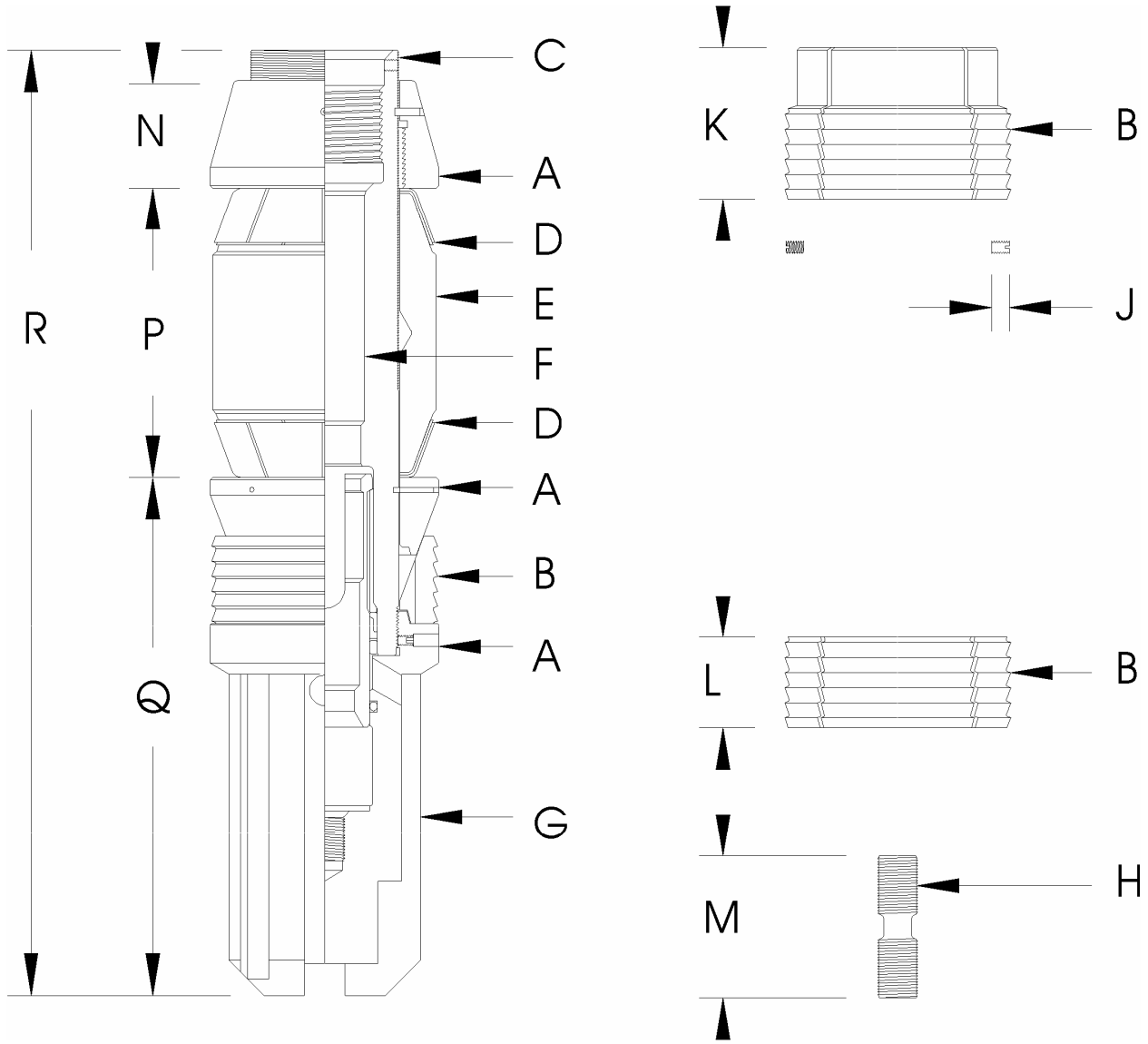
Model B Sleeve Valve Cement Retainer

DIMENSIONAL DATA

Ret. O.D.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
3.593	3.593	3.500	2.500	3.531	3.531	1.345	3.375	.875	.437	3.187	2.187	6.750	2.437	5.312	11.687	20.312
3.937	3.937	3.875	2.500	3.875	3.875	1.345	3.375	.875	.437	3.187	2.187	6.750	2.437	5.125	11.840	20.312
4.312	4.312	4.250	2.750	4.187	4.187	1.345	3.375	.875	.750	3.562	2.750	6.750	3.187	5.390	10.840	20.312
5.375	5.375	5.312	3.687	5.260	5.260	2.000	4.500	1.000	.750	3.781	2.562	3.500	2.687	7.250	11.526	21.968
5.687	5.687	5.625	3.687	5.546	5.546	2.000	4.500	1.000	.750	3.781	2.562	3.500	2.687	7.250	11.526	21.968
6.312	6.312	6.250	4.125	5.968	5.968	2.000	4.500	1.000	.750	5.000	2.875	3.500	3.062	8.859	11.928	22.062
7.125	7.125	7.062	4.625	6.843	6.843	2.000	4.500	1.000	.750	4.062	2.500	3.500	2.750	9.796	11.928	22.062
8.125	8.125	8.000	5.125	7.593	7.593	2.000	4.500	1.000	1.250	3.875	3.062	3.500	3.062	10.046	13.720	22.781
9.437	9.437	9.375	6.750	9.375	9.375	2.000	4.500	1.000	1.250	4.062	2.812	3.500	3.500	10.562	9.886	23.312
12.00	12.00	11.750	9.000	11.875	11.875	2.000	4.500	1.000	1.250	4.375	3.312	3.500	4.625	10.609	8.250	23.843

