



Geo-Vista

Survey Direction Tools

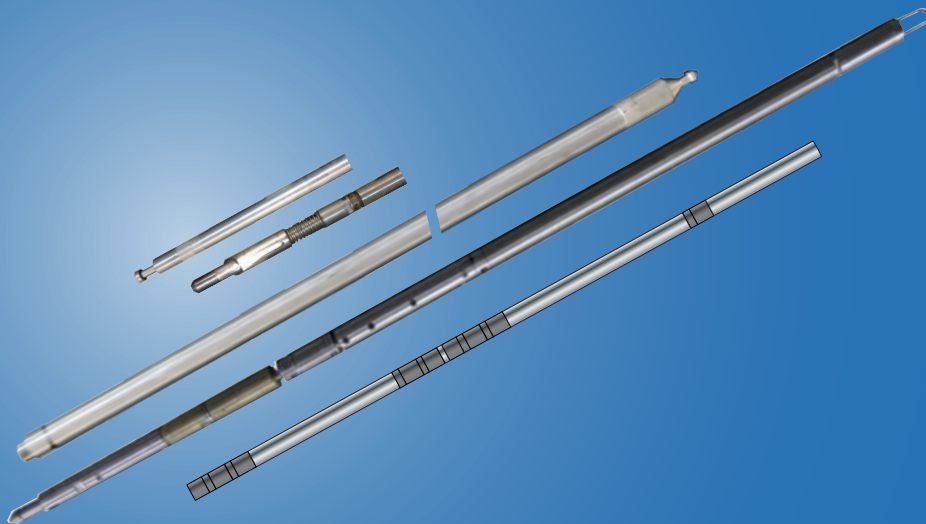
Gyroscope Measurement While Drilling (GyroMWD)

Gyroscope Orientation Tool-Continuous (GOT-C)

Single-shot Survey Tool (SST)

Multi-shot Survey Tool (MST)

Rotary Magnet Ranging Tool (RMR)



www.RenheSun.com
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Applications

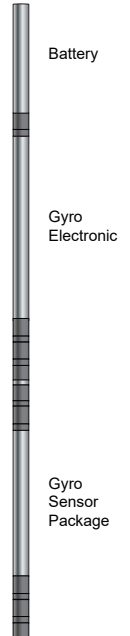
- Drilling through magnetic rock
- Wells in close proximity to others
- Whipstock orientation and window milling
- Single-shot and continuous measurement

Introduction

The gyro tool provides a North-seeking gyro for applications where magnetic interference dictates gyroscopic instruments for directional surveying and BHA orientation. This gyro provides the inclination, azimuth and gyro tool face survey data in a magnetic environment, it can work in stationary and continuous measurement mode. One battery sub can be used for 250 hours.

Specifications

Maximum Temperature	185°F (85°C)
Maximum Pressure	20,000 psi (137.9 MPa)
Probe OD	1.75 in. (44.5 mm)
Inclination Range	0 ~ ± 90°
Inclination Accuracy	± 0.15°
Azimuth Range	0 ~ 360°
Azimuth Accuracy	± 2° (@ Inclination > 3°)
Gyro Toolface Range	0 ~ 360°
Gyro Toolface Accuracy	± 2°
North-seeking Time	≤ 2 min
Power Supply	Battery





Applications

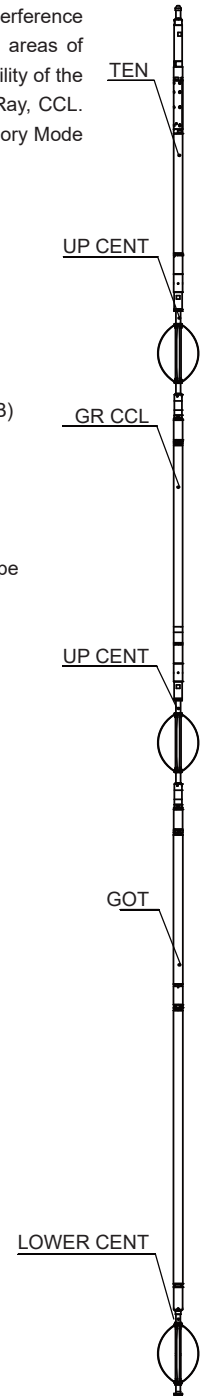
- Measure well trajectory inside the drill pipe, casing, tubing and openhole.
- Measure orientation & trajectory while drilling
- Measure orientation for sidetracking whipstock tool and directional perforation
- Measure directional parameters under magnetic interference conditions (such as cluster wells).

