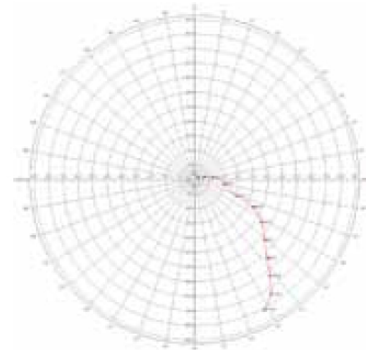
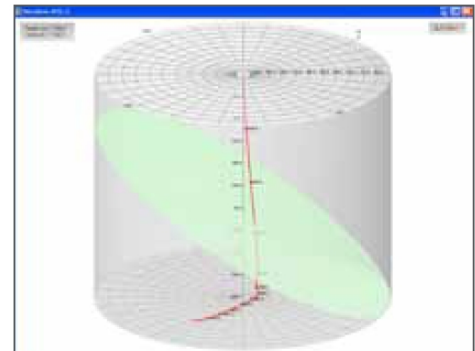


QL40.DEV Borehole Deviation Probe

The QL40-DEV measures the direction relative to magnetic north, inclination and trajectory of the borehole. Measurements are based on the “Applied Physics Systems” 544 orientation sensor containing both a 3-axis fluxgate magnetometer and a 3-axis accelerometer. Deviation parameters are calculated in real time and displayed as continuous logs during the measurement.

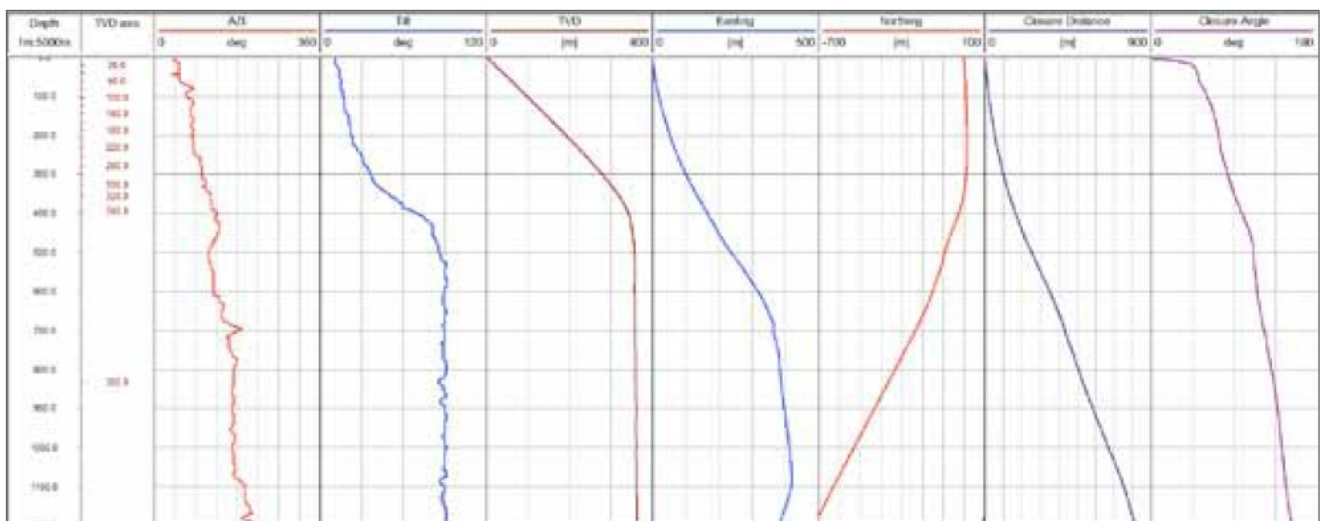
Deviation data can be processed further using the WellCAD software and deviation module. The WellCAD deviation module includes various 2D and 3D display options for deviation data from classical bull’s eye, projection and closure 2D views to 3D cubic and cylindrical displays.

The QL40-DEV is supplied as a middle sub. It can be combined with other logging tools of the QL (Quick Link) product line or can be operated as a standalone tool. It is compatible with Matrix acquisition system.



Application

- Borehole True Vertical Depth
- Borehole trajectory based on direction, inclination and drift measurement.
- True bed thickness



QL40.DEV Borehole Deviation Probe

Principle of measurement

The orientation sensor implemented in the QL40-DEV contains both a 3 axis fluxgate magnetometer and a 3 axis accelerometer. The combination of these two sensor systems enables the inclination, roll and azimuth angles of the sensor reference frame to be determined. Inclination and roll angles are determined from the accelerometer subsystem, which measures the pull of gravity. After inclination and roll are known, the magnetometer subsystem is used to determine system azimuth angle. Knowledge of the inclination and roll angles enable determination of the horizontal components of the earth's local magnetic field; this information defines the azimuth angle.

Measurement/Features

| | |
|----------|--|
| Azimuth. | Azimuth from Magnetic North – deg |
| Tilt | Inclination from verticality – deg |
| MRoll | Tool relative bearing calculated from magnetometers – deg |
| Roll | Tool relative bearing calculated from accelerometers – deg |
| MagField | Total Magnetic field strength at measurement point - μT |
| Grav | Absolute value of the earth gravity – g |
| TDev | Temperature at deviation sensor - $^{\circ}\text{C}$ |
| Voltage | Deviation sensor voltage – V |
| MX | Magnetometer X-component - μT |
| MY | Magnetometer Y-component - μT |
| MZ | Magnetometer Z-component - μT |
| AX. | Accelerometer X-component – g |
| AY | Accelerometer Y-component – g |
| AZ | Accelerometer Z-component - g |

Operating conditions

- Open or plastic-cased borehole.
- Water filled or dry borehole.
- Non-magnetic centralizers required

Technical Specifications

Tool

- Diameter : 40mm.
- Length : 0.715m.
- Weight : 3.4 kgs.
- Maximum. Temperature: 70 $^{\circ}\text{C}$.
- Maximum. Pressure: 200bar (2900psi).
- Measurement point : 0.185m (from bottom join)

Orientation sensor

- Sensor : APS544.
- Location : middle point of sensor located at 18.5 cm from tool bottom.
- Orientation : 3 axis magnetometer, 3 accelerometers
- Inclination: range: 0-180 degree.
- Accuracy : +/- 0.5 degree.
- Azimuth : range: 0-360 degree.
- Accuracy : +/-1.2 degree