The figures contained herein are subject to change without notice.
Some sizes differ slightly from the illustrations shown



Model "B" Sleeve Valve Cement Retainer is a safe, reliable, fast and inexpensive means of placing a cement retainer at a predetermined depth in the casing. Designed with high quality materials insures an excellent combination of strength and drillability. Can easily be converted to Wireline Set / Tubing Set Bridge Plug. The "B" Cement Retainer has many features. The most notable ones being:

- Locked Upper Cone, cannot move upward under slips due to impact from below because of stop ring attached to the body of retainer.
- Locked Lower Cone is pinned to body and supported through packing system to stationary upper cone. This greatly reduces risk of premature set.
- Locked-in Full Circle Lower Slips are securely locked against mating shoulder in body and cannot be knocked loose by impact from below.

INSTALLATION ONTO MECHANICAL SETTING TOOL

The Cement Retainer is made up on the Mechanical Setting Assembly without the top slips in place (these instructions are for assembly of Alpha "B" Cement Retainer onto the Alpha "B" Mechanical Setting Tool. If another setting tool is being used please follow the directions for that particular setting tool.) As retainer is going on the setting tool note that the threads are left-handed. Once the threads catch, make it up until the torque screw holes align with the holes on the setting tool. Insert desired number of torque screws (the brass torque screws require approximately 200 ft./lbs. each to shear). Now place the top slip on the assembly. A clamp will be required to hold the slips down tight enough for the slip retaining sleeve to cover the top portion of slip. The upset on the setting tool will fit into the inside groove near the top end of slip. Now cover top of slip with sleeve and remove clamp. Make certain that the setting tool is bottomed against the stop and ready for run in.

NOTE: As a precaution, one left-hand turn should be taken every five to ten stands during run-in for prevention of premature top slip release which results in premature setting of the retainer.

RUNNING MECHANICALLY

1. At the desired setting depth pick-up 2 feet. The Mechanical Setting Assembly is actuated by rotating the tubing to the right ten turns.
2. Lower the tubing back down 2 feet. The top slips are released to make contact with the casing.
3. Next an upstrain on the tubing string pulls the body of the Cement Retainer up with respect to the top slip setting and packing-off the Cement Retainer. When desired force is stored in the retainer (refer to the chart for acceptable setting force) going by tubing stretch charts lock down tubing for a few minutes and allow packoff to set. At this time the valve in retainer is closed. The stroke for opening and closing the valve is two inches.
4. Release setting tool from cement retainer by placing an upstrain on tubing of 800 lbs. and rotating to the right initially breaking torque screws. Continuing with ten turns to the right.

TUBING SETTING FORCES

Retainer O.D.	Minimum Strain	Maximum Strain
3.593-4.312	22,000 lbs.	30,000 lbs.
5.375 - 5.687	30,000 lbs.	45,000 lbs.
6.312 - 12.00	35,000 lbs.	48,000 lbs.

NOTE: If desired, the setting tool may be released from retainer with four to five right-hand turns at the tool and 8,000 to 10,000 lbs. upstrain. This is accomplished by unscrewing the top portion of the threads on the control latch and collapsing the threads on the lower end.

After releasing from the retainer, a set down weight of 3,000 to 5,000 lbs. will re-latch the setting tool and an 8,000 to 10,000 lbs. upstrain will remove it. The stinger seal will remain in the retainer seal bore as long as the snap-out force is not exceeded.

More information about Alpha's "B" Mechanical Setting Tool and its operation are contained in the technical unit for that tool.

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.

Please read Cement Retainer Hydraulics on the following pages.

Cement Retainer Hydraulics:

There are varied forces exerted by pressures to the casing and to the cementing string which act on the Stinger sub and cementing string during the operation of cementing. The effects of these forces are governed by the size of the Stinger sub, the size, weight per foot and length of the tubing or drill pipe, mud weight, casing pressure, and the cementing string pressure.

When pressure is applied to the casing annulus the Stinger Sub tends to lift upward and thereby close the Control Valve with a force equal to the annulus pressure at the Cement Retainer times the difference between the area of the outside of the cementing string and the area of the Cement Retainer bore.

