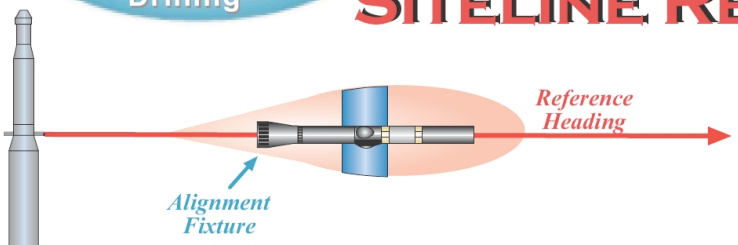
KEEPER GYRO
SITELINE REFERENCE MODE



Survey & Orientation Under Motion

North-seeking technology has greatly improved survey/orientation accuracy. However, north-seeking systems require a motionless environment. They are subjected to time-consuming errors in applications such as offshore kickoffs at or near seabed, drillpipe surveys/orientation on floating vessels, flowing wellbores, or other conditions where tool stability cannot be maintained.

SITELINE KEEPER'S Time & Cost-Savings Solution

Scientific Drilling, International (SDI) has engineered a solution that incorporates north-seeking/attitude reference survey accuracy with sight-reference gyro simplicity. **SDI**'s ***Keeper Gyro System*** with ***Siteline Reference Mode*** (SITELINE KEEPER) is a highly-accurate, all-in-one proprietary solution. SITELINE KEEPER reduces survey orientation time and improves survey accuracy while eliminating the cost of down-time due to excessive downhole motion. The chart at the right illustrates the time savings (>300%) of SITELINE KEEPER over traditional north-seeking tools which translate directly into significant cost savings.

Application Versatility

SITELINE KEEPER is a highly-effective survey/orientation solution in any application where tool stability cannot be maintained, such as:

- Offshore kickoff at or near seabed
- Drillpipe surveys/orientations on floating vessels
- Template or wellhead surveys/orientations

Technical Specifications			
* Accuracy:	Subject to well profile		
Pressure Rating:	20,000 psi (137,900 kPa)		
Survey Speed:	≈600 ft/min (≈150m/min)		
Diameter:	1.75"	1.85"	2.125"
Length:	18 ft	19 ft	19 ft
Weight:	110 lbs	120 lbs	140 lbs
Temperature Rating:	300°F	400°F*	400°F*
Battery Power:	Alkaline ≈ 12 hours Lithium ≈ 30 hours		

* Error ellipse calculations available upon request for individual well profiles.

Orientation at Seabed Time Comparison	
North Seeking Compass	**Minutes**
Pick up tool:	0.50
Traverse in hole:	3.00
Survey:	10.00
Orient pipe (blind operation, no toolface tracking):	3.00
Traverse out of hole:	3.00
Lay down tool:	0.50
TOTAL TIME:	**30.00**
SITELINE KEEPER	**Minutes**
Pick up tool & sight reference to known heading:	1.00
Traverse in hole:	3.00
Survey:	0.25
Orient pipe (display realtime operation using toolface tracking):	1.00
Traverse out of hole:	3.00
Check sight reference and lay down tool:	1.00
TOTAL TIME:	**9.25**

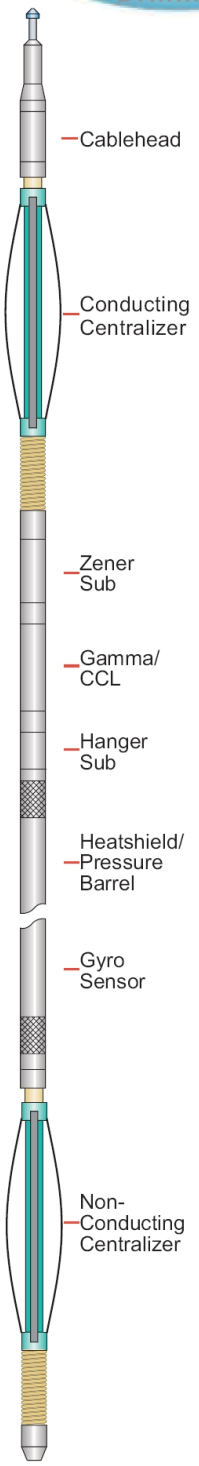
ADVANTAGES

- **Under-Motion Operations**. Not susceptible to errors due to motion.
- **Data Redundancy**. Multiple modes of operation capable of sight reference and north-seeking surveys/orientations.
- **Faster Cluster Shots**. Faster than north seeking gyro. Tool face is tracked and displayed realtime on rig floor display (6 updates/second).

