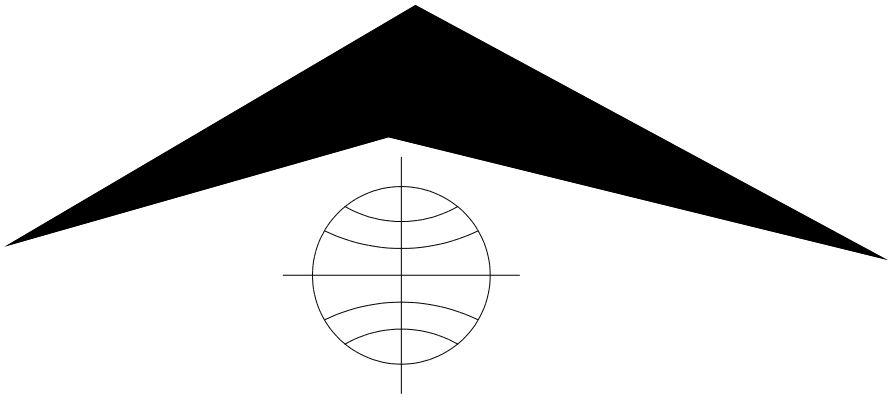
2FSA-1000 Fluid Sampler



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General Information

Overview

The 2FSA-1000, one liter Fluid Sampler Probe operates from a single conductor wireline. The probe can be lowered to a desired depth where the sample chamber can be opened by applying the proper voltage polarity to the cable line. Reversing the voltage polarity closes the sample chamber. Power requirements for the probe are a minimum of 50 volts D.C. negative and positive (at the probe top) to operate the sampler motor. Negative voltage applied to the wireline conductor with respect to the wireline armor opens the sample chamber valve. The reverse closes the sample chamber valve. Typically the sample chamber valve is opened and closed using built in caliper open and close commands, respectively, of the logger.

Theory of Operation

A motor in the probe is operated by voltage on the wireline. The motor turns an O-ring valve, which in turn allows fluid to enter the sample chamber. The valve travels in both directions and is limited by mechanical switches that interrupt the voltage to the motor thereby preventing further movement with that particular polarity of voltage applied.

The sample is removed by means of a valve located inside a removable cap on the bottom of the probe. With the cap removed, a tube can be attached between the valve outlet and a container for the sample. Operating the valve allows the sample to be drawn from the sample chamber into an external container.

Specifications

Operating pressure rating.	2000psi	13.79 MPa
Length, overall:	74"	188 cm
Diameter, maximum:	1.5"	38 mm
Weight, empty:	15 lb	6.8 kg
Sample point	16”	41 cm below probe top
Sample chamber:	.265 gal.	Approximately one liter

Operating Procedure

Operation with MGX II Loggers - MSLog:

Note: Fully read this manual before using the probe.

For the MGX II Logger, start MSLog and select the proper tool driver (**2FSA-1000 Sampler**).

Caution: Before placing the probe in the borehole, be sure the sample chamber valve is closed. If it is open you can see through the valve body ports.

Place the probe in the borehole and proceed to the desired depth. When the desired depth is reached, stop the winch and press Tool Power ***On***.

Press ***Tool Settings/Commands*** button and from the caliper open dialog, press ***Open***. The sample valve will open in approximately five seconds. Press ***Done***. Wait an appropriate time to insure that the sample chamber has filled.

Note: At low pressures i.e. under 100 PSI, air can become trapped in the sample valve slowing or even preventing fluid from entering. Move the tool around by raising and lowering and shaking the cable line. You may need to do this for up to five minutes to insure the sample chamber has filled. When sampling at low pressures, the integrity of the valve seals is more critical. They tend to leak if scratched or otherwise damaged. Test your valve seal integrity often. Replace o-rings as needed.

Press ***Tool Settings/Commands*** button and from the caliper open dialog, press ***Close***. The sample valve will close in approximately five seconds. Press ***Done*** and bring the probe to the surface. Remove the probe from the borehole.

Operation with MATRIX Logger and Software

For the Matrix logger, start Matrix and select the proper tol file **(2FSA Sampler for Matrix)**.

Caution: Before placing the probe in the borehole, be sure the sample chamber valve is closed. If it is open you can see through the valve body ports.

Place the probe in the hole and lower it so that the probe top is at the zero reference for your work. Then, select the upper right hand icon on the depth window. When the depth set screen comes up, press Zero Tool. The depth setting will be set to 0.4 m, which is the depth to the sample port. The probe sample chamber extends below this port about 1.2 m.

