

WellWatcher eQuartz

ESP-immune high-temperature, high-resolution PT gauge



Rated up to 25,000 psi
[172 MPa]



Rated up to 200 degC
[392 degF]

APPLICATIONS

- Intelligent completions
- Wells with ESP for artificial lift
- Long-term production and reservoir monitoring
- Injection monitoring
- Real-time surveillance monitoring
- Pressure buildup surveys
- Transient well testing
- Hydraulic fracturing monitoring

BENEFITS

- Optimizes well integration with compact gauges and the ability to run using monoconductor cable
- Enables real-time evaluation and immediate corrective actions by delivering continuous PT measurements
- Helps to improve production through the evaluation of efficiency and functionality of artificial lift systems, e.g. gas lift and ESP
- Enables high measurement stability and extended lifetime with hermetically sealed quartz resonator crystals and digital solid-state electronics, including advanced mechanical sealing technology

FEATURES

- Immunity to electrical noise and electromagnetic field interference from devices such as ESP pumps
- Advanced electronics technology
- Long-term measurement accuracy with excellent sensor and electronic metrology
- Up to 16 sensors on a monoconductor cable
- In-house calibration at a Schlumberger manufacturing center
- Grade VO lower connection system as per ISO 14998
- H2S-resistant gauges as per ISO 15156

WellWatcher eQuartz* ESP-immune high-temperature, high-resolution PT gauges have advanced quartz sensors that enable high performance. The advanced telemetry of the gauges enable immunity to external electrical noise. The flexible multidrop functionality enables up to 16 sensors to be installed on a single cable. Downhole data acquired using WellWatcher eQuartz gauges is used for production analysis and pressure transient analysis, which are important for well productivity and reservoir depletion evaluation.

Stable measurements at reservoir conditions

These permanent gauges are engineered to deliver stable pressure measurements, which are essential in long-term reservoir and production monitoring applications. Performance is validated in a controlled test cell where drift stability is measured at simulated reservoir pressure and temperature conditions.

Downhole data at surface, even with ESP wells

The new telemetry or signal communication process WellWatcher eQuartz gauges use to collect and transmit downhole data is immune to electrical disturbances, such as the noise induced by ESP power lines or motor drives. The noise immunity is enabled by the enhanced demodulation capabilities of the integrated and specialized digital signal microprocessor in the surface acquisition card.

Connector options for enhanced sealing

For extra reliability, the WellWatcher eQuartz gauge is equipped with the Intellitite* downhole dual-seal dry-mate connector, which is electron-beam welded and integrated into the gauge's housing. This premium connector has three independent seals, including two fully redundant metal-to-metal seals, and is fully pressure testable using a microleak detection system. The gauge is hermetically sealed to ensure a long, reliable lifetime.

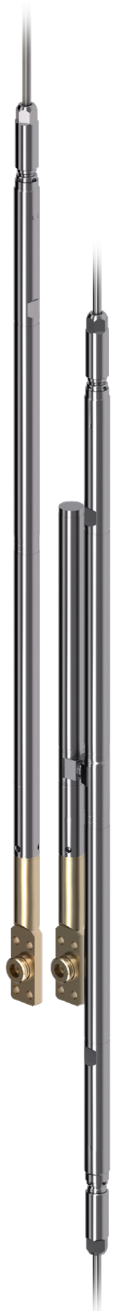
Rigorous qualification testing

The WellWatcher eQuartz gauge is subjected to power on-off cycles and temperature cycling to simulate the most demanding operating conditions. It supersedes the lifetime expectation of all previous WellWatcher gauge series. The gauge completed repeated shock and vibration testing at rigorous levels to meet the environmental qualifications for production and injection wells. These qualifications meet or exceed the Advanced Well Equipment Standards recommended practice for the qualification of downhole instrumentation and sensors.

Part of an integrated system

WellWatcher eQuartz gauges are a part of the family of WellWatcher* permanent monitoring systems. When the gauges are used in conjunction with WellWatcher Advisor* real-time intelligent completion software, they become a part of a monitoring solution that includes downhole data surveillance, data analysis, and reservoir interpretation.

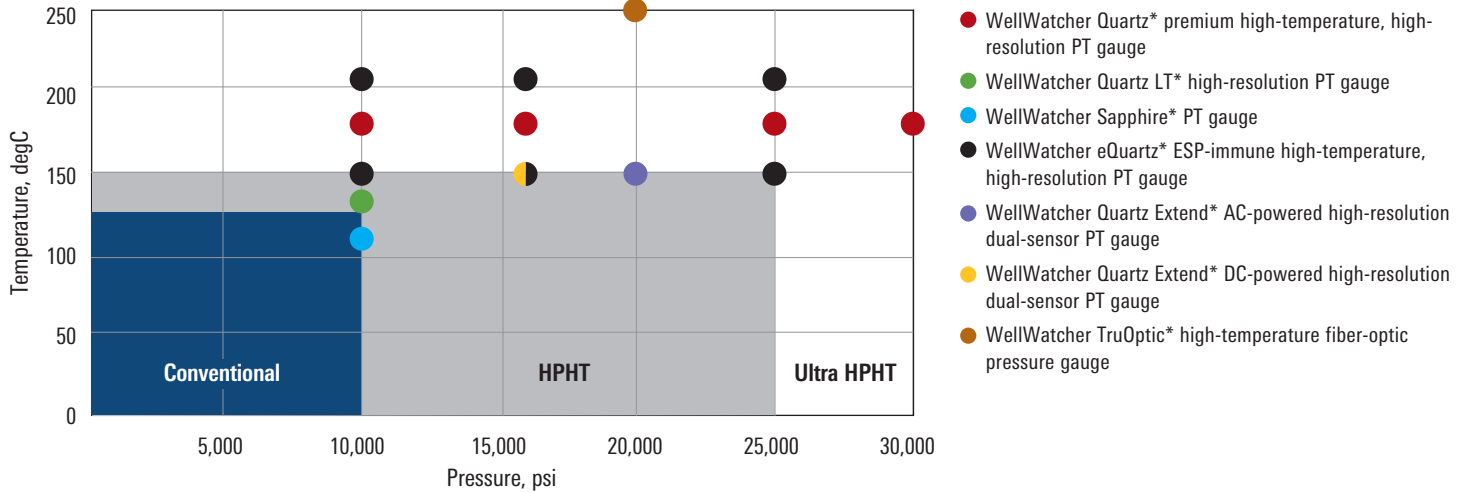
WellWatcher systems are supported and deployed by a specialized group of engineers and technicians who are highly trained in permanent monitoring systems and intelligent completion technology. This specific central support for project preparation and operations contributes to the delivery of best-in-class service quality worldwide.