When pressure is applied to the cementing string a force is exerted at the top of the string which reduces the hook-load. This pressure also applies a force at the bottom holding the Stinger Sub in the Cement Retainer bore and keeps the valve open. These two forces have a net effect of upward force equal to the cementing pressure times the area of the Cement Retainer bore. When the hook-load is reduced to zero-weight, the upward force acting against the top of the cementing string will close the Control Valve by lifting the tubing string.

The pressure in the annulus and in the cementing string will determine the amount of weight that must be set on the Cement Retainer to keep the Stinger Sub in the correct place and the Control Valve open. Having the Stinger Sub in place and the Control Valve open will be the two requirements necessary to determine the minimum depth at which the Cement Retainer can be set.

Therefore, the amount of cementing string pressure and annulus pressure that can be utilized will be limited for any size and length of cementing string. If the total of the forces trying to close the Control Valve is equal to the weight of the cementing string in the well fluid, an increase in either of these pressures will close the Control Valve. It is possible however to increase the cementing pressure if the casing pressure is decreased and vice versa.

If the snap-out force of from 8,000 to 10,000 lbs. is not exceeded the Stinger Sub will remain in the Cement Retainer Seal Bore.

It is possible to pump the Stinger Sub out of the retainer bore in situations such as a load put on the tubing such as during pressure testing, or if a high annulus pressure is encountered. The opening or closing of the valve after the retainer has been set has no bearing on the Snap-Latch feature of the Stinger Sub. Two inches of movement at the Retainer (Up to Close, Down to open) will open or close the Control Valve.

The values in the chart “Areas (In Sq. In.) Acted Upon by Tubing and Annulus Pressures” are printed shaded and unshaded. These values are the number of square inches acted upon by the pressure change, and also the resulting direction of force. The unshaded areas will, with a pressure increase, cause a force tending to keep the Control Valve open. The shaded areas will have an upward force, or a force wanting to close the Control Valve.

When the net force is upward, the set-down weight must be used to keep the Control Valve Open.

Note: Columns 1, 2, 4, 5, 6, & 7 must be multiplied by the change in pressure at the tool. Whereas column 3 must be multiplied by the tubing gage pressure.

HOW TO USE AREA PRESSURE CHART:

1. Multiply whichever column is applicable (Col 1, 4, 6) times the change in tubing pressure at the tool.2. Multiply whichever column is applicable (Col 2, 5, or 7) times the change in annulus pressure at the tool.3. Multiply Column 3 by the tubing gage pressure.

As the figure is always shaded in Column 3, the resulting force tends to close the Control Valve by lifting the tubing at the surface. The tubing will raise and the valve will be closed if by adding all three forces the result is a force tending to close the valve, and is greater than the maximum hook-load of the tubing before setting the tool.

Areas (in.2) Acted Upon By Tubing and Annulus Pressures

Cement Retainer Size (OD)	Tubing or Drill Pipe OD	Tubing Pressure Greater Than Annulus Pressure At The Tool			Annulus Pressure Greater Than Tubing Pressure At The Tool		Annulus Pressure Greater Than Tubing Pressure At The Tool Because Of Swabbing The Tool	
		Tubing Area	Annulus Area	Tubing ID Area	Tubing Area	Annulus Area	Tubing Area	Annulus Area
		Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	1.660	.1	.7	1.5	.1	.7	.1	.7
3.593	1.900	.6	1.4	2.0	.6	1.4	.6	1.4
thru	2.062	1.0	1.9	2.4	1.0	1.9	1.0	1.9
4.312	2 3/8	1.7	3.0	3.1	1.7	3.0	1.7	3.0
	2 7/8	3.3	5.1	4.7	3.3	5.1	3.3	5.1
5.375	2 3/8	.0	1.3	3.1	.0	1.3	.0	1.3
thru	2 7/8	1.5	3.4	4.7	1.5	3.4	1.5	3.4
12.00	3 1/2	3.9	6.5	7.0	3.9	6.5	3.9	6.5

Example

Cement Retainer (OD)		3.593
Tubing		2 3/8 OD EU
Maximum hookload before stabbing stinger sub		7,000 lbs.
Maximum cementing pressure		2,800 PSI
Change in tubing pressure at tool (due to heavier fluid introduced during cementing plus cementing pressure)		3,700 PSI
Annulus pressure to be applied during cementing		1,200 PSI
3,700 PSI (Tubing pressure change at tool) x 1.7 (column 1)	=	6,290 lbs. DOWN
1,200 PSI (Annulus pressure change at tool) x 3.0 (column 2)	=	3,600 lbs. UP
6,290 - 3,600 = 2690 lbs. DOWN	So the Set DOWN weight will not be needed	
2,800 PSI (Gage pressure) x 3.1 (column 3)	=	8,680 lbs. UP
6,290 - 2,800 - 8,680	=	5,190 lbs. UP

The job may be completed successfully because the maximum hookload has not been exceeded.