

Signature Quartz Gauges

Reliable, accurate pressure measurements in any environment

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

BENEFITS

- Improves operational accuracy in HPHT environments
- Mitigates risk by improving reservoir description

FEATURES

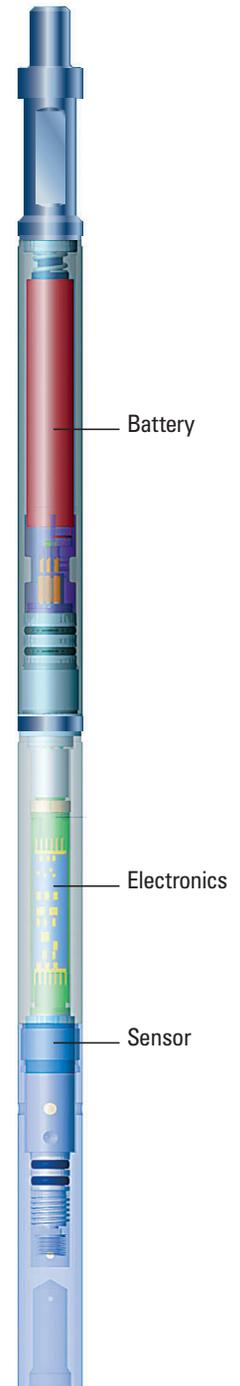
- Resolution optimization
- Reliable and consistent performance up to the maximum temperature rating (437 degF), even over long durations
- Quartz sensor
- Downhole wireless telemetry option that enables bidirectional communication for tool command, verification, and readout of downhole data
- Increased memory storage to capture larger datasets
- Extreme shock qualification
- Memory guard and automatic data compression
- Single ceramic multichip module (MCM)

Signature* quartz gauges incorporate 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 to enable confident testing across the life of the field.

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

Signature gauges are designed to incorporate the best technologies, combining proprietary electronics for excellent resolution and efficient operation with an all-ceramic, single-substrate-constructed MCM. Resolution improvements with the new electronics mean that differences less than 0.005 psi can be detected at a 1-s recording rate for conducting analysis that was previously impossible. By placing electronics with 100% ceramic MCM components onto a single substrate, 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 Signature gauges have the best power sources available.

Signature gauges running as part of the Quartet* downhole reservoir testing system enabled by Muzic* wireless telemetry allow you to obtain real-time pressure measurements while monitoring and controlling downhole reservoir tests. Each gauge can be interrogated independently for real-time or historical pressure or temperature data.



Signature quartz gauge.

Signature Quartz Gauges



Signature gauges are 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	THQR Signature HPHT* High-Pressure, High- Temperature Quartz Gauge	THXR Signature Xtreme* High-Temperature Quartz Gauge
Sensor type	CQG 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	MZGM	MZGM	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.

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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/year	<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]	77–347 [25–175]	77–347 [25–175]	77–347 [25–175]	95–410 [35–210]	77–437 [25–225]
Drift, degF/year [degC/year]	<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.

Run Signature quartz gauges as part of the Quartet-HT* high-temperature downhole reservoir testing system or the Quartet system enabled by Muzic telemetry. These systems deliver the highest-quality pressure measurements and representative fluid samples with maximum safety and efficiency, for altogether better reservoir testing.

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