The WellWatcher eQuartz gauge is available in bottom gauge and multidrop variants.

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Pressure and Temperature Ratings for WellWatcher* Permanent Monitoring Systems Downhole Gauges



The graph shows the environmental applications in which WellWatcher system downhole gauges are most appropriate. The WellWatcher eQuartz gauge is suitable for temperatures as high as 200 degC and pressures as high as 25,000 psi.

WellWatcher eQuartz Gauge Technical Specifications

	EQTZ 150-10	EQTZ 200-10	EQTZ 150-16	EQTZ 200-16	EQTZ 150-25	EQTZ 200-25
Maximum pressure, psi [MPa]	10,000 [69]	10,000 [69]	16,000 [110]	16,000 [110]	25,000 [172]	25,000 [172]
Maximum temperature, degF [degC]	300 [150]	392 [200]	300 [150]	392 [200]	300 [150]	392 [200]
Shock and vibration	As per Advanced Well Equipment Standardization standard or beyond					
H2S resistance	NACE International raw materials					
Scanning rate	One dataset (pressure and temperature) per gauge per second					
Tool power	10–70V, 10 mA (±20%) for the gauge plus 15 mA for telemetry					

Metrology

Standard pressure calibration range,† psi [MPa]	1,000 to 10,000 [6.9 to 69]	1,000 to 10,000 [6.9 to 69]	1,000 to 16,000 [6.9 to 110]	1,000 to 16,000 [6.9 to 110]	1,000 to 25,000 [6.9 to 172]	1,000 to 25,000 [6.9 to 172]
Standard temperature calibration range,† degF [degC]	77 to 300 [25 to 150]†	77 to 400 [25 to 205]†	77 to 300 [25 to 150]†	77 to 400 [25 to 205]†	77 to 300 [25 to 150]†	77 to 400 [25 to 205]†
Pressure accuracy, %FS	±0.012	±0.012	±0.015	±0.015	±0.015	±0.015
Pressure resolution, psi/sec [kPa/sec]	<0.006 [0.041]	<0.006 [0.041]	<0.008 [0.055]	<0.008 [0.055]	<0.010 [0.069]	<0.010 [0.069]
Pressure Drift, psi/year [MPa/year] FS	±2 [0.014]	±2 [0.014]	±3.2 [0.022]	±3.2 [0.022]	±5 [0.034]	±5 [0.034]
Temperature accuracy, degF [degC]	±0.9 [±0.5]	±0.9 [±0.5]	±0.9 [±0.5]	±0.9 [±0.5]	±0.9 [±0.5]	±0.9 [±0.5]
Temperature resolution, 1-s gate time, degF [degC]	±0.009 [±0.005]	±0.009 [±0.005]	±0.009 [±0.005]	±0.009 [±0.005]	±0.009 [±0.005]	±0.009 [±0.005]
Temperature repeatability, degF [degC]	<0.02 [<0.01]	<0.02 [<0.01]	<0.02 [<0.01]	<0.02 [<0.01]	<0.02 [<0.01]	<0.02 [<0.01]
Temperature drift at 350 degF, degF/year [177 degC, degC/year]	±0.29 [± 0.1]	±0.29 [± 0.1]	±0.29 [± 0.1]	±0.29 [± 0.1]	±0.29 [± 0.1]	±0.29 [± 0.1]

Dimensions

Outer diameter, in [mm]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]	0.75 [19]
Single sensor overall length, in [mm]	22.8 [580]	22.8 [580]	22.8 [580]	22.8 [580]	22.8 [580]	22.8 [580]
Single sensor with feed-through, in [mm]	25.8 [655]	25.8 [655]	25.8 [655]	25.8 [655]	25.8 [655]	25.8 [655]
Dual sensor length, in [mm]	20.9 [530]	20.9 [530]	20.9 [530]	20.9 [530]	20.9 [530]	20.9 [530]
Dual sensor with feed-through length, in [mm]	31.5 [800]	31.5 [800]	31.5 [800]	31.5 [800]	31.5 [800]	31.5 [800]

†Custom calibration ranges are available if required. Standard calibration is at 300 degF [150 degC] or 392 degF [200 degC] depending on the gauge version and temperature rating.

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