

ZCorr

Advanced Digital Leak Detection

Introduction

ZCorr is a portable leak detection system that combines a network of digital correlating loggers (DCLs), a computer docking station and easy-to-use sound analyzing software. Using ZCorr, water providers can strategically target a section of distribution system pipe and pinpoint the exact locations of any leaks within the defined coverage area in a single night. ZCorr enables leak detection managers to plan the placement of the ZCorr DCLs and analyze and review the overnight recording results—all from the comfort and convenience of the office.

How It Works

Deployment

Water providers first identify one or more sections of pipeline for investigation. The compact ZCorr docking station holds up to eight digital correlating loggers and connects to a desktop PC, laptop or rugged mobile computer via USB cable for programming of each DCL. Logger configuration includes: the synchronization of the real-time clocks in each DCL and placement of each DCL on a digitized map of the distribution system. ZCorr DCLs are typically deployed in the field 400 to 4,000 feet apart, usually on valves or hydrants. ZCorr optionally generates printed work orders to direct field personnel in the exact placement of the DCLs on specific valves or other pipe fittings.

Data Collection

Once deployed, DCLs intelligently sample and record high-resolution sound data over a single night or multiple nights. The DCLs record and save vibration samples at the times specified in their configuration. The loggers then enter low-power mode until they are retrieved and reinserted into the ZCorr docking station. Nighttime data recorded by the DCLs is then downloaded to the PC, stored permanently and automatically analyzed to pinpoint the locations of any significant leaks.

ZCorr data processing uses special encoding techniques to account for the unique environmental conditions of each logger. For example, different pipe materials (plastic, cement or metal), large-diameter pipes, and long distances between loggers (with the presumption of very small leak signals), are all situations where the encoding is set to enhance the leak acoustic signature.

Data Analysis

Rather than relying on conventional digital filters, ZCorr utilizes a sophisticated “smart” noise correlation analysis technique, Automatic Leak Frequency Analysis (ALFA™), to provide the most accurate leak pinpointing in the industry. ALFA works by identifying the acoustic signature of the leak sound at each logger and then designs an optimal correlation filter that is unique for that recording. The ALFA filter concentrates on the leak sounds and discards other vibrations, for example those due to normal flow, transient usage and environmental sounds such as traffic.

ZCorr software finds all significant leak noise correlations automatically when the loggers are replaced in the docking station. The results are ranked by Correlation Score (0 – 100) into a leak index based on the determination of leakage versus usage, correlation signal quality, and the smallest estimated error in pinpointed location of any leak(s). A summary displays a zone map with all DCLs and a table with all significant correlations and exact locations of pinpointed leak noises.



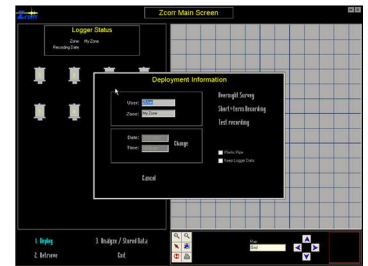
Technical specifications

Digital Correlating Logger (DCL)

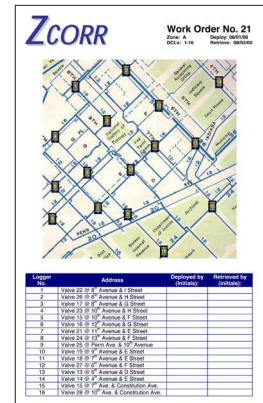
- > Enclosure: Aluminum, cylindrical
- > Protection: IP68, fully submersible
- > Dimensions: 2.25" diameter x 4.5" (5.7 cm x 11.4 cm)
- > Weight: 1 lb (450 g)
- > Mounting: Magnet, 40 lbs (18 kg) pull force
- > Operating temperature range: -20 to +140°F (-30 to +60°C)
- > Power source: Lithium battery, 5-year life, factory-replaceable, non-rechargeable
- > Sensor:
 - High-resolution electronic accelerometer
 - Shockproof to 6,000 g
 - Sensitivity: 1 V/g
 - Resolution: 0.25 μ g / \sqrt Hz
- > Data Acquisition:
 - Frequency range: 1-3,000 Hz
 - Signal range: sub 1 μ g – 20 mg
 - Digital resolution: 20 bits

Docking Station

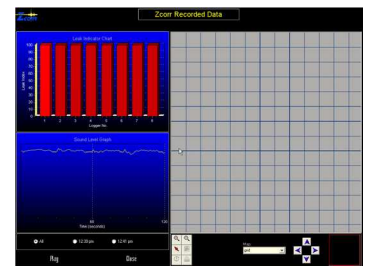
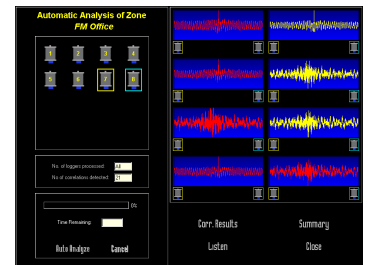
- > Enclosure: Rugged ABS carrying case
- > Protection: IP68 - closed; IP65 - open
- > Weight: 15 lbs (6.8 kg) without DCLs
- > Dimensions: 20.5" x 16.75" x 8.5" (52 cm x 42 cm x 22 cm)
- > Operating temperature range: +20 to +140°F (-5 to +60°C)
- > Capacity: 3 to 16 DCLs
- > PC link: RS-232



Deployment



Data Collection



Data Analysis

About Itron Inc.

Itron Inc. is a leading technology provider to the global energy and water industries. Our company is the world's leading provider of intelligent metering, data collection and utility software solutions, with nearly 8,000 utilities worldwide relying on our technology to optimize the delivery and use of energy and water. Our products include electricity, gas, water and heat meters; data collection and communication systems, including automated meter reading (AMR) and advanced metering infrastructure (AMI); meter data management and related software applications; as well as project management, installation, and consulting services. To know more, start here: www.itron.com



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