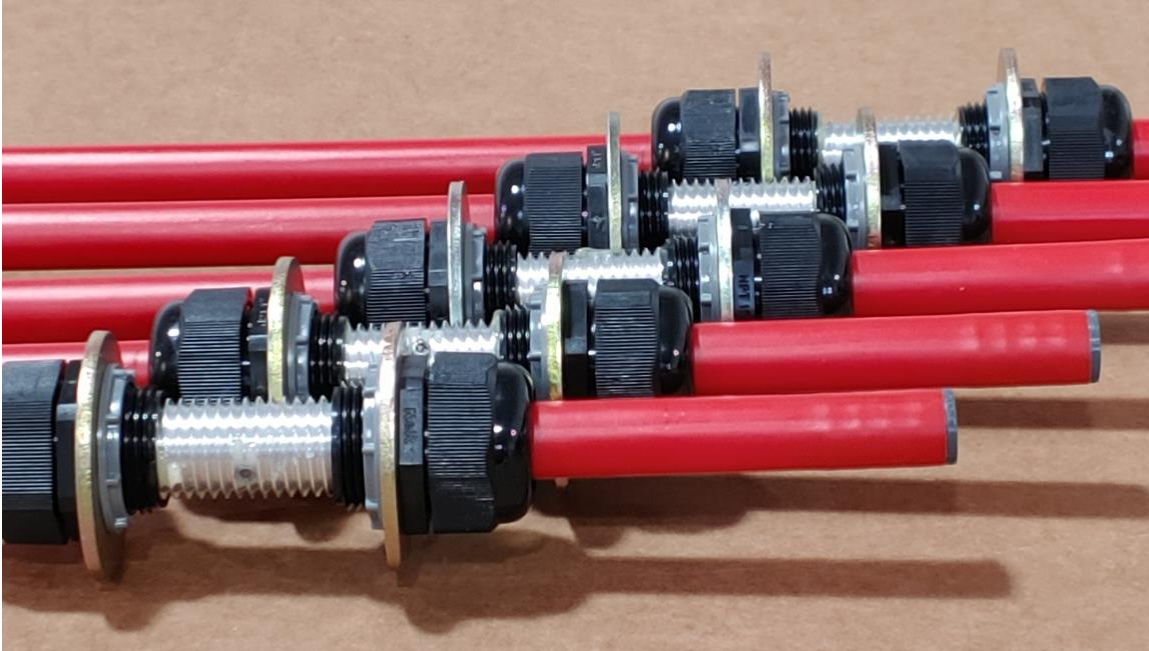




## *dEXTO-CIVIL-CIVIL User Manual*



YieldPoint Inc.

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# Warranty and Service Policy

## Product Warranty

YieldPoint Inc., warrants the instruments described in this manual to be free from defects in materials and factory workmanship to the original buyer. This warranty is contingent upon proper use of the equipment, and does not cover equipment that has been modified or has been subjected to abusive physical or electrical stresses. YieldPoint Inc., agrees to repair or replace, at its sole discretion, any instrument that fails to perform as specified within 6 months after date of the original shipment from the factory, or 3 months after the date of installation, whichever date comes first.

Yieldpoint Inc., reserves the right to make substitutions and modifications in the specifications of equipment that do not materially or adversely affect the performance of the equipment.

New equipment may be returned within 30 days of shipment with prior approval. New items which are less than thirty days old after shipment may be returned for credit, less a minimum restocking and testing charge of twenty percent of the list price upon factory approval only, provided the customer pays all shipping and handling charges. Specially ordered, or modified goods, or goods which have been used or have been unpacked, or goods which have been shipped more than thirty days prior are not returnable.

The information contained in this manual is subject to change without notice. YieldPoint Inc. makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Further, YieldPoint Inc., assumes no responsibility for any errors that may appear in this manual and makes no commitment to update, or keep current, the information contained in this manual.

## Service Policy

Units within the warranty period returned for repair, test, and recalibration are serviced at no charge in accordance with the terms of the warranty policy. The Customer pays all transportation and other charges to the factory.

Units out of warranty returned for repair, test, and/or recalibration are handled on a time and material basis. If requested, or if costs exceed 50% of current list price, YieldPoint Inc., advises the customer prior to making the repairs. Such repairs are performed at the customer's expense. Typical test, recalibration, and repairs are 25% of the instrument's current list price. Transportation charges both ways are at the customer's expense.

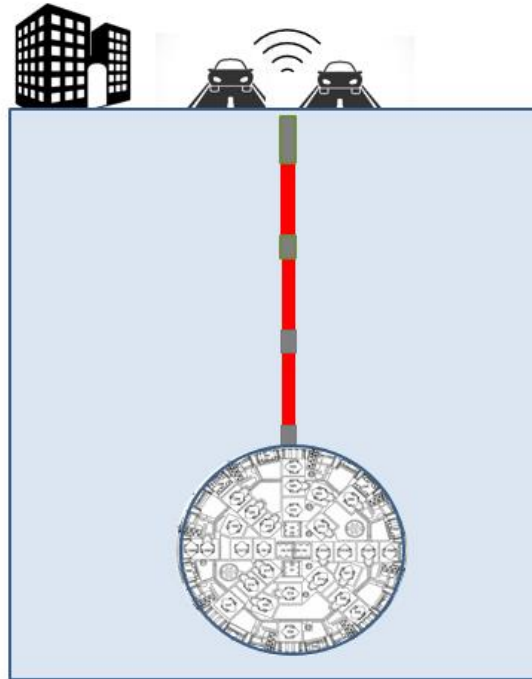
Please be sure all returns are shipped with the following information included:

1. Your company Name with Billing and Shipping Addresses.
2. A complete description of your problem, or re-calibration data.
3. The contact person at your company, with their telephone and facsimile numbers.
4. Non-Warranty returns additionally need your Purchase Order Number.

