

## d-Conv



YieldPoint's *d-Conv* is a fully functional closure solution complete with a high accuracy displacement sensor with/without the associated hardware to monitor roof to floor convergence.

It is widely used to monitor roof movement in salt and potash mines.

### Features:

- ▲ *150mm (6.0inch ) stroke length*
- ▲ *High accuracy (0.25% FS) & resolution(0.006% FS)*
- ▲ *ASCII encoded RS485 Output signal*
- ▲ *Microcontroller provides output in real world units (mm and °C)*
- ▲ *Microcontroller stores Sensor\_ID & Calibration Coeffs.*
- ▲ *Digital temperature sensor for accurate compensation*
- ▲ *Immunity to hostile environment*
- ▲ *High survivability to shock and vibration*
- ▲ *Easy to install and maintain and re-zero*
- ▲ *Low cost readout unit*
- ▲ *Plug 'n Play d-LOGGER*
- ▲ *Easy to interface with Ethernet, WiFi networks and LTE networks*
- ▲ *BlueTooth 5 compatible using BluPoint*
- ▲ *Networked over kms using 1for 1 radio*
- ▲ *Competitively priced*

## Technology

The d-Conv displacement sensor capable of 0.01mm resolution over a range of 150mm. The gauge is attached to the structure using the hardware that may or may not be provided by YieldPoint.. The length of the instrument is 300mm (closed) and the diameter of the body is 25mm.



Fig 1: Using d-Conv to monitor a retaining wall

## Signal Conditioning

An on-board microcontroller provides temperature compensation, applies a 10-point calibration algorithm, and outputs an ASCII encoded RS485 (9600,8,N,1) signal.

## Output Signal

The output signal includes the instrument's unique Sensor\_ID, the Sensor\_Type as well as the temperature and displacement data. A balanced differential RS485 output signal is widely recognized for reliability in harsh environments. The signal can be routinely transmitted over 1000ft of lead-wire.

APPLIED DISP (mm)	DISP 1 (mm)
0.00	. 0
8.33	8.33
16.66	16.64
25.00	24.96
50.00	49.99
75.00	74.98
100.00	99.97
125.00	124.97
150.00	149.98
175.00	174.99
200.00	199.99
CAL. SLOPE	1
CAL. OFFSET	-0.0158

The relation between displacement and microcontroller output for d-micro (@ 20.3°C)

## Telemetry

### Manual Readout

Readout can be made using YieldPoint's low cost manual reader(d-Reader), with a backlit LCD. The Unit displays the Sensor\_Type and Sensor\_ID and outputs the displacement and temperature data directly in mm and °C.

### BluPoint

Instruments can be wirelessly enabled using BluLink which provides a Bluetooth 5.0 connection which has a range of 100m LOS. BluLink can transmit data to BluGateways which are WiFi or LTE-M enabled. These devices can upload data to VantagePoint, YieldPoint's data aggregation and visualization tool.

BluLink also functions as a local data-logger storing 30,000 readings. Wireless download can be by any Bluetooth enabled Android device using the BluPoint app.

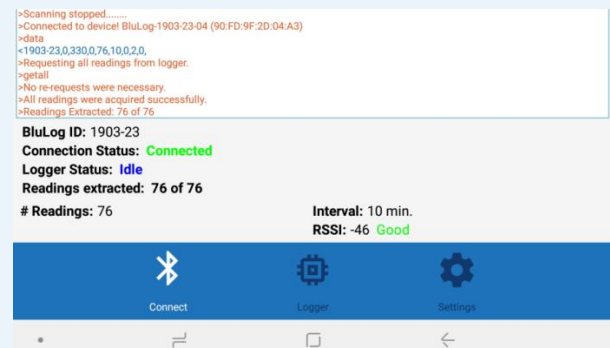


Fig 2: BluLink and the BluPoint App.

## Telemetry

### 900MHz 1for1 Telemetry

For longer range deployments the d-Rebar operate with YieldPoint's 900MHz 1for1 mesh radio telemetry system. Individual radios have a LOS range of 300m.



Fig 3: An installed 1 for 1 radio



Fig 4: The 1for1 Gateway

## Applications

- ▲ Roof to floor convergence in salt and Potash mines
- ▲ Monitoring crack opening in buildings and structures.
- ▲ Monitoring crack opening in underground excavations.
- ▲ Monitoring concrete fracturing
- ▲ Monitoring the loading of structural elements such as posts and pillars
- ▲ Monitoring the loading of concrete columns or pillars
- ▲ Determining load in steel reinforcing elements.

Convergence sensor are most commonly used in room and pillar mines such as salt mines and potash mines.

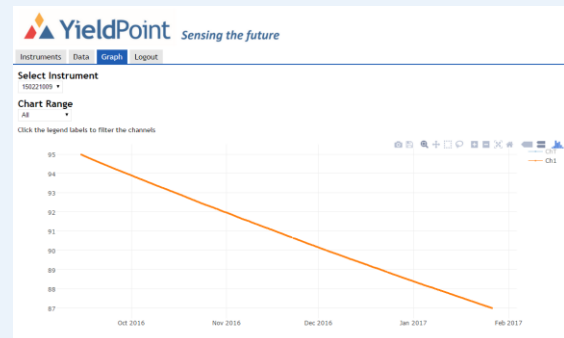


Fig 5: d-Closure data collected over a 6 month period from a Salt mine Readings are taken every 4hrs. The total convergence of 6months is approximately 8mm.

## Specification

- ▲ **Displacement:**
  - 0-125mm. 0.5%FS linearity.
  - 0-150mm. 0.5%FS linearity.
  - 0-200mm. 0.5%FS linearity.
- ▲ Better than 0.8%FS accuracy.
- ▲ **Temperature:**
  - 35C to +125C
  - 0.1C resolution.
  - +/-2C accuracy over entire range.
- ▲ **Output Signal** RS485 with transmission to data logger up to 500m over 2 x tp.

### To order, please specify:

- ▲ Displacement range (mm).
- ▲ Hardware requirements. Height of back.
- ▲ Datalogging and telemetry requirements.