Zenith E-Series ESP gauges
Prolong ESP run life and enhance oil recovery
**RELIABLE, REAL-TIME INSIGHT**

**Zenith™ E-Series gauges** for electrical submersible pumping (ESP) systems deliver accurate, real-time measurements to enable fast, appropriate, and confident assessment of well and lift system performance. With more than 15,000 gauges installed worldwide, Zenith gauges have a proven track record of delivering the data you need to make fast, informed decisions.

The absence of accurate, reliable data in any artificial lift operation constitutes significant operational risks and inhibits wells from producing at optimal rates. Lack of information can lead to improperly sized ESP systems and no insight to problems until there is a decline in production rates or the artificial lift system fails.

The challenge in an age of depleted reserves, maturing wells, harsh environments, and high production costs is to increase equipment uptime, prolong run life, improve lift system performance, and optimize production, while reducing operating costs.

The Zenith E-Series gauge is installed below the ESP motor, providing reliable well and pump surveillance via direct measurement of key parameters surrounding the motor and pump. The gauge is connected electrically to the motor wye point with data communicated via the ESP cable to a wellsite surface interface panel, and offsite by way of a data transmission device such as SCADA.

**Confidence in accurate, timely, and consistent well and pump surveillance data empowers operators to make fast, appropriate, and reliable decisions to facilitate optimum production and ESP system run life.**

Gauges and surface panels are available in multiple specifications to suit the application and economic impact of deploying a downhole monitoring system.

### Flexible options

**Low production wells with small economic impact**
Measure intake pressure and intake temperature to prevent pump-off and to provide well pressure surveillance.

**Prolific wells or difficult conditions**
Add discharge pressure, motor winding temperature, and vibration to enable full well analyses to assess performance and optimize production.

A suite of gauge options are available to ensure reliable operation in high-pressure and high-temperature environments.

**Advanced monitoring and system protection**
Intelligent options combine multiparameter gauges with intelligent surface equipment to provide valuable data for well analyses, including advanced parameters.

Measurement of the ESP electrical system enables foresight into potential equipment problems to facilitate preventative maintenance and effective workover management. The addition of intelligent parameters automates ESP protection and enables advanced analysis, diagnosis, and field-wide optimization.

### Measurement

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✔ parameter included as standard  | ○ optional addition or alternative  | *calculated
Maximize run life while reducing costs
Alarm/trip safeguards ESP and well, protecting against:
• Unnecessary workover and expenditure
• Excessive well draw down
• High- or low-flow rates (pump upthrust or downthrust)
• Dead heading or shut in
• Resonant vibration frequencies

Optimize production
• Dual pressure gauge enables full validation and analysis of well and ESP operating conditions
• Feedback intake pressure level to VSD frequency setting to provide automated control of draw down
• Fast sampling and accurate gauges enable analysis of draw-down and build-up pressure transients

Ensure reliable data and analysis
• Identification of pump wear issues
• Validation of inflow/outflow data
• Exacting product test processes and standards
• Continual product improvement
• Multiple gauge specification options
• Fast, accurate sampling
• Slimline, tubing-deployed, and dual ESP system designs
• Solutions for high-pressure and high-temperature environments
• Field-proven reliability
• Long service life for repeated deployment
• In-country refurbishment service
• Gauges compatible with all pump manufacturers
• Surface equipment compatible with non-BHGE drives

Proven reliability
A heritage of reliability and engineering excellence, coupled with rigorous testing and ongoing improvement, ensures delivery of a continuous stream of data for the life of the well.

In-house test facilities ensure high quality products through dynamic and long-term testing.

Continuous improvement program exploits performance and environmental test results, field feedback, and industry insight to sustain a best-in-class product offering.

Designed to operate reliably up to 150°C, 175°C, 225°C, or 260°C (302°F, 347°F, 437°F, or 500°F), Zenith E-Series gauges are fully tested and field proven to survive higher temperatures that often occur during ESP operation.

• Robust welded housing
• Advanced technology welded transducers
• Electronics mounted to absorb vibration

>12 YEARS LONGEST E-SERIES GAUGE RUN TIME

Gauge reliability rates calculated from 8,500+ tracked installs vs known gauge issues. All stats correct as of September 2017.
Advanced technology ESP gauge options

Zenith E-Series ESP gauge with motor diagnostics
Energy required to extract oil from wells is increasing as resources decline and operations go deeper.

The Zenith E-Series gauge with motor diagnostics unlocks real-time power analysis from a standard ESP gauge, delivering key electrical measurements to optimize efficiency and output.

Traditionally referencing unreliable surface calculations, operators can access accurate electrical and mechanical measurements through voltage and frequency analysis directly at the motor, confidently running equipment at actual optimum electrical points using assured system adjustments based on true measured values.

Zenith E-Series ESP gauge with downhole water cut
Knowledge of downhole water cut is essential for true optimized well performance. Several techniques are used widely at surface, but accurate downhole measurement can add significant cost to operations.

The Zenith E-Series gauge with downhole water cut economically delivers direct, live measurement of downhole water content from an industry-standard gauge, enabling real-time understanding of changes in the well and reservoir.

Real-time knowledge of downhole water cut with insight into reservoir behavior enables efficient and reliable water management for effective production optimization.
Zenith HT (225°C and 260°C [437°F and 500°F]) high-temperature gauges

Traditional 150°C to 175°C-rated (302°F to 347°F-rated) electronic gauge technology has been shown to operate up to 265°C (509°F), but with very low life expectancy.

The Zenith HT gauge enables dependable downhole surveillance in challenging production environments, to ensure delivery of well data essential for efficient production.

Specifically designed for high-temperature reservoirs and excessive temperatures generated by ESP systems during operation, the HT gauge delivers field-proven reliability in high-temperature conditions.

Zenith GFI™ ground fault immune ESP gauge

Over 15% of downhole ESP monitoring systems fail due to ground fault on the ESP cable. With no downhole data available, operators are faced with a full workover or running motors at lower pumping rates to ensure safe operation.

The Zenith GFI ESP gauge is not impacted by cable ground faults, allowing operators to maintain reliable, high-speed well surveillance resulting in up to 25% more output compared with ESPs running without data.

In addition, the GFI gauge provides the ability to monitor cable health in real time, enabling proactive workover planning and reduced downtime.

ASK YOUR LOCAL BHGE REPRESENTATIVE FOR MORE INFORMATION