

Signature quartz gauge

Reliable, accurate pressure measurements in any environment



Temperature:

Rated up to 437 degF [225 degC]



Pressure:

Rated up to 30,000 psi [207 MPa]

Applications

- Downhole reservoir testing
- Exploration or appraisal testing
- HPHT, hostile, and extreme-temperature wells
- Testing with wireless readout or memory mode
- Pressure surveys in production wells

How it improves wells

- Provides confidence in operational accuracy in HPHT environments
- Mitigates risk by improving the reservoir description

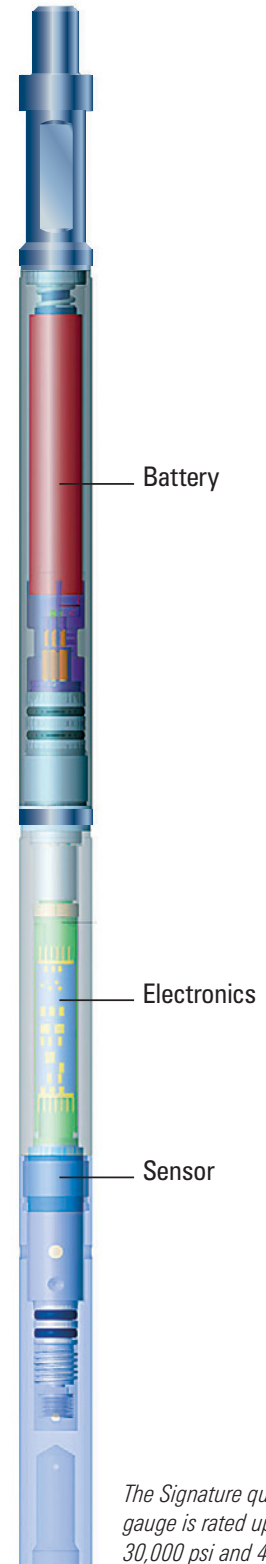
How it works

The Signature* quartz gauge incorporates leading-edge technologies to consistently provide the best pressure measurements in any environment. High-resolution measurements are captured with improved accuracy for better quantification of reservoir properties, enabling confident testing across the life of the field.

Designed for the most hostile downhole environments, the Signature gauge has the highest temperature rating on the market. Rated to 30,000 psi and 437 degF, the gauge delivers dependable measurements that enable the operator to see beyond the near-wellbore area, identify detailed reservoir features, and detect even minor pressure fluctuations that can significantly affect field development plans.

By combining proprietary electronics for excellent resolution and efficient operation with an all-ceramic, single-substrate-constructed multichip module (MCM), the Signature gauge provides resolution that can detect pressure differences less than 0.005 psi at a 1-s recording rate to conduct analysis that was previously impossible. Placing the electronics with 100% ceramic MCM components onto a single substrate means there are fewer connections and fewer components, resulting in improved reliability under rugged downhole conditions. The ceramic substrate also ensures the long life of electronics at high temperatures. In addition, Schlumberger battery specialists design, build, and test batteries to ensure that the gauge has the best power source available.

The Signature gauge is incorporated in the Quartet* downhole reservoir testing system for high-frequency measurement of the test progress. The gauge can be enabled by Muzic* wireless telemetry to deliver pressure measurements in real time for detailed monitoring of test progress downhole. Each gauge can be interrogated independently for real-time or historical pressure or temperature data.



The Signature quartz gauge is rated up to 30,000 psi and 437 degF.

Signature



The Signature gauge is designed to withstand the harshest downhole conditions to maintain reliable accuracy and consistency to their maximum pressure and temperature ratings.