Scientific Drilling
www.scientificdrilling.com

KEEPER

HIGH-SPEED GYRO SURVEY / STEERING SYSTEM



Definitive Survey/ Orientation System

Scientific Drilling's KEEPER is the next generation of our *Finder* borehole surveying system. KEEPER operates in continuous mode from vertical through horizontal. It is capable of providing definitive surveys, orientations, and gyro steering at all inclinations and orientations. KEEPER is more accurate, more versatile, and much faster than any other small diameter system.

High-Speed Performance

KEEPER's proprietary state-of-the-art gyro allows surveying "on the fly" from vertical through horizontal at wireline speeds >600 feet per minute. This high-speed capability translates into significant rigtime savings when compared to other gyro compass tools.

Expertise and Reliability

KEEPER surveys are performed by Scientific Drilling's highly-trained and experienced Directional Surveyors and support teams. Strict pre- and post-job quality assurance and calibration checks are performed. Continuous monitoring during the job ensures the highest surveying standards are maintained.

Application Versatility

KEEPER's small diameter and adaptable running gear provide configurations for surveying in drillpipe and tubing as small as 2 inches internal diameter. KEEPER performs casing, high angle pump down, and pipeline surveys. KEEPER's unique versatility enables individual solutions to diverse survey requirements.

Robust Gyro Steering

KEEPER's durable and rugged sensors allow for steering-while-drilling. Continuous directional information is available from vertical even in the presence of magnetic interference. KEEPER's versatile and fast space stabilized servo system reports real-time gyro toolface continuously to a rigfloor display.

Optional Features

- **Temperature Log**. Combined with a temperature logging tool, KEEPER locates "cement tops" after running casing.
- **Gamma Ray/Casing Collar Locator (CCL)**. Combined with KEEPER, a gamma ray/CCL logging device aids in depth correlation.
- **Survey/Logging Combination Runs**. KEEPER can be run with electric wireline logs.

Technical Specifications				
*Accuracy:	Subject to well profile			
Pressure Rating:	20,000 psi (137,896 kPa)			
Survey Speed:	≈500 ft/min (≈152m/min)			
Diameter:	1.75" (4.5cm)	1.85" (4.7cm)	2.125" (5.4cm)	3.0" (7.6cm)
Length:	18 ft (5.5m)	19 ft (5.8m)	19 ft (5.8m)	16 ft (4.9m)
Weight:	110 lbs (50kg)	120 lbs (54kg)	140 lbs (63kg)	300 lbs (136kg)
Temperature Rating:	257°F (125°C)	400°F* (204°C)	400°F* (204°C)	400°F* 204°C

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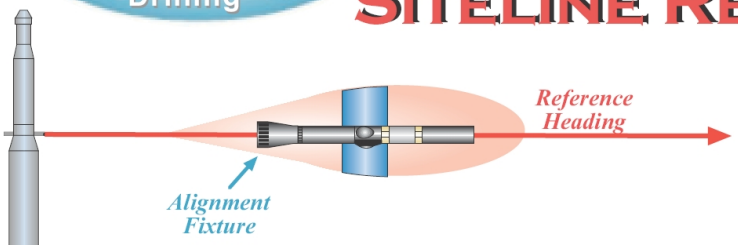

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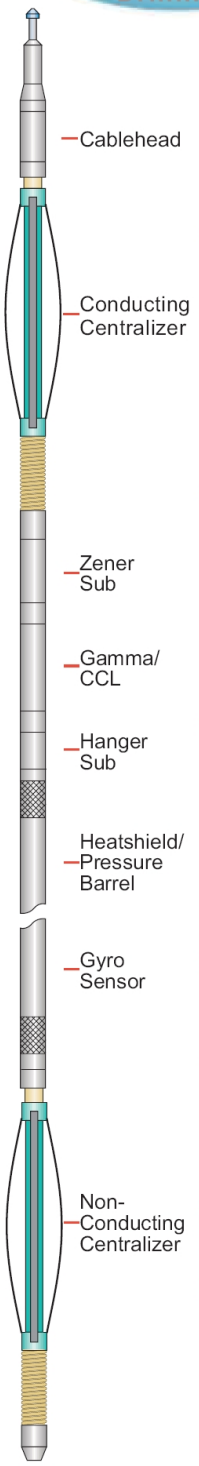

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