Lower probe to desired sampling depth. Go to Tool Settings selection, and click on it. A “Caliper Open/Close” dialog box will appear. Press Open to open the sample port. A small display with little blue squares will indicate that power is being applied (and the voltage and current displays on the Tool Power window will indicate the motor load. It takes about 9 seconds for the valve to open. Wait about 1 minute for the sampler to fill. Then press Close, and a similar status indication will appear, with the blue squares.

Return the probe to the surface and follow the instructions below for opening the sampler.

Removing the sample

Caution: WEAR EYE PROTECTION when working with the valves on the surface!

Warning: Never open the sample chamber valve with a pressurized sample in the volume. Doing so will lead to premature failure of the motorized valve seal. Always relieve the sample pressure with the bottom valve first.

Place the probe in a stable position.
Remove the valve cap located at the bottom of the probe.

Attach an end of appropriate tubing to the outlet valve tube and your sample collection container or hold the bottom valve outlet tube over the sample collection container. When the joints are secure, open the bottom valve being careful to aim the bottom valve outlet tube away from your body.

To speed up transfer, after the sample chamber pressure is relieved, you can open the motorized valve as above.

Note: The bottom valve outlet tube is nominally, 3/16” diameter.

If you want to pour the contents out of the sample chamber you should first bleed off any pressure by opening the bottom valve. Be careful to aim the valve outlet away from your body. Close the bottom valve and unscrew the sample chamber at the sample port body. Now you can pour the chamber contents into a container.

Note: The bottom valve threads into a 1/4” NPT hole. If you replace the valve type or outlet tube diameter, test for clearance with the valve cap.

When the sample has been transferred, clean the sample chamber by an appropriate method. If you have not already done so, close the valve, replace the valve cap and remove the probe from the wireline. Replace the protective cap on the probe top. Test and replace o-rings in the valve at regular intervals.

Preventive Maintenance

The 2FSA-1000 should provide long life with only minor maintenance required to the mechanical end of the probe. When possible, clean and flush mud and or contaminants out of the sample chamber and valve body and replace the o-rings on the sampler valve. Keep the sampler valve o-rings lubricated with non-reactive o-ring lubricant. If electronic or mechanical troubleshooting becomes necessary contact a qualified technician.

To remove the sampler valve, first unscrew and remove the sample chamber from the valve port body. With the valve in the open position hold the valve in place using a 13mm wrench. Remove the nut from the bottom of the valve.

Use a large screwdriver inserted into the slot around the lower valve to pry it down and away from the valve port body.

The seals that are most susceptible to wear are the two O-rings (25-402-011).in the elliptical grooves on opposite faces of the plug valve

When finished push the valve back into the valve body making sure the slot in the top of the valve fits onto the dowel in the valve stem. Use a 13 mm wrench to hold the valve in position and install the nut. Do not over tighten the nut**. Before using the probe turn it on, this will turn the valve to its opened or closed position.**

To access the inside of the upper probe, remove three radial M3 socket screws and carefully pull the probe top out of the housing. Disconnect the wire connector. Unscrew the short, upper housing from the sample port body.

Just above the sample port and below the motor are limit switches that shut off or pass voltage to the motor. A cam attached to the motor shaft activates the switches.

Common electronic problems are a broken or shorted wire or a broken switch. A visual inspection of the wiring should be performed before further testing is done.

If electronic testing is to be done a copy of the schematic is highly recommended. Monitor operating voltages and test the quality of the diodes, switches and motor.

If the upper housing floods it is imperative to immediately flush the tool with denatured alcohol and allow it to dry.

O-rings:

Valve Body
2 each 25-402-216

Plug Valve
4 each 25-402-111 (cylinder seals)
2 each 25-402-011 (face seals)

Bulkhead (at bottom of sample volume)
4 each 25-402-216

Appendix

Suggested QA Procedure

Caution: WEAR EYE PROTECTION when **working** with the valves on the surface

To test the integrity of the volume without a pressure chamber, lower the probe to depth and allow it to sit for a period of time. Bring the probe to the surface and release any pressure with the bottom valve. Be careful to point the valve exit port away from your body. If the seals are intact there should be nothing in the volume. Leaking is more of a problem at shallow depths.

Replace the two valve o-ring face seals after each use at shallow depths. These are mounted in the elliptical grooves on opposite faces of the valve.

Replace the valve seals at regular intervals as they wear with usage.

Flush the volume between jobs with de-ionized water, or other suitable liquid, and allow it to dry before reassembling.