Model SXA Sliding Sleeve is a down-hole flow control device mounted in the production tubing. It effectively controls the flow between the tubing and the casing annulus by means of an internal sleeve which can be opened or closed.

The SXA Sleeve can be installed at any point in the tubing string, and more than one can be installed without any loss of function. The sleeve can be selectively opened and closed no matter what their positions. The Model ‘B’ Shifting Tool is used to shift the SXA Sleeve open and closed. Upward jarring OPENS the sleeve and downward jarring CLOSES it. The sleeve is designed so that normal wireline activities will not open or close the sleeve inadvertently.

The SXA Sleeve has replaceable upper and lower seals, which are easy and inexpensive to replace. They can be of various elastomeric or non-elastomeric types. The upper sub has a selective SOX landing nipple profile machined into it to serve as a receptacle for other flow control devices such as blanking plugs and separation tools. The lower sub has a polished seal bore.

APPLICATIONS

- Displacing kill or completion fluid.
- Allowing multiple zones to produce up one tubing string.
- Selective testing of individual zones.
- Selective stimulation of individual zones.
- Circulation to kill the well.
- Gas lifting the well.
- Landing a blanking plug in the profile in the upper sub to shut in the well, test the tubing, or test the sleeve itself.
- Circulating inhibitors or methanol.
The SXA Sliding Sleeve consists of the following:

- Top Sub
- Middle Sub
- Inner Sleeve (Closing Sleeve)
- Packing Sets
- Bottom Sub

The Top Sub connects to the tubing string. It contains a SOX Style Locking Profile and Polish Bore. It has an inclined shoulder which causes the Model 'B' Shifting Tool to release after the Inner Sleeve reaches an up position. The lower end of the Top Sub is threaded to fit the Middle Sub and is sealed by the Top Sub's O-Ring.

The Middle Sub screws onto both the Top and Bottom Sub. It provides flow ports for communication and provides for the positioning and sealing of the packing.

The Packing Sets consist of three separate groups. The Upper Packing is made up of two sets of Vee packing secured between two female steel adapters and separated by a male adapter or O-ring. The Middle Set consists of a middle O-ring which is secured between two female steel adapters and is held in place by split ring segments. The Bottom Set consists of two sets of Vee packing secured between two female steel adapters and separated by a male adapter and O-ring.

The Inner Sleeve fits inside the Middle and the Top and Bottom Subs. It has a collet latch for positioning, an equalizing port, and flow ports for communication. The Shifting Key recesses are inside either end of the Inner Sleeve, allowing the shifting tool to latch into and move the Inner Sleeve either up or down.

The Bottom Sub screws onto the Middle Sub and a bottom O-ring seals this joint. The SXA Bottom Sub contains a bottom polish bore as well as an inclined shoulder to release the Model 'B' Shifting Tool after shifting the Inner Sleeve. The lower end of the sub screws into the tubing string.

The SXA Sleeve always opens (shifting UP) and closes (shifting DOWN).
SHIFTING PROCEDURE

TO OPEN (shifting UP):

Place Model 'B' Shifting Tool on bottom of wireline work string with shifting keys looking up. Go into hole to a point where you are sure you have gone through Sleeve. Slowly pick back up through Sleeve. Your Shifting Tool should engage the top of the Inner Sleeve at the internal shifting shoulder.

Jar up. The Inner Sleeve should move into the equalizing position. After equalizing, continue jarring up until the Inner Sleeve is in the full open position. At this time the Shifting Tool should release and move up hole easily when pulled.

To check Sleeve, drop back down into Sleeve and try to engage Inner Sleeve. If you cannot engage, assume Sleeve is opened and come out of hole. Check shear pin on Shifting Tool. If shear pin is not sheared, then you can assume sleeve is shifted. Flowing either the tubing or casing should affect both sides if Sleeve is opened.

TO CLOSE (shifting DOWN):

Using the correct Model 'B' Shifting Tool or alternate manufacturer’s equivalent, place the tool on the bottom of your wireline work string with the engaging (shifting) keys looking down. Go into hole to proper depth of sleeve. Your Shifting Tool should engage the bottom of the Inner Sleeve at the internal shifting shoulder.

Jar down and continue jarring until the Inner Sleeve is shifted into the closed position. At this time the Shifting Tool should release and fall through the Sleeve.

To check Sleeve to see if it is fully closed, pull back up into Sleeve and try to engage Inner Sleeve. If you cannot engage Inner Sleeve, it is fully closed or shear pin is sheared on Shifting Tool. Come out of hole and check Shifting Tool. If pin is not sheared, then you can assume Sleeve is shifted. Flowing either the tubing or casing should not affect the other side if Sleeve is closed.
ASSEMBLY INSTRUCTIONS

Use grease or pipe dope on all threaded connections and white grease on all O-rings, Vee seals, and Inner Sleeve.

