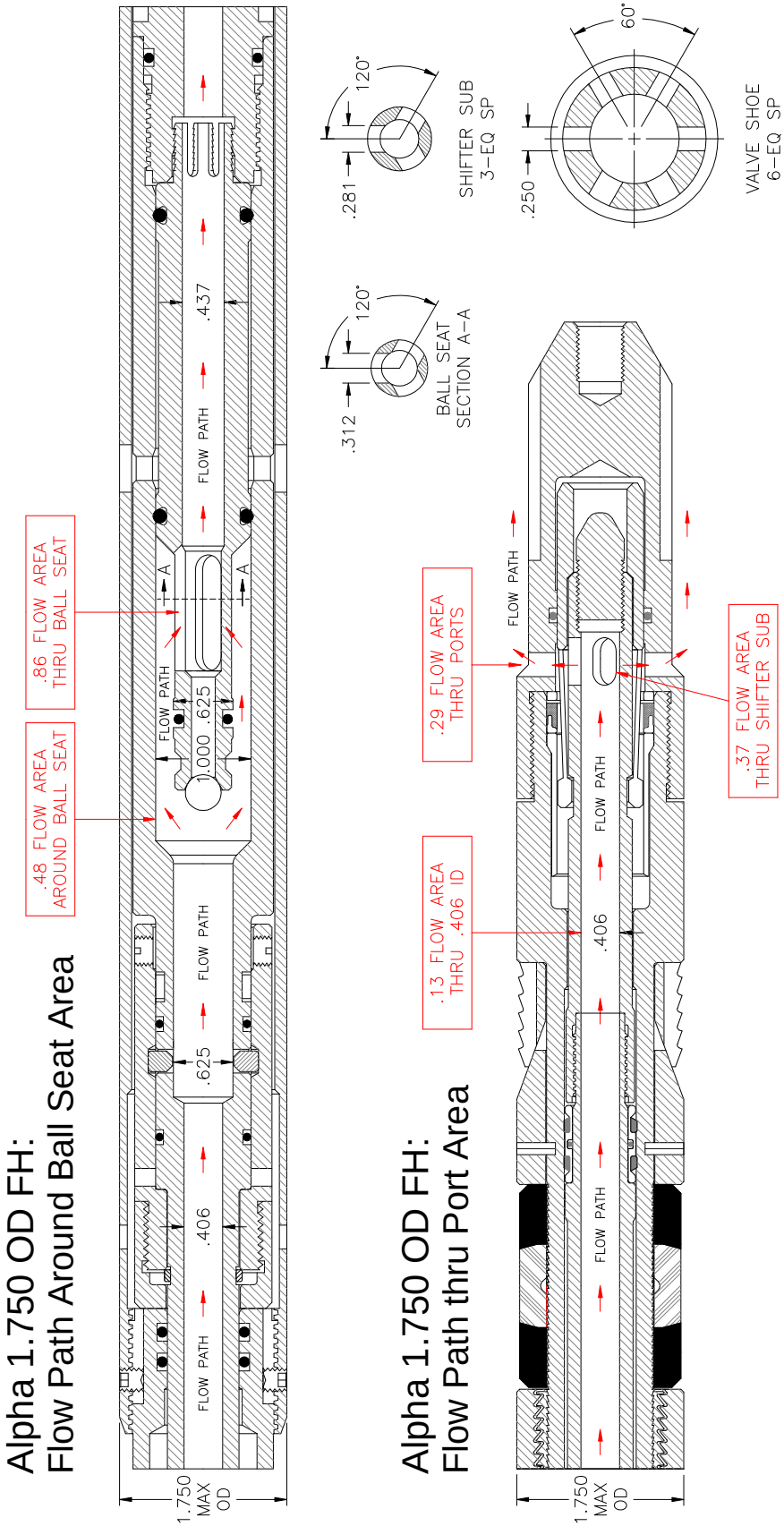
   If unsuccessful, then bleed off pressure, return tubing to the neutral point and reverse circulate capacity of the tubing (+10 BBL) to remove debris that may be inside the tubing and tool. Circulate Ball back to the Ball Seat and attempt pressuring tubing again to 3,000 psi max. Note: The Ball Seat cannot be pumped out until the setting stroke has been completed.

   Pull 8,000 pounds (CR disconnect valve) over tubing weight.

FLOW PATH

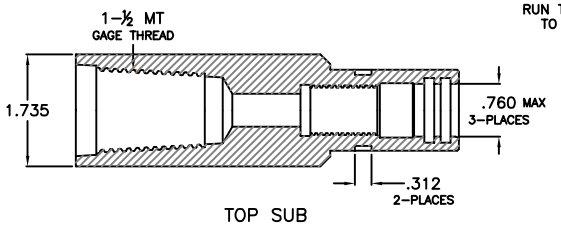
Alpha 1.750 Model FH Hydraulic Setting Tool for 2-3/8" Tubing
Alpha 1.750 Model FH SVCR

Date: April 15, 2005
Page: 1 of 1
Rev: 1 (11-28-19)

