

DETECT 3EX

Features:

- ▲ 127mm (5 inch) stroke length
- ▲ High accuracy (0.5% FS) + resolution (0.01% FS) using [DETECT](#) technology
- ▲ Single rod design reduces manufacturing costs
- ▲ Inherently digital
- ▲ Microcontroller provides output in real world units
- ▲ Microcontroller stores sensor ID & Calibration Coeffs. in Flash memory
- ▲ Smallest electronics head (25mm diameter 150mm long)
- ▲ On-board digital temperature sensor for accurate compensation
- ▲ Non-contact technology provides immunity to hostile environment
- ▲ High survivability following blasts and vibration
- ▲ Easy to install and maintain—Arrives on site fully assembled
- ▲ Low cost readout unit
- ▲ Lowest cost in class

YieldPoint's unique 3-Point Extensometer (DETECT-3EX) combines a novel single-rod design for improved accuracy and digital signal processing to result in dramatically improved reliability compared to similar priced existing technology. This high precision digital instrument comprises 3 down-probe long range eddy current displacement sensors and an on-board digital temperature sensor.

The inherently digital nature of the signals eliminates the necessity for expensive analog-to-digital conversion and results in low cost readout unit that reads data directly in real world units (mm and °C). The sensor output is a 1-wire frequency modulated (CMOS and TTL compatible) digital signal which can be read by a low cost electronic meter or tachometer, and can be routinely interfaced with digital channels on PLCs. The signals themselves are robust (0-5V square waves) can be transmitted over 1000ft of lead-wire, and if broken the lead-wire can be twisted and taped together. Frequency modulation is widely recognized as preferable for the harsh mining environment where amplitude signals are prone to inaccuracies. Both the resolution (<0.01mm) and accuracy (<0.50%) are an order of magnitude better than for similarly priced alternatives. An on-board digital temperature sensor provides accurate compensation ($T_c=0.01\%FS/^\circ C$ over 0-50°C).



Automated Data Retrieval

Clusters of sensors (4 per Slave) can be polled YieldPoint's DESTINY (Digitally Enabled Sensor Transducer and Instrumentation Network from YieldPoint) technology. DESTINY/IP is a low cost, low maintenance RS-485 sensor network (modbus protocol), that interfaces with ethernet running TCP/IP. Other versions of DESTINY can interface with the pre-existing leaky feeder wireless or even an ESG seismic system.

This solution can save time and money by transmitting data directly to a central control room or an engineer's desktop computer.

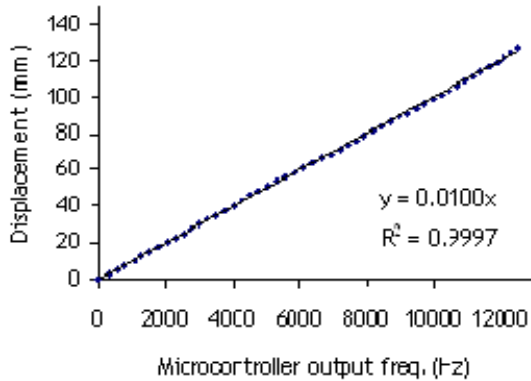
Applications

DETECT-3EX extensometers provide information concerning the stability of small-medium size underground excavations (max 6m (18ft) long). The 3EX is primarily designed as a low cost solution to monitor the stability of underground access drifts, intersections as well as some medium size excavations (e.g garages, shaft stations and lunch rooms). Typically these are excavations where men and equipment will be exposed and the information can be used to manage safe working conditions.

The 3EX is typically grouted in a 50mm (2") percussion borehole. The maximum length of the instrument is 6m (18ft). If necessary multiple sensors can be "decked" in the same hole.

Specific applications include:

- ▲ Monitoring access drifts
- ▲ Monitoring intersection stability
- ▲ Monitoring brows
- ▲ Monitoring shaft stability
- ▲ Monitoring pillar stability
- ▲ Mining under backfill



The relation between displacement and microcontroller output frequency for a DETECT-3EX

Manual Readout

Readout can be made using YieldPoint's low cost manual readout box, with a backlit LCD. An on-board microcontroller performs diagnostics on the leadwires, recognizes the sensor type and ID and outputs the displacement and temperature data in mm and °C. A jumper inside the unit can be used to configure the unit for either SI or imperial units.



The manual readout unit. The LCD is backlit for underground

The electronics of DETECT extensometers are hermitically sealed making them suitable for embedment in concrete structures.

Specification

Dimensions: up to 6m (18ft) length.
Borehole size: 50mm+

Core Technology

Long range eddy current displacement sensor (oscillation Frequency 100 - 12,700Hz @ 100Hz/mm)
 Temperature sensor (oscillation frequency 10Hz/°C)

Output Signal - CMOS: + TTL compatible 0-5V square wave train.

Displ. Range (F.S.): - 127mm, 101.6mm or 50.8mm.

Displ. Resolution: - 0.01mm with manual readout

Displ. Linearity: - typically 0.25% F.S.

Displ. Accuracy: - better than +/- 0.5mm.

Temp. Range: -40 to 125°C

Temp Accuracy: +/- 2°C -Digitally trimmed at 0°C and 25°C

Temp Resolution: 0.1°C

Temp coeff: <0.01%F.S./°C (0-50°C)