Introduction

Gyroscope Orientation Tool provides accurate and free magnetic interference directional survey in drill pipe, cased holes and production tubing, or in areas of magnetic interference. The GOT also can be run into drill pipes. The flexibility of the design allows the combination with additional services such as Gamma Ray, CCL. Also for direction perforating. GOT-C provides two operating modes: Memory Mode and Real-Time Mode.

Specifications

Maximum Temperature	350°F (175°C) for 4 hours
Maximum Pressure	15,000 psi (103.4 MPa)
Make-up Length	31 ft. (9.48 m) (without SKB)
Weight	134 lbs. (61 kg) (without SKB)
Tool Diameter	2.25 in. (57 mm)
Maximum Hole Diameter	12.0 in. (305 mm)
Maximum Logging Speed	100 ft./min (30 m/min)
Orientation Sensor	Dynamically Tuned Gyroscope
Power Requirements:	
Operating Voltage & Current	200 Vac, 75 mA
Maximum Tensile Force	14000 lbs. (6350 kg)
Sensor Accuracy	
Measurement Range	
Inclination	0°~± 90°
Azimuth	0°~360°
Gravity High Angle	0°~360°
Gyro High Angle	0°~360°
Measurement Accuracy	
Inclination	≤ ± 0.15°
Azimuth	≤ ± 2° (Deviation > 1°)
Gravity High Angle	≤ ± 1.5°
Gyro High Angle	≤ ± 2.0°
Wireline Requirements	Mono-Conductor Slick Line





Single-shot Survey Tool (SST) Multi-shot Survey Tool (MST)

Geo-Vista

Applications

- Well trajectory monitoring
- Provides attitude, magnetic field, temperature and power parameters
- No need wire winches for self-floating type tool, conveyed by mud

Features

- High precision solid state sensor
- 150 °C high temperature battery
- Data with real-time clock labels

SST

NO.	Absolute Time	Inclination	Azimuth	Gravity Highside	Magnetic Highside	Temperature	Magnetic Field Strength	DIP
	h: m: s	deg	deg	deg	deg	°C	uT	deg
1	8:30:00	0.4	161.8	315.8	118.1	23.2	45.2	45.8
2	8:30:01	0.3	161.8	161.9	118.1	23.2	45.2	45.8
3	8:30:02	0.4	161.9	161.9	118.1	23.2	45.3	45.7
4	8:30:03	0.4	161.8	161.8	118.1	23.2	45.2	45.8
5	8:30:04	0.4	161.9	161.7	118.1	23.2	45.2	45.8
6	8:30:05	0.4	162	161.8	118.2	23.2	45.2	45.8
7	8:30:06	0.4	161.9	161.8	118.1	23.2	45.2	45.8
8	8:30:07	0.4	161.9	161.8	118.1	23.2	45.2	45.8
9	8:30:08	0.4	161.9	161.8	118.1	23.2	45.2	45.8

MST

NO.	Absolute Time	Inclination	Azimuth	Gravity Highside	Magnetic Highside	Temperature	Magnetic Field Strength	DIP
	h: m: s	deg	deg	deg	deg	°C	uT	deg
1	12:08:00	24	188.1	16.1	201.1	41.2	45.2	45.8
2	12:08:01	24	188.1	16	201.1	41.2	45.2	45.8
3	12:08:02	24	188.4	16	201.1	41.2	45.3	45.8
4	12:08:03	24	188.4	16	201.1	41.2	45.2	45.8
5	12:08:04	24	188.4	16	201.1	41.2	45.2	45.8
6	12:08:05	24.1	188.4	16	201.1	41.2	45.2	45.8
7	12:08:06	24	188.4	16	201.1	41.2	45.2	45.8
8	12:08:07	24	188.4	16	201.1	41.2	45.2	45.8
9	12:08:08	24	188.4	16	201.1	41.2	45.2	45.8
10	12:08:09	24	188.4	16	201.1	41.2	45.2	45.8
11	12:08:10	24	188.4	15.8	201.1	41.2	45.2	45.8
:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:
8011	13:48:11	11	180.6	158	339.2	23.8	45.2	45.8
8012	13:48:12	11	180.6	158	339.2	23.8	45.3	45.8
8013	13:48:13	11	180.4	158	339.2	23.8	45.3	45.8
8014	13:48:14	11	180.4	158	339.2	23.8	45.2	45.8
8015	13:48:15	11.2	180.5	159	339.2	23.8	45.2	45.8
:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:

Introduction

The SST is mainly used in the well attitude and temperature measurement of well drilling. It is suitable for the sitting-key and slickline job. It uses an embedded system to process data, eliminating manual reading errors, and acquires 9 sets of data at each measurement point with data self-checking.