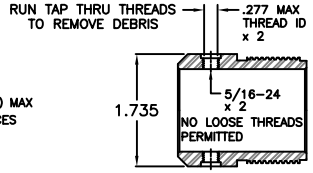


DRAWING NUMBER	REV: 0
019-1750-200 WEAR DIMENSIONS	

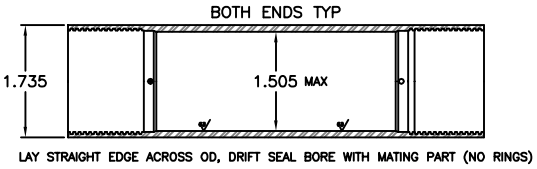
DIMENSIONS SHOWN ARE CRITICAL. TOOLS NEEDED: CALIPER, OD & ID MICS, 18" METAL SCALE, 5/16-24 TAP. PROCEDURE: REMOVE O-RINGS, CLEAN ASSEMBLY, VISUALLY INSPECT. CHECK GIVEN DIMENSIONS



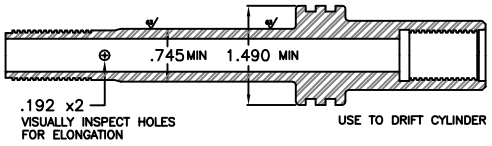
TOP SUB
019-1750-220



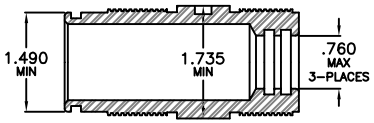
CYLINDER CAP
019-1750-221



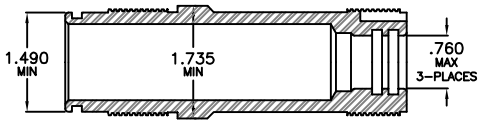
CYLINDER
019-1750-222



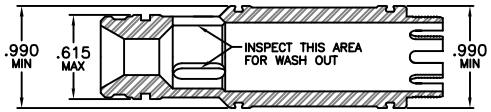
PISTON
019-1750-223



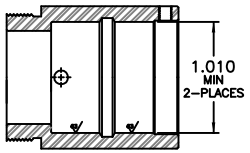
UPPER CONNECTOR
019-1750-224



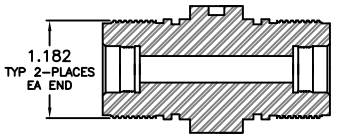
LOWER CONNECTOR
019-1750-225



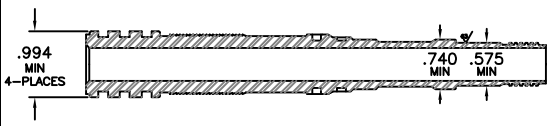
BALL SEAT HOUSING
019-1750-227



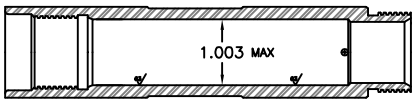
LOCK RETAINER
019-1750-230



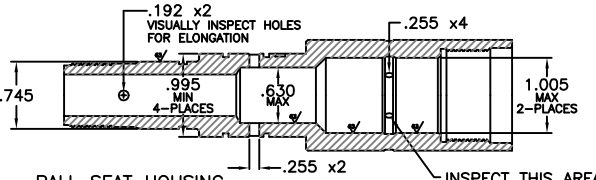
TANDEM SUB
019-1750-242



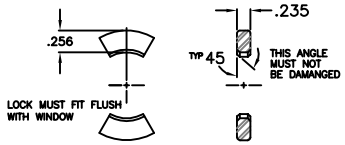
STINGER COMPENSATION PISTON
019-1750-244



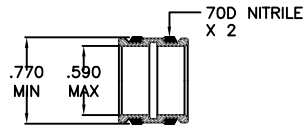
STROKE COMPENSATION HOUSING
019-1750-243



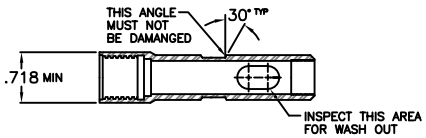
BALL SEAT HOUSING
019-1750-237



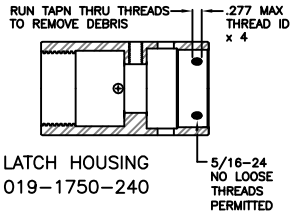
BALL SEAT LOCK
019-1750-229



STINGER MOLDED SEAL
019-1750-233



SHIFTER SUB
019-1750-234



LATCH HOUSING
019-1750-240

REV	DESCRIPTION	DATE	BY
R4			
R3			
R2			
R1			

DATE: 5-04-20 | DRAWN: AT | APPROVED BY: XT | SCALE: FULL

TOLERANCES UNLESS NOTED OTHERWISE
DECIMAL ± .015, FRACTIONAL ± 1/64, ANGULAR ± 1/2°
O-RING GROOVES REF EDM 225
ALL DIAMETERS CONCENTRIC WITHIN +/- .002 TIR
BREAK SHARP EDGES 1/64 RADIUS
FINISH MARK INDICATES POLISH FINISH 32 63 125
"CONFIDENTIAL INFORMATION DO NOT REPRODUCE"

MATERIAL: ALLOY STEEL, NITRILE | TREATMENT: BLACK OXIDE & OIL
HEAT TREAT: | VENDOR:

WEAR DIMENSIONS
1.750 FH HYDRAULIC SETTING TOOL

Alpha Oil Tools
A DIVISION OF SHARP ENERGY GROUP
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(817) 293-5192 www.alphaoiltools.com