

# DataSphere® LinX® Monitoring System

## BEHIND CASING RESERVOIR MONITORING

### OVERVIEW

Operators want maximum recovery, control and safety for the life of their reservoirs, all while under pressure to reduce costs. Methods to monitor connectivity between reservoirs and across the field, and the drive to optimize field performance is more critical than ever before. Continuous reservoir pressure and temperature monitoring behind casing enables a cost-effective approach to understanding connectivity between formations. Continuous monitoring of top of reservoir pressure optimizes the injection process while avoiding out-of-zone injections or cap rock integrity issues.

The DataSphere® LinX® monitoring system is a step change in reservoir monitoring enabled by wireless through-casing power and communication. With the LinX system, sensors are permanently placed behind the well barriers – right where they need to be – monitoring without compromising well integrity or changing the well design, and without major revisions to the drilling program.

### Here's how

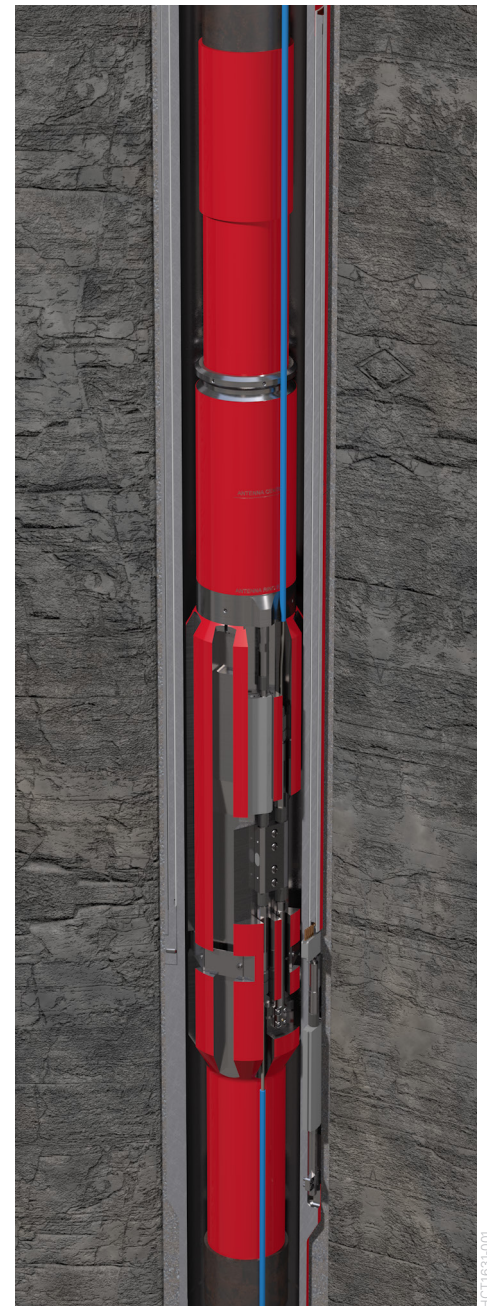
The LinX monitoring system is a wireless through-wellbore technology that enables the placement of a permanent pressure/ temperature gauge behind the casing or liner in the cement, using electromagnetic power and communication to drive and communicate with sensors, without the need for batteries or extra barrier penetrations. Power and communication with surface is provided by industry-standard cable and an IWIS interface card, enabling the system to be combined with traditional downhole monitoring on a single cable.

### Behind casing reservoir monitoring

The LinX system senses any pressure/temperature fluctuations in the formation. This enables the operator to detect pressure changes, from a producing or injecting well, in:

- » Overburden
- » Caprock
- » Reservoir

This newly gained knowledge yields significant benefits in field development and in injection optimization and risk reduction. The LinX system can gather high value information on communication across the field, including between injector and producer, between producing zones or between producing and non-producing reservoirs – information vital to the field development strategy and placement of new wells. Often the only way to gain this knowledge has been do use dedicated monitoring wells at great cost. Now the data can be gathered much more economically from any well passing the formation of interest.



The Halliburton LinX® monitoring system showing the LinX-200 Casing and Tubing Mandrels

**How it works**

LinX® system monitoring is a three-step process powered by electromagnetic currents powering quartz pressure and temperature (P/T) gauge sensors.

1. One sensor and coil are fitted on the casing or liner using a custom casing pup.
2. Another sensor and coil are fitted on the tubing using a custom tubing joint. The tubing-conveyed sensor is then connected to surface via a traditional downhole cable.
3. Using the two coils, electromagnetism powers and communicates with the casing-conveyed sensor.

The electromagnetic transfer of power, does not have the limitations of batteries, enabling unlimited transfer of data over the life of the well as needed for permanent monitoring.

**Gauge Specifications**

Pressure range / Temperature range	0-20,000 PSIA / -20 – 200°C (14 – 392°F)
Calibration ranges	200 - 10,000 PSIA / -10 – 150°C (-4 – 302°F) 200 - 20,000 PSIA / 25 – 200°C ( 77 - 392°F)
Stated accuracy in calibrated range	1.5 psi / 0.5 °C
Typical accuracy in calibrated range	1.2 psi / 0.15 °C
Resolution (per sec)	< 0.006 psi / < 0.005 °C
Drift at maximum pressure and temperature (per year)	0.02% FS / < 0.1 °C
Cable type	1/4" OD Mono-conductor/TEC
Gauge material	MP-35N / Per NACE MR-0175
Electrical wellhead requirements	1-pin conductor
Maximum downhole capacity	7 gauges / 21 sensors
Seals and terminations	Dual metal-to-metal Field pressure testable
Space out tolerance	1 foot

**BENEFITS**

- » Low cost alternative to monitor connectivity across a field
- » Continuous monitoring of injector-producer communication, stacked reservoir connectivity, or producing and non producing reservoirs
- » Top of reservoir pressure to avoid out-of-zone injection and verify cap rock integrity
- » Customizable to any well design – single, multi-zone, intelligent, standard, subsea, dry tree
- » Compatible with the Halliburton DataSphere® Opsis® permanent downhole gauges as both can be run on the same interface card and downhole cable



Halliburton LinX®-200 Casing Mandrel

HCT1631-002

For more information, contact your local Halliburton representative or visit us on the web at [www.halliburton.com](http://www.halliburton.com)

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