

## d-MPBX



YieldPoint's unique 3-8-Point Extensometer (*d-MPBX*) combines a novel single-rod design and digital signal processing to result in dramatically improved accuracy reliability compared to similar priced existing technology. This high precision digital instrument comprises up to 8 down-probe long range eddy current displacement sensors and an on-board digital temperature sensor.

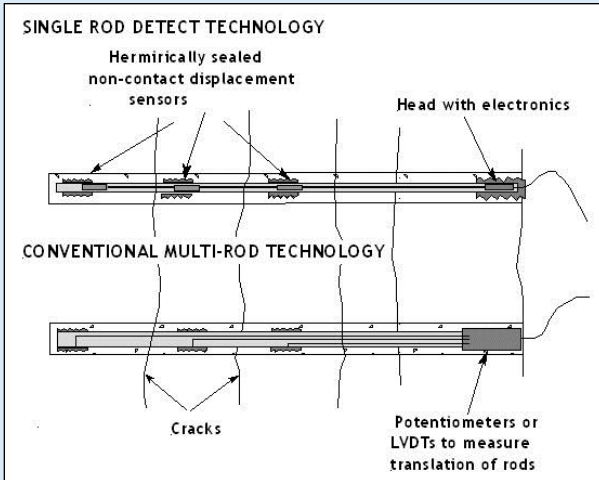
The inherently digital nature of the signals eliminates the necessity for expensive analog-to-digital conversion and results in low cost readout unit that reads data directly in real world units (*mm* and  $^{\circ}\text{C}$ ). The sensor output is an ASCII (9600,8,N,1) digital signal which can be read by a low cost readout unit (*d-READER*), dataloggers (*d-LOGGER*), and networked (*DESTINY*) for transmission to servers. The signals themselves are robust and can be transmitted over 1000ft of lead-wire. If broken the lead-wire can be twisted and taped together.

### Features:

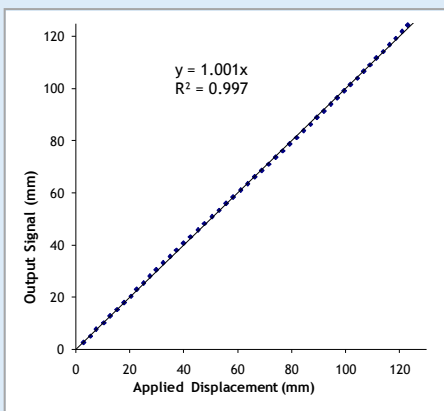
- ▲ *125mm (5 inch) stroke length*
- ▲ *High accuracy (0.5% FS) and resolution (0.01% FS)*
- ▲ *Single rod design*
- ▲ *Inherently digital*
- ▲ *Microcontroller for output in real world units*
- ▲ *Unique instrument ID*
- ▲ *Calibration Coeffs. in Flash memory*
- ▲ *Smallest electronics head (25mm diameter 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 data collection solution*

## Technology

The **d-MPBX** design is based on a unique single-rod design (see below) which includes 3 to 8 inductive displacement sensors. The unique single rod design avoids the rod translation errors (friction and sag) that impede multiple rod designs.



Each displacement sensor is individually calibrated and the calibration coefficients written to microcontroller memory. The **d-MPBX** can easily detect and resolve sub-mm displacements of with  $10\mu\text{m}$  resolution. Accuracy is enhanced by an on-board temperature sensor which provides compensation. The displacement sensors use non-contact sensing the design is inherently waterproof; therefore it is especially suited for monitoring the displacement of backfill.



Relation between displacement and microcontroller output frequency for a DETECT-6EX

## Telemetry

The RS485 output signal can be transmitted over 1000ft without amplification. Readings (one for each displacement sensor) are directly in mm allowing immediate interpretation of rock mass movement without having to enter the raw voltage data in a spreadsheet.

## Manual Readout



YieldPoint's low cost **d-READER** readout unit provides the temperature and load data directly in  $^{\circ}\text{C}$  and mm.

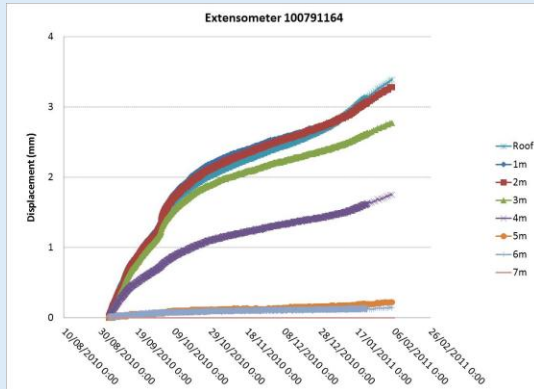
## Datalogging

Data from the **d-MPBX** can be collected using YieldPoint's **d-LOGGER** dataloggers (**d<sup>1</sup>LOGGER** and **d<sup>4</sup>LOGGER**). The data-loggers require no configuration and are fully interchangeable with any other type of YieldPoint instrument (**d-CABLE**, **d-GMM**, **d-TILT**, **d-PLUCKER** etc). Therefore arrays of instruments to monitor cable load and ground movement can easily be combined.

## Automated Data Retrieval

Clusters of sensors (4 per Slave) can be polled using YieldPoint's **DESTINY** (digitally Enabled Sensor Transducer and Instrumentation Network from YieldPoint) technology. Each low-cost **DESTINY** node interfaces 4 instruments directly to a TCP/IP network.

## Applications



**d<sup>8</sup>MPBX** data monitored using **d<sup>4</sup>LOGGER**. Relative movements between anchor points of 50um of easily resolvable.

**d-MPBX** extensometers provide detailed information concerning the stability of small, medium and large scale underground excavations. The **d-MPBX** is primarily designed as a low cost solution to monitor the stability of underground openings including stopes (hanging walls, backs and brows), headings especially intersections, crusher stations as well as detailed monitoring of garages, shaft stations and drift intersections.

Specific applications include:

- ▲ Monitoring stope HWs
- ▲ Monitoring stope backs
- ▲ Monitoring brows
- ▲ Monitoring crusher stations
- ▲ Monitoring intersection stability
- ▲ Monitoring shaft stability
- ▲ Monitoring pillar stability
- ▲ Mining under backfill
- ▲ Monitoring open pit slopes

## Specification

- ▲ **Core Technology:** Temperature compensated Eddy current displacement sensor. 125mm linear. Digital Temperature sensor
- ▲ **Output Signal** -RS485 with transmission up to 500m over 2xtp.
- ▲ **Disp Range (F.S.)** -0-125mm. Initial reading usually set to 25mm.
- ▲ **Disp Resolution** - 0.01mm.
- ▲ **Disp.Linearity** - typically 0.5% F.S
- ▲ **Disp Accuracy** - typically better than 1mm.
- ▲ **Temp. range:** Temp: -40 to 125°C
- ▲ **Temp Resolution:** 0.1°C
- ▲ **Temp Accuracy:** +/- 2°C Temp
- ▲ **Temp. coeff for disp sensor:** <+/- 0.01%/°C

### To Order Specify:

- ▲ Number of anchor points (1-8).
- ▲ Locations of anchors.
- ▲ Leadwire length.
- ▲ Poly leadwire cover.