

How the Direct Systems Northseeker [DS-Northseeker] works?

The instrument itself is the smallest North Seeking Rate gyro on the market. It incorporates the latest rate gyro and accelerometer technologies, in a compact and rugged design. Combined with advanced electronics and calibration software the instrument provides high accuracy performance, coupled with ease of use and affordability.

The gyro sensor is a Two-degree-of-freedom, dry flexure tuned rotor gyro. The gyro provides electrical signals which are proportional to the angular rates about the two axes, orthogonal to the spin axis on the rotor.

By measuring these rates, the DS-Northseeker can calculate the component of the earth's horizontal rate of rotation seen on each gyro axis relative to its precise known latitude at the commencement of a survey. These measurements are then used to determine the boreholes direction relative to True North.

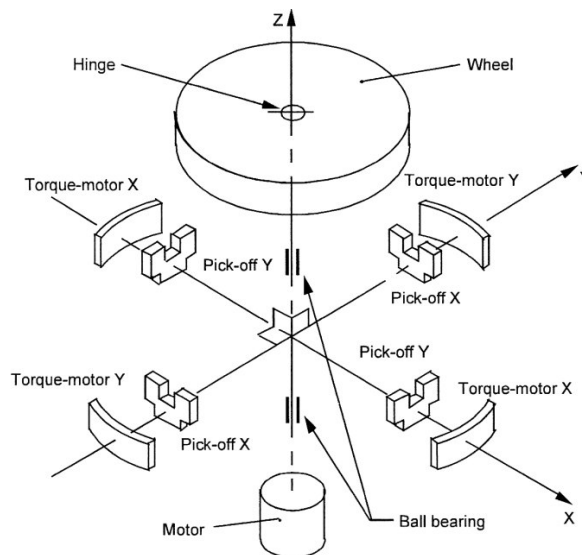


Figure : Two Axis Rate Gyro Schematic

System

The system consists of a Gyroflex™ instrument which can run on either an electric wireline connected to a surface power supply and PC or in memory mode on slick / braided line or in drop mode.

Features:

- Conductive Wireline mode
- Memory Multi-shot Mode
- Fast Traverse Speed 60m/min
- Calibrates Whilst Operational
- Accuracy to 0.3% Measured Depth
- User friendly software interface
- Smallest North Seeking Rate Gyro on the market and eliminates the need for surface orientations.
- 5 years proven reliability from manufacturers service division

Wireline mode the operation is fast and efficient. The instrument is placed in the hole and ran to the required depth for the commencement of a survey and within minutes of reaching the start point the survey can commence with real time diagnostics and communication with the instrument. In this instance the instrument is also very efficient in checking the orientation of wedges and directional motor work.

Memory mode offers a plethora of options for the borehole survey.

- Instrument can be ran into the borehole on rig slick-lines that have counters attached
- Can be seated in the rods to survey as they are being withdrawn from the borehole
- 40 hours gyro memory operational capability (programmable hold off, shot interval)

Survey Speed – can be traversed at the rate of 60m/minute whilst operational/Non operational.

In-hole Calibration – takes one minute to effect whilst the instrument is operational. This can be conducted for every survey station or at intervals as determined by the operator to effect a more efficient survey. Normal gyrocompass survey recording stations take ~10 seconds to obtain.

Accuracy – Each survey station is an individual recording of a gyrocompass position. Manufacturer quotes accuracy of 0.3% for measured depth. The advantage of an individually recorded station is that surface orientation or drift errors cannot be carried through the data set or be exacerbated as occurs with other instruments.

Software – user friendly, with state of the art diagnostic applications so that the operators can in real time assess the operation of the instrument or post survey diagnostics can be performed remotely by management or if need be the manufacturer. The interfaces are easy to navigate and can be used for planning, projections, or show instantly how close the boreholes are to known infrastructure.

Size – Smallest True North seeking rate gyro on the market. (see specs)

5 years proven service history from the manufacturers affiliated survey division which is base in the oilfields of the USA.



The next phase of its development will take the DS-Northseeker into a continuous running platform. There will also be a modulated version of the instrument that will be able to survey horizontal boreholes.



Instrument Specifications

Inclination	: +/- 0.1°	
Azimuth Survey Mode	: +/- 0.25°	(Lat <60°)
Azimuth Orientation Mode	: +/- 1°	(Lat <60°)
Toolface	: +/- 2°	
Positional Uncertainty	: 0.3% of Measured Depth	
Max Borehole Survey Travel Speed	: 60m/min	

Operating Features

Instrument OD	: 30mm	{1.2"}
Instrument Length	: 610mm	24"
Pressure Barrel OD	: 381mm	1.5" (without thermal shield)
	: 444mm	1.75" (with thermal shield)
Pressure Case length	: 914.4mm	36"
Operating Modes	: User Defined based upon service requirements (Orientation, survey, single, gyro / gamma)	
Wireline Telemetry	: FSK via Mono conductor	
Digital Interface	: Serial RS 232 compatible	
Data Storage	: Calibration data only	
Parameters Sampled	: Gx,y, Ax,y, Temp (x2), W/L Volts	
Data Outputs	: Raw sensor output	

Electrical

Wireline Supply	: 500mA Constants current @ 12v
Max Power Consumption	: 5 Watts
Through Conductors	: Up to 10 off (x2 power, x8 Uncommitted)
Uncommitted Inputs	: Upto 10 12 bit A/D

Sensors

Dynamically tuned twin axis gyroscope
Solid State high accuracy accelerometers

Environmental

Temperature	: 0-204°C	(with thermal shield)	32-400°F
	: 4-93°C	(without thermal shield)	40-200°F
Shock	: 300g, 1/2 sine 1mS		
Vibration	: 10g rms, 20-1000Hz random		

Surface Equipment

Wireline Power supply	: 240 v AC in
	: 200w @ 1A out max with protection
Rig Floor Display	: 256 x 128 Transflective LCD with backlight
	: +12v @ 300mA input
	: Sealed to IP65
	: Industry standard RS232 data format
Software	: Windows based Drillog™ service software