Specifications

Model	TCQR Signature CQG* Crystal Quartz Gauge	TQPR Signature Quartz Gauge	TUPR Signature HP* High-Pressure Quartz Gauge	THOR Signature HPHT* High-Pressure, High-Temperature Quartz Gauge	THXR Signature Xtreme* High-Temperature Quartz Gauge
Sensor type	COG crystal quartz	Quartz	HP quartz	HPHT quartz	Extreme-temperature quartz
Pressure rating, psi [MPa]	16,000 [110]	16,000 [110]	30,000 [207]	30,000 [207]	25,000 [172]
Temperature rating, degF [degC]	347 [175]	347 [175]	347 [175]	410 [210]	437 [225]
Autonomy [†]	6 months	1 year	1 year	37 d at 400 degF 21 d at 410 degF	12 d at 428 degF
Max. datasets	5,000,000	5,000,000	5,000,000	1,250,000	1,250,000
Memory size, MB	16	16	16	4	4
Memory capacity [†] at 1-s recording, days	40	50	50	12	12
Max. OD, in [mm]	1.2 [30.5]	1.0 [25]	1.0 [25]	1.0 [25]	1.0 [25]
Length, in [mm]	40.2 [1,021]	18.9 [480]	18.9 [480]	18.9 [480]	19.9 [506]
Weight (excluding battery), lbm [kg]	9.9 [4.5]	3.75 [1.70]	3.75 [1.70]	3.75 [1.70]	3.90 [1.77]
Material	INCONEL [®] 718 and C276	INCONEL 718 and MP35N [‡]	INCONEL 718 and MP35N	INCONEL 718 and MP35N	INCONEL 718 and MP35N
Function enabled by Muzic wireless telemetry	na ^{††}	Real-time or historical wireless data transmission	Real-time or historical wireless data transmission	Real-time or historical wireless data transmission	na
Interface with Muzic wireless telemetry	na	Model MZGM	Model MZGM	Model MZGM	na
Autonomy of wireless transmission of real-time data, ^{††} days	na	20	20	20	na
Downhole to surface wireless transmission time, s	na	90	90	90	na

[†] Function of temperature and recording rate that may vary based on individual job parameters.

[‡] Exact capacity depends on data compression ratio.

[§] Sensor housing and bulkhead are INCONEL 718. Battery housing and sensor are MP35N.

^{††} Not applicable.

^{†††} Transmission of historical-mode data remains uninterrupted and lasts the test duration.

Metrology					
Model	TCQR Signature CQG Crystal Quartz Gauge	TQPR Signature Quartz Gauge	TUPR Signature HP High-Pressure Quartz Gauge	THQR Signature HPHT High-Pressure, High-Temperature Quartz Gauge	THXR Signature Xtreme High-Temperature Quartz Gauge
Pressure					
Accuracy	±1.2 psi [±8.3 kPa]	±3.2 psi [±22 kPa]	±0.015% full scale [†]	±0.015% full scale [†]	±0.015% full scale [†]
Resolution, psi [kPa]	0.003 [0.021]	0.005 [0.03]	0.01 [0.07]	0.01 [0.07]	0.01 [0.07]
Calibration range, psi [MPa]	Atmospheric to 15,000 [103]	Atmospheric to 16,000 [110]	Atmospheric to 30,000 [207]	Atmospheric to 30,000 [207]	Atmospheric to 25,000 [172]
Drift at pressure and temperature rating, % full scale/yr	<0.01	<0.020	<0.025	<0.025	<0.025
Temperature					
Accuracy, degF [degC]	±0.4 [±0.2]	±0.4 [±0.2]	±0.4 [±0.2]	±0.4 [±0.2]	±0.4 [±0.2]
Resolution, degF [degC]	0.002 [0.001]	0.002 [0.001]	0.002 [0.001]	0.002 [0.001]	0.002 [0.001]
Calibration range, [‡] degF [degC]	77 to 347 [25 to 175]	77 to 347 [25 to 175]	77 to 347 [25 to 175]	95 to 410 [35 to 210]	77 to 437 [25 to 225]
Drift, degF/yr [degC/yr]	<0.2 [<0.1]	<0.2 [<0.1]	<0.2 [<0.1]	<0.2 [<0.1]	<0.2 [<0.1]
Scanning rate	0.1 s to 10 min	0.1 s to 10 min	0.1 s to 10 min	0.1 s to 5 s	0.1 s to 5 s

[†] Accuracy of high-pressure quartz sensor is dependent on calibrated range of gauge.

[‡] Calibration range can be extended to 32 degF [0 degC] on request for seabed operations.