The MST is used for trajectory measurement of well drilling and geological exploration. It acquires 5000 sets of multiple points well attitude parameters within one time, which could draw the well trajectory map conveniently and quickly. The MST is used for surveying: MST measures data during POOH after the instrument is directly put into the bottom of the well, and read-out data after POOH, therefore, no need slickline or winch.

There are three types: Throw Type, Self-floating Type and Sitting-Key Type. The Throw Type is directly put into the drill pipe, and drop to the bottom of the drill pipe by its own gravity, and read-out memory data and process after POOH.

Self-floating Type has a float, it is necessary to pump on, and it reach the bottom of the drill pipe. After the pump turned off, the instrument floats up to the wellhead, and read memory data and process.

The Sitting-Key Type needs to be equipped with slick line. It is used to direction drilling.

Specifications

Max. Temperature	300°F (150°C)
Temperature Accuracy	± 2 °C
Max. Pressure	140 MPa (20,000 psi)
Outside Diameter	1.77 in. (45 mm)
Inclination Range	0°-180°
Inclination Accuracy	± 0.15°
Azimuth Range	0°-360°
Azimuth Accuracy	± 1°
Highside Toolface Range	0°-360°
Highside Toolface Accuracy	± 1.5°
Magnetic Toolface Range	0°-360°
Magnetic Toolface Accuracy	± 1.5°
Magnetic Field Strength Range	0 -100 uT
Magnetic Field Strength Accuracy	± 0.5 uT
DIP Range	-90°-90°
DIP Accuracy	± 0.3°



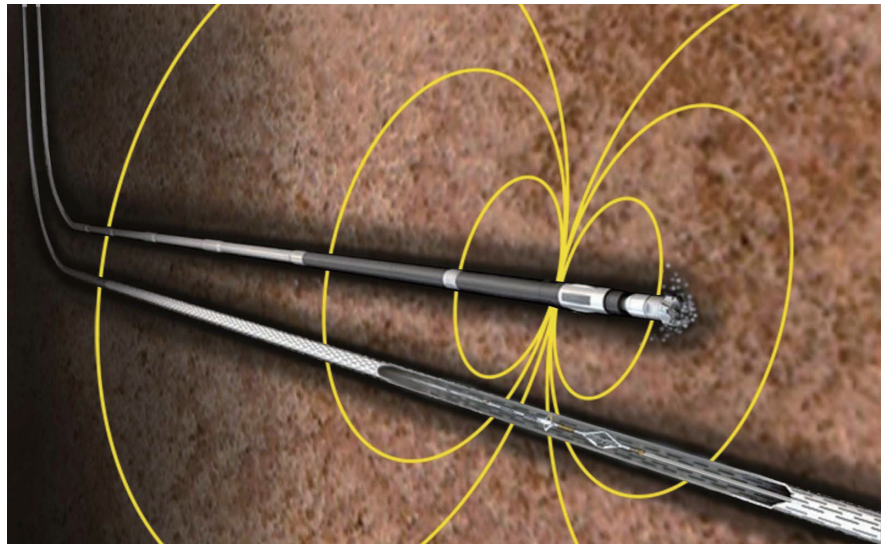
UBHO

Applications

- Drilling stacked horizontal well pairs for steam - assisted gravity design (SAGD)
- Infill drilling and collision avoidance
- Wellbore Intersections for well control or pipelines
- Observation well placement
- Coalbed methane degasification wells

Introduction

The RMR system works with well - to - well separation distances up to 50m. The RMR systems are used to drill the majority of SAGD pairs worldwide. It can be combined with CTT (Downhole Casing & Tubing Tractor).



Specifications

Nominal O.D.	1.75 in. (44.5 mm)
Hole Size Range	3.875 in. and Up
Min. Tubing I.D.	2.875 in. (73 mm)
Max. Tubing I.D.	NA
Length	8.2 ft. (2.5 m)
Weight	60 lbs. (27.3 kg)
BHA Connection	2.375 in. Reg and Up
Max. Operating Temperature	350°F (175°C)
Max. Operating Pressure	20,000 psi (137.9 MPa)
Accuracy 16 ft. to 49 ft. (5 m to 15 m)	5%
Accuracy 49 ft. to 82 ft. (15 m to 25 m)	5%
Accuracy Beyond 82 ft. (25 m)	5%
Max. Range	164 ft (50 m)



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