

## TLT3 BASSETT CONVERGENCE SYSTEM

Datasheet TLT3



### Description

The Bassett Convergence System is designed for automated monitoring of tunnel deformation.

The system is robust, simple and proven. It is most commonly used in transportation tunnels, but can be adapted to monitor other structures.

The itmsoil Bassett Convergence System uses pairs of MEMS servo accelerometer sensors arranged within short and long arms; this provides near real time  $\Delta x$  and  $\Delta z$  data which in turn is converted to show the deformation in millimetres.

The system is supplied complete with a data logger and itmsoil software to display data, both as a graphical representation of the tunnel or structure, and also with X and Z graphs for each point. Full user defined alarm functionality can be built into the BCS system.

The itmsoil Bassett Convergence System is the only system officially authorised and endorsed by its inventor, Dr Richard Bassett, Emeritus Reader in Geotechnics at University College London.

### Features

- Very low profile system
- Low cost, simple, rugged sensor technology
- Gives a complete  $\Delta x$  and  $\Delta z$  profile
- Automated via data acquisition and BCS software
- Very well established track record on major projects across the world

### Benefits

- Can be fitted in areas of minimum clearance such as live railway tunnels
- Needs very little power to read
- Designed specifically for monitoring tunnels
- Suited for harsh environments
- Does not interfere with tunnel traffic
- Unaffected by vibration, temperature changes or electromagnetic interference caused by tunnel traffic



Comprehensive information about this product and our full range is available at [www.itmsoil.com](http://www.itmsoil.com)  
If you would like to speak with someone directly please call +44 (0)1825 765044 or email [sales@itmsoil.com](mailto:sales@itmsoil.com)



Microelectromechanical Systems, or MEMS, is a technology that uses miniaturised mechanical and electromechanical elements that are made using the techniques of microfabrication. The physical dimensions of MEMS devices can vary from well below one micron all the way to several millimetres.

Our MEMS microsensors are small discrete devices that convert a measured mechanical signal, gravity (g) into a voltage signal.

### Operation

In its most basic form a BCS system comprises a Short Arm and Sensor and a Long Arm and Sensor; these parts are repeated for the amount of sensors pairs needed to monitor the given tunnel (or structure).

One BCS is created via these articulated arms to form a loop (open or closed) around the inside of the tunnel. The sensors positioned on the short and long arms form a triangle between each other and a reference point; any resulting displacement affects the relationship of this triangle and the resulting change is calculated by the itmsoil software to display the data both as a graphical representation as well as X and Y graphs for each point.

### Applications

The measurement of displacement ( $\Delta x$  and  $\Delta z$ ) in tunnels and structures:

- Monitoring of live railway tunnels during operating hours
- Control of tunnel deformation
- Monitoring movement of shotcrete tunnel linings

### Associated products

For details on:

Catalogue code:

