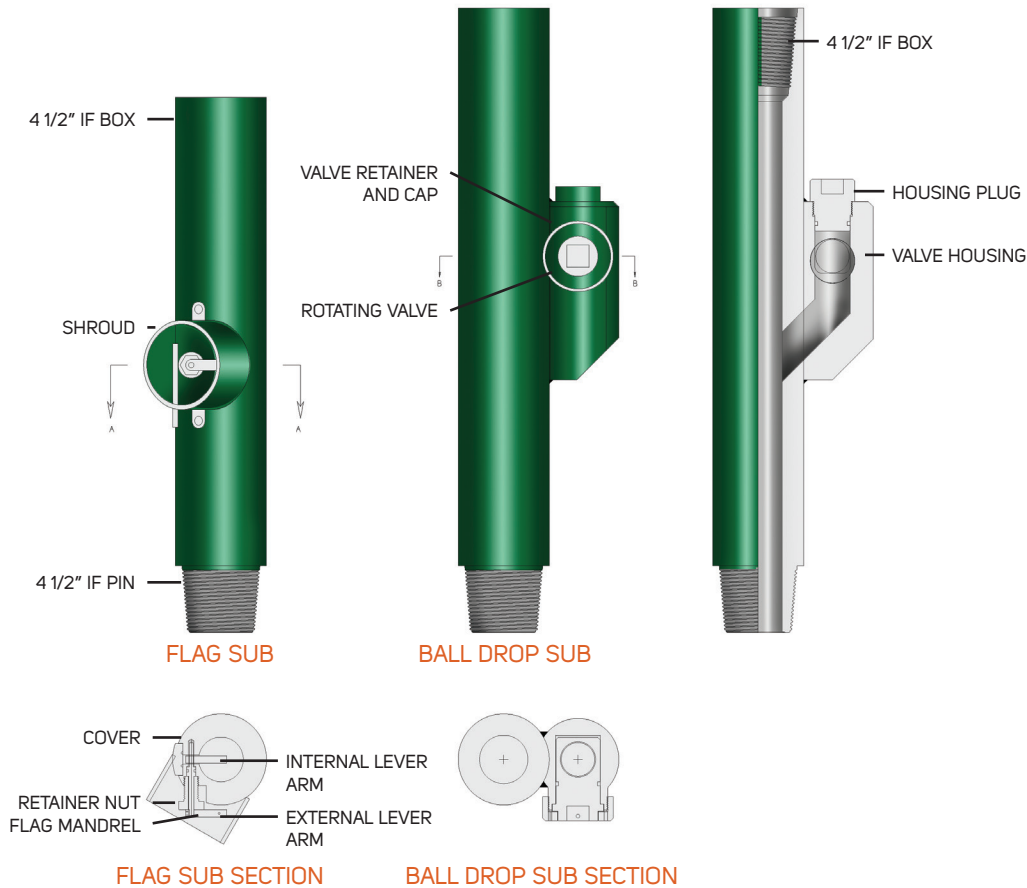


SETTING TOOLS

FLAG SUB AND BALL DROP SUB



The Flag Sub provides a simple external indicator and confirmation that the drill pipe dart has launched and left the cement manifold. Running the Flag Sub is standard on all cemented liner jobs. The Flag Sub is easily maintained and serviceable. The Flag Sub can be run with both the Rotary type cement manifold and the Top Drive cement manifold.

The central mechanical part of the Flag Sub is an actuator arm that is set in the center of the sub I.D. and extends perpendicular to the Flag Sub flow. This actuator arm is keyed to a sealed flag mandrel which protrudes from the Flag Sub body. An external lever arm is fixed to the end of the mandrel. This external lever arm is held in place with a brass trip wire. This wire is sufficiently strong to keep the internal actuator arm in the flow path during normal circulating and cement pumping. After launch, the drill pipe dart contacts and shears out the trip wire with negligible pressure. After shear the internal actuator arm swings completely out of the flow path, rotates the mandrel 90 degrees and provides the external indicator required. This external lever arm movement can be seen from a fair distance. A shroud is fastened to the Flag Sub to protect the external lever arm and retainer arm.

The Ball Drop Sub is run directly below the Cement Manifold and Flag Sub. The purpose of the Ball Drop Sub is to provide a means of dropping a setting ball in the circulation flow without picking up and breaking a connection. This is especially necessary for setting of the hydraulic liner hanger.

The design of the Chancellor Ball Drop Sub includes a ball valve housing that is separate from the main body and outside of the full flow path during circulating. No tensile load is carried through the ball valve. The setting ball is loaded in the valve housing prior to the job. With setting ball loaded, the rotating valve is pinned in the circulating position. This prevents the accidental launching of the setting ball. When ready to drop the ball, the retainer pin is pulled, a valve wrench is used to rotate the valve 90 degrees to the drop position. An external drop position indicator is provided. After drop the valve is pinned.

FOR MORE INFORMATION CALL CHANCELLOR AT **661-324-2213**