

GYRO SURVEYING

PHOENIX HAS A DEMONSTRATED TRACK RECORD OF REDUCING COSTS, DECREASING OPERATING RISK, AND MAXIMIZING OPERATIONAL EFFICIENCIES; **COMBINE THIS WITH OUR INNOVATE GYRO SURVEYING TECHNOLOGIES, AND WE DRIVE DOWN YOUR BOTTOM LINE.**

Innovative Technology

Our Gyro Survey system's continuous mode provides the ability to survey at 200 ft/min, maximizing cost savings for all well types.

Using our true north direction finding system, orientation accuracy is made quicker and simpler. The true north system does not require on-site technician calibration prior to a survey, and the system can be calibrated while down hole.

Versatile Platform

Gyro platform can run:

- In real time with our state-of-the-art fleet of wireline trucks
- Can be dropped directly inside the drill string
- On memory with rig wireline
- Without the rig, using our trailer mounted crane unit

Our Gyro System can be used for orientating:

- Performance drilling motor
- Whipstock
- Casing

The Phoenix Advantage

Phoenix has built a reputation as a quality solution provider that fosters a culture of excellence through our detailed protocols and processes. In-house calibration of our tools at regionally based Phoenix facilities ensures we deliver consistent service and reliable performance each and every run. Phoenix's greatest investment are the employees and staff that deliver our services and operate our technology. Our training programs measure competency through a combination of hands-on practical training and theoretical classroom sessions which translates into confident and qualified personnel with deep technical knowledge.

Dimensions

Diameter	1.77" (45mm)
Gyro module length	36.6" (950mm)
Telemetry module length	15.74" (400mm)
Weight	17.6lbs (8kg)
Dimensions (surface unit)	6.496" x 8.661" x 3.346" (165mm x 220mm x 85mm)
Weight (surface unit)	2.2lbs (1kg)

Technical Specifications

Inclination accuracy	+/-0.1°
Azimuth accuracy continuous mode	0.1% (subject to well profile)
Azimuth accuracy point survey	+/-1.0°
Gravity toolface accuracy	+/- 0.1° for i ncl. > 3°
Gyroscopic toolface accuracy	+/- 1.0°
Repeatability	+/- 0.5°
Inclination range	0° to 180° (from vertical)
Pressure rating	10,000 psi (70Mpa)
Temperature rating	-22°F to +185°F (-30°C to +85°C)
Survey speed	300 ft/min (91m/min)
Surface unit input	100-240v

Sensor Type Comparison

Direct & Indirect Methods of Measurement - North Seekers, Free Gyros, Solid State

Capabilities	Phoenix True North	Competition A Gyros	Competition B Gyros
True North Finding	✓	x	x
Inertial Navigation System	✓	✓	x
Earth Spin Rotation Measurement	✓	x	x
No Collar Azimuth Required	✓	x	x
Independent Shots	✓	✓	x
No Drift Accumulation	✓	✓	x
No Room for Human Error	✓	x	x
Directional Drilling	✓	✓	x
Continuous Survey Mode up to 300ft/min	✓	x	x
Survey Interval	Continuous Mode (non-stop)	Continuous Mode (non-stop)	Every 16.4' (5m) (mandatory)
Average Survey Time for 328' (100m) Depth	15 minutes	45 minutes	2 hrs and 40 minutes



Additional Capabilities

- Temperature Surveys provide an estimate of the location of the top of the cement casing and can indicate zones of lost circulation
- With full pressure control that includes lubricators, pack off, tool trap and BOP system, our equipment can run in an active well