Please pack your returned instruments in their original shipping cartons, or in equivalent strong protective shipping cartons.

## General Statement

The dEXTO-CIVIL-CIVIL is a fully integrated borehole extensometer for settlement monitoring over tunnel projects. They are typically installed between a road box on surface and the expected position of the tunnel crown. that is extremely straightforward to install. This manual outlines a procedure that was developed for long boreholes of small diameter.



The extensometer is usually cemented in place with a soft grout made of a mix of Portland cement and Bentonite clay. The probe head is small enough to be recessed into the collar of the borehole so providing (i) protection against physical damage and (ii) improved thermal stability.

dEXTO-CIVIL's footprint (left) is small compared to that of the traditional solutions (right).

dEXTO-CIVIL's footprint (below) is small compared to that of the traditional solutions (right).



In addition, 100% of the instrument is protected within the grout, both physically and thermally. Smaller size road boxes can be used and a 4G LTE-M battery operated IoT gateway can be placed inside most road boxes as well.

### *Hole Size*

The *dEXTO-CIVIL* can be installed in 3.0 (76mm) holes and bigger.

### ***Unwrapping the Extensometer.***

1. Uncoil the instrument and lay it flat.
2. It is not necessary to wait for the instrument to straighten as the materials used will straighten right after uncoiling. There is no need to wait to temperature equalization either.
3. Plug the uncoiled and relaxed *dEXTO-CIVIL* into either:

- the *d-READER*



or a BluLink Bluetooth Logger



Check a few readings. The instrument will scroll through its anchors. Anchor 1 is closest to the head, the head itself is Anchor 0. Check that all the anchor points are reading within the range of 25mm or whatever value was agreed upon.

4. Anchor points values are a bit different when the *dEXTO-CIVIL* is coiled, the most valuable readings are made with the instrument straightened.
5. Each anchor point has a high profile for proper force transfer through a soft grout. The 2 black glands provide manual stiffness adjustment to potentially adapt to grouts of various strengths.



dEXTO-CIVIL-CIVIL Anchor Point

### ***Modular Bottom Anchor***

The option of a length adjustable bottom anchor is available. When the depths of the future boreholes cannot be guaranteed in advance it is practical to be able to order slightly long instruments and to adjust their length at the last minute at the site, after the borehole depth is verified. Simple tools will allow for this modification in a few minutes and without impact on the instrument's performance.



### ***Install the dEXTO-CIVIL***



6. Blow all down-holes and in general make sure the holes are as clean as possible.
7. In poor ground insert, a regular (non-instrumented) grout hose to make sure the borehole is viable.
8. Cut a length of grout hose to the appropriate length for the *dEXTO-CIVIL*. Remember to cut the end of the grout hose at a 60 degree angle to make insertion easier.
9. Securely attach the grout hose to the instrumented end of *dEXTO-CIVIL* with electrical tape (toe to collar grouting assumed). **IMPORTANT:** The angled end of the grout hose should be 100mm or 4in longer than the *dEXTO-CIVIL*.
10. Insert into the borehole carefully by pushing on the grout hose. Tape the grout hose to the *dEXTO-CIVIL* at regular intervals during insertion.
11. If problems occur during insertion remove the borehole extensometer and probe the borehole with a regular 7-wire strand cable or some other long tubing to dislodge any loose fragments.
12. Secure the instrument at the collar of the borehole by using expansive foam or burlap cloth.

13. Take a reading with the *d-READER*



or with a BluLink Bluetooth logger.



### *Grouting the Instrument*

14. Grout the cables with a 0.35 - 0.38 w/c ratio Portland cement grout if in Rock. In softer ground it is recommended to read "Mikkelsen Grouting Bentonite".
15. Under no circumstances use a grout greater than 0.40 w:c ratio.

### *List of items that must be accounted for before installation.*

1. Boreholes from ground surface can sometimes close very quickly, so preparedness is essential.
2. Boreholes of the proper length and diameter must have been prepared and cleaned.
3. A grouting pump must be available, with suitable power to push the grout all the way to the bottom of the borehole.
4. Cement, bentonite and water must be available ahead of time in quantities sufficient to fill all boreholes.
5. Grout hoses of appropriate lengths, and tape to tie them to the extensometers, must be available.
6. All YieldPoint instruments to be installed must be available at the site and kept safely lying straight on the ground.
7. A YieldPoint *dREADER* readout unit or a BluLink with its 9V battery must be available to check all instruments before and after installation.