1. PREPARE UPPER AND LOWER SUBS

1.1. Drift both upper and lower seal bores with appropriate sized drift.

1.2. Grease the threads and seal bores on both the Upper and Lower Subs.

1.3. Put Upper Sub in vice.

1.4. Install O-rings onto Upper and Lower subs.

1.5. Insert the Inner Sleeve into the Upper Sub collet fingers first until it stops.

1.6. Grease the O-ring on the Upper Sub and protruding part on the Inner Sleeve.

1.7. Grease the O-Ring on the Lower Sub.

2. PREPARE BOTTOM END OF MIDDLE HOUSING

2.1. Hold the Middle Housing so that the bottom end is facing up (segment groove facing up) insert one Female Adapter Ring with grooved side facing up.

2.2. Insert one O-ring into the groove in Female Ring.

2.3. Insert another Female Adapter Ring groove side down onto the O-ring.

2.4. Insert Split Segments into groove inside the Middle Housing.

2.5. Insert one Female Adapter Ring onto Split Segments with the groove side facing up.

2.6. Insert appropriate number of Vee Seals grooved side facing up onto Female Adapter Ring.

2.7. Insert one O-ring into groove in the Vee Seal.

2.8. Insert appropriate number of Vee Seals grooved side down facing down onto the O-ring.

2.9. Insert one Female Adapter Ring with the grooved side facing down onto the Vee Seals.

2.10. Compress the seal stack (Vee seals and O-rings) with rod, measure the stack height and compare with the
3. PREPARE TOP END OF MIDDLE HOUSING

3.1. Insert one Female Adapter Ring into the top end of the Middle Housing with the grooved side facing up.

3.2. Insert appropriate number of Vee Seals (grooved side facing up) onto the Female Adapter Ring.

3.3. Insert one O-ring into the groove in the Vee Seal.

3.4. Insert appropriate number of Vee Seals (grooved side facing down) onto the O-ring.

3.5. Insert one Female Adapter Ring (grooved side facing down) onto the Vee Seals.

3.6. Compress the seal stack (Vee Seals and O-ring) with a rod, measure the stack height and compare with the Upper Subs UNC thread length.

3.7. Grease all O-rings and Vee Seals with grease.

4. COMPLETE ASSEMBLY, TEST, AND TORQUE

4.1. Vertically slide the protruding part of the Inner Sleeve into the Vee Seals and O-ring in the Top end of the Middle Housing.

4.2. Screw the Upper Sub in the top end of the Middle Housing until the parts shoulder.

4.3. Torque sleeve tight with wrench.

4.4. Using a Model ‘B’ Shifting Tool and spang jars; shift the Inner Sleeve closed, open, and closed to ensure functionality.

4.5. Test to appropriate pressure.
RE-DRESS INSTRUCTIONS

After a SXA sleeve has been pulled from the hole, it is recommended you change the Vee Packing and O-rings and also check packing area before running it back down-hole.

The Redress procedure is as follows:

1. Place Top Sub of Sleeve in vice and secure. Place stand under Sleeve for support. Tap with hammer at area where Bottom Sub screws onto Middle Housing. Place wrench on Bottom Sub and break top connection. Using uniform torque, unscrew Bottom Sub from Middle Housing.

2. Now place wrench on Middle Housing and break connection. Unscrew Middle Housing from Top Sub. Shift Inner Sleeve out of Top Sub. Packing should remain in Middle Housing when unscrewed and pulled off Inner Sleeve.

3. Remove Vee Packing, Steel Rings, and O-rings from sleeve. Clean all parts, check for flow cuts, inspect packing area, caliper area, and all threads taking special care of small threads on top and bottom subs. Also check O.D. of Inner Sleeve and Shifting Shoulder on Inner Sleeve.

4. After all parts are cleaned and inspected, place the Top Sub back into vice and secure. Grease liberally. Shift Inner Sleeve into the first indent of Top Sub. Grease outside of Inner Sleeve. Assemble Vee Packing, Steel Rings, and O-rings as detailed in the Assembly Section. Slide Packing Assembly onto Inner Sleeve.

5. Grease outside of Packing Assembly and inside the Middle Housing. There is a groove cut inside the Middle Housing on one end. Face this end of Middle Housing toward you. One at a time, place a Female Adapter Ring, then an O-ring, and another Female Ring in the Middle Housing, pushing them down until they lay bottom out just below groove. Place Split Segments in the Middle Housing as shown in the Assembly Section. Back up with another Female Ring.

6. Take Middle Housing, still having the end you worked on facing you, and make up on Top Sub. The Inner Sleeve should remain out of the Middle Housing far enough that you can now place remaining Vee Packing and Rings onto it. Next, take the Bottom Sub and make up onto Middle.

7. After Sleeve is completely made up and torqued, it should be shifted and pressure tested before being run.