

ANNULAR PRESSURE WHILE DRILLING SPECIFICATIONS



OilField Guidance Inc.

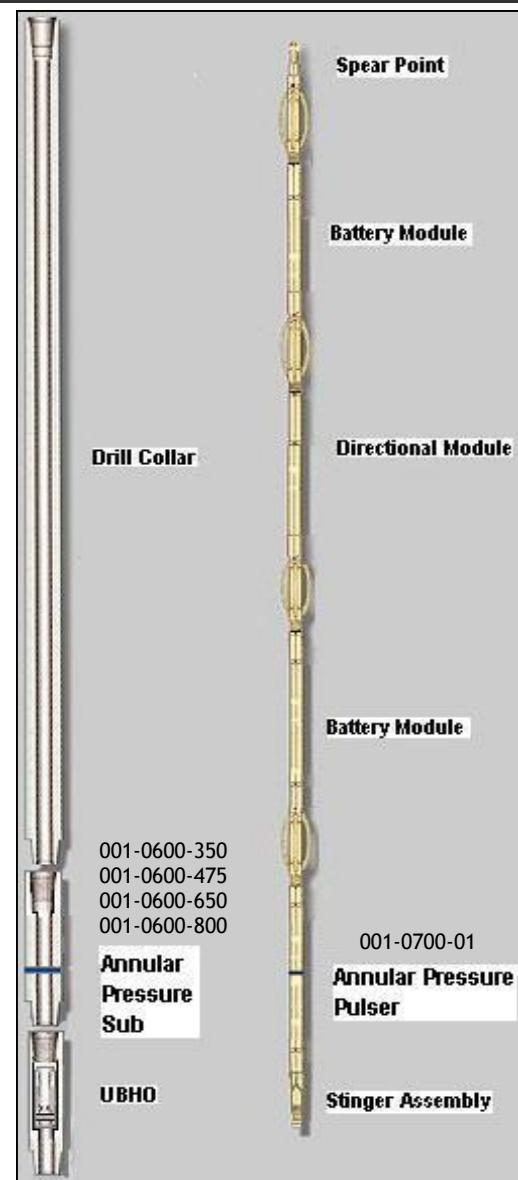
OilField Guidance Inc. Annular-Pressure-While-Drilling (APWD) sensor increases drilling efficiency by providing real-time down hole annular pressure information that allows the driller to make faster and better decisions.

Annular pressure increases often indicate poor hole cleaning which can lead to lost circulation. With APWD measurements this situation can be detected early and drilling fluid parameters and operating parameters can be adjusted to improve hole cleaning. On extended reach wells, real time information helps to maintain wellbore pressures between safe operating limits as well as monitor hole cleaning. Drop in pressure can indicate an unexpected water, gas or oil kick. With real time pressure measurements it is possible to detect problems much earlier than traditional surface measurements decreasing the likelihood of costly drilling delays.

APWD service provides annular pressure measurements using the Mud Pulse MWD system. By incorporating a pressure sub on top of the UBHO (Landing) sub and a specialized pulser driver, sensor readings are placed as close to the bit as possible and still allowing for retrievability. Onsite calibration is done to ensure accuracy and repeatability. Programming includes adding a generic variable to the tool face logging sequence. The pressure variables are sent to surface via mud-pulse and can be logged with standard gamma logging software that has generic variables.

Nominal tool OD	3 1/2 in (89mm)	4 3/4 in (121mm)	6 1/2 in (165mm)	8 in (203mm)
Connections	2 7/8 REG	3 1/2 IF	4 1/2 XH	6 5/8 Reg
Sub Length	6 ft (1.8m)	6 ft (1.8m)	6 ft (1.8m)	6 ft (1.8m)
Temp Rating	150 C (302 F)	150 C (302 F)	150 C (302 F)	150 C (302 F)
Working Pressure	10,000 psi (68,947 kpa)	10,000 psi (68,947 kpa)	10,000 psi (68,947 kpa)	10,000 psi (68,947 kpa)
Accuracy +/-	10 psi (69 kpa)	10 psi (69 kpa)	10 psi (69 kpa)	10 psi (69 kpa)
Repeatability +/-	5 psi (34 kpa)	5 psi (34 kpa)	5 psi (34 kpa)	5 psi (34 kpa)
Detector Type	Quartz	Quartz	Quartz	Quartz

Applications
Reservoir Pressure Management.
Drilling optimization.
Early Lost circulation detection.
Formation fracture or collapse detection.
Early detection of well flows and kicks.
Hole cleaning monitoring.
Improved ECD management.
Benefits
Fully GE Tensor compatible.
Real time updates.
Reduced drilling expenses



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