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Case Study

Simplifying Subsurface Ventilation Surveys with the XP3i Digital Pressure Gauge

Summary of Requirements

Subsurface ventilation engineering demands precise measurement of air pressure differences across underground stations. Traditionally, this process involves:

- Using two highly precise barometers or altimeters to record pressure readings at each location.
- Calibrating instruments before surveys and compensating for temperature and atmospheric drift.
- Collecting simultaneous readings over time, either by keeping a barometer fixed at the surface (control station method) or by moving two barometers in sequence (leapfrog method).
- Carefully recording all readings with synchronized timing to adjust for natural pressure fluctuations.

Accurate records are essential for calculating ventilation resistances and designing safe airflow systems in mines.



Challenges of Traditional Barometric Surveys

This process presents several major challenges:

- **Labor Intensive Data Collection:** Typically, an additional person is required solely to stay at a control station and manually write down pressure readings at fixed intervals.
- **Manual Record Keeping:** Recording pressures with pencil and paper is prone to transcription errors and requires extra care to maintain legible, accurate logs.
- **Environmental Factors:** Cold, heat, and damp underground conditions can damage paper records and make writing difficult.
- **Instrument Drift and Calibration:** Mechanical barometers need repeated calibration checks, and reading them accurately under poor lighting or confined spaces is slow.

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Results Achieved Using the XP3i

When the customer switched to the XP3i Digital Pressure Gauge, they immediately transformed their workflow. Here's what they accomplished:

- **Eliminated the Need for Extra Personnel:** The XP3i's built-in datalogging feature—capable of storing up to 200 million data points—meant that one person could collect all necessary pressure data without needing an assistant stationed on the surface to record readings. This alone saved significant labor costs and simplified scheduling.
- **Simplified Data Management**: Instead of relying on handwritten logs, the team captured all pressure data digitally. This improved consistency, removed the risk of lost or smudged paper records, and allowed instant exporting to analysis software.
- **Improved Environmental Resilience**: Working underground or in unpredictable weather, the XP3i's sealed construction and digital storage protected records from rain, cold, and heat. No more balancing paper notebooks on equipment or trying to write legibly in harsh conditions.
- **Eliminated Manual Unit Conversions:** Because the XP3i reads directly in absolute pressure, there was no need for separate calculations or look-up tables to convert gauge readings—reducing potential errors and saving time.
- **Enhanced Cleanliness and Ergonomics**: Removing pencils, notebooks, and clipboards freed the team from carrying extra supplies and helped maintain a cleaner, more organized work area underground.

Customer Feedback

"The unit went well, and to answer one of your previous questions, the datalogging feature avoided having someone extra working on the data collection project and noting down the pressures. My customer mentioned that the previous engineering firm that came to do the work needed someone on the surface to note down the pressures, which was a big plus in our case as I did not need an extra person to do that."

This experience underscores how the XP3i not only improves accuracy but also reduces staffing needs, simplifies logistics, and makes critical ventilation surveys faster and more efficient.