'Argus' Monitoring Software

D4

Dataloggers

D1

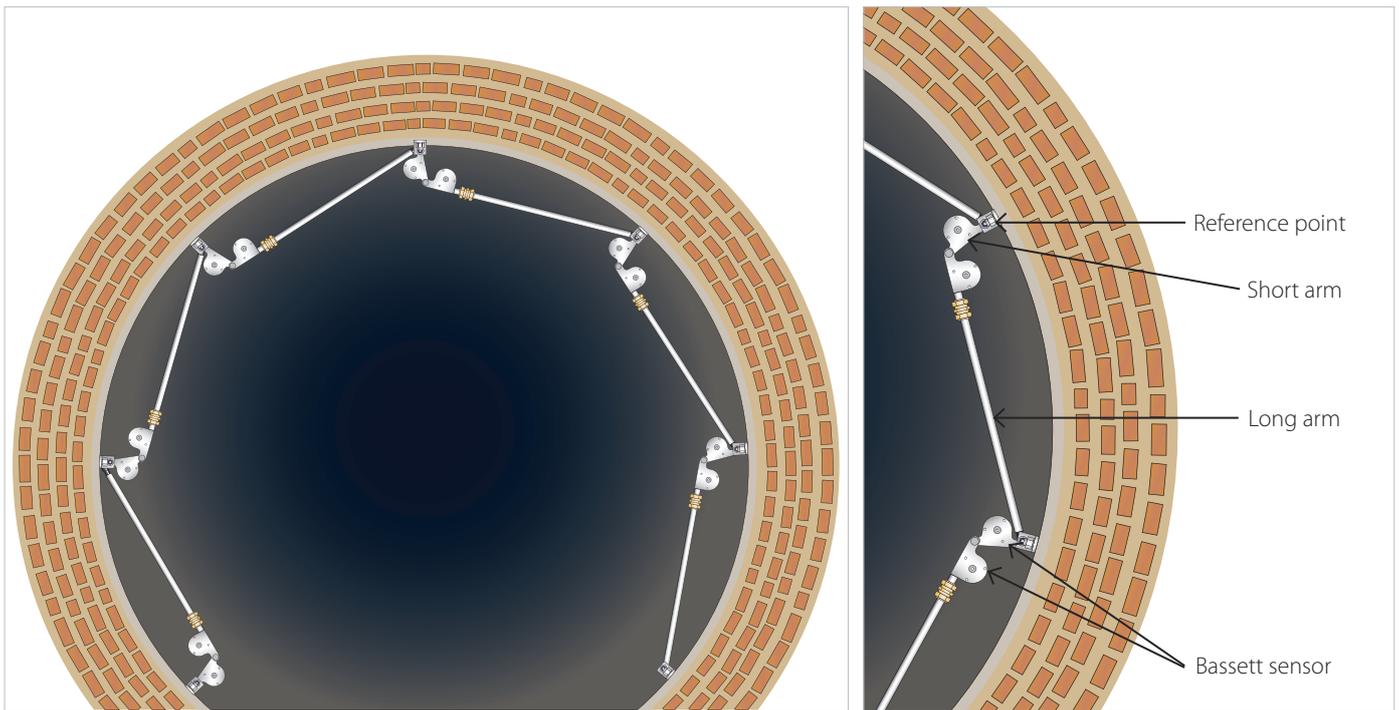
IPI Handheld Readout

C12-7.4

Terminal and Junction Boxes

RO-TB/JB/TJ

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### THE TECHNICAL RATING FOR THIS PRODUCT:

As the correct installation of any monitoring sensor or system is vital to maximise performance and accuracy, itmsoil makes the following recommendations, for the skill level of the installation contractor.

#### ADDITIONAL SUPPORT

itmsoil offer installation and monitoring services to support this system. For more information please email : [sales@itmsoil.com](mailto:sales@itmsoil.com) or call **+44 (0) 1825 765044**

#### ADVANCED



#### ADVANCED



The installer is trained and experienced in the installation of this type of instrument or systems, and is ideally a specialist Instrumentation and Monitoring contractor.

#### INTERMEDIATE



The installer already has previous experience and/or training in the installation of this instrument or system.

#### BASIC



As a minimum the installer has read and fully comprehends the manual, and if possible has observed these instruments or systems being installed by others.

## Specifications

### Sensors

Type	Long Arm	Short Arm
Calibrated range	±34.9mm (±2°)	±173.6mm (±10°)
Resolution <sup>1</sup>		0.008% full scale
Sensor accuracy		±0.05% full scale
Operating temperature		-20 to +80°C
Weight (without cable)		475g
Dimensions		100mm x Ø55mm
Signal output full range		±2.5V DC
Current consumption		9mA
Ingress protection		IP67
Housing material		Stainless Steel
Input voltage		10 -16V DC

### Long Arm Assembly

Material	Copper/Brass
Dimensions	1.5m x Ø19mm
Weight	800g

### Cables

Type	Standard	Low smoke
Construction	4 conductor screened polyurethane outer sheath	4 core screened low smoke halogen free
Weight	26g/m	28g/m
Cable diameter	5mm	6mm

<sup>1</sup>Dependent on readout

## Ordering information

### Long and Short Arm Assembly

TLT3-1.1	BCS long and short arm assembly; includes: Short Arm sensor $\pm 173.65\text{mm/m}$ ( $\pm 10$ arc degrees), Long Arm sensor $\pm 34.9\text{mm/m}$ ( $\pm 2$ arc degrees) and a 1.5m copper long arm
TLT3-4.1	BCS mounting bracket and pivot pin assembly; 1No. required per long & Short Arm assembly, plus one per ring

### Connecting Cable

CA-3.1-4-IC	Instrument cable, 4 core, 7/0.20, screened; priced per metre, polyurethane jacket
CA-3.2-4-FR	Low smoke cable, 4 core, 16/0.20, screened; priced per metre, halogen-free cable
CA-4.2	Coloured adhesive tapes; set of 10No
W6-6.1	Nylon ties; 150mm x 3.5mm, pack of 100No
ST1-3.5	Nylon ties; 370mm x 4.7mm, pack of 100No

### Software

TLT3-5.1	BCS data management and display; includes 3No. USB licence keys
TLT3-5.2	BCS software; configuration of the software per logger

### Manual

MAN-210	BCS System
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INSTRUMENTS



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