

# LVDT - Displacement Sensor

For the use in high pressure cells

Release February 2015

## Properties

In geotechnical application, the precise and reproducible measurement of linear displacements is a crucial requirement for obtaining significant experimental results from stress-strain testing.

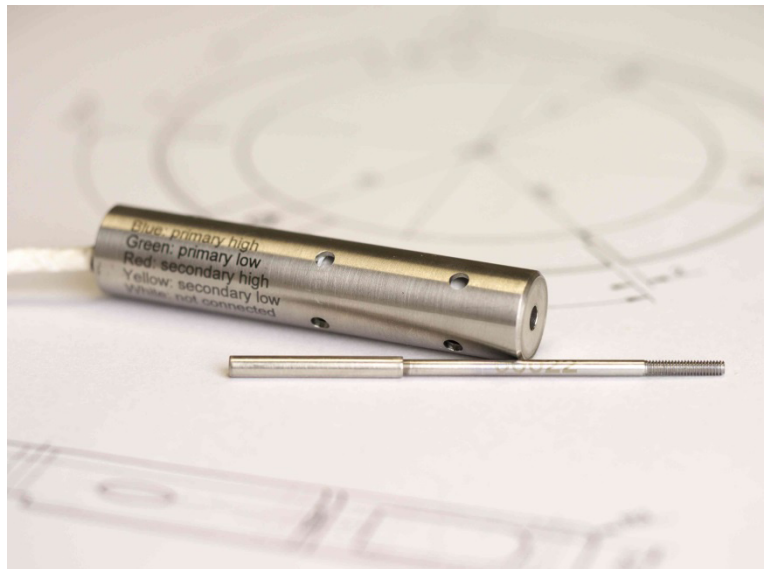
Linear Variable Differential Transformer (LVDT) displacement transducer are characterised by their high accuracy whilst maintaining robustness against external loads.

## High-pressure application

For many tasks in the geotechnical test laboratory, the specimens have to be restored to their original environmental conditions.

Consequently, the specimens are tested in specially designed pressure cells that provide the in situ overburden pressure and, if also necessary, the elevated in situ temperature. The displacement is then measured very close to the specimen inside the cell to avoid the load frame's deformation being part of the results.

The LVDT described here are specially designed for the use under the harsh conditions inside of pressure vessels. They withstand the hydraulic pressure medium (e.g. mineral oil), the confining pressure of up to 200 MPa (about 30,000 psi) and also temperatures of up to 200°C (about 400°F).



Displacement transducer developed for the use inside of pressure cells at temperatures from -40 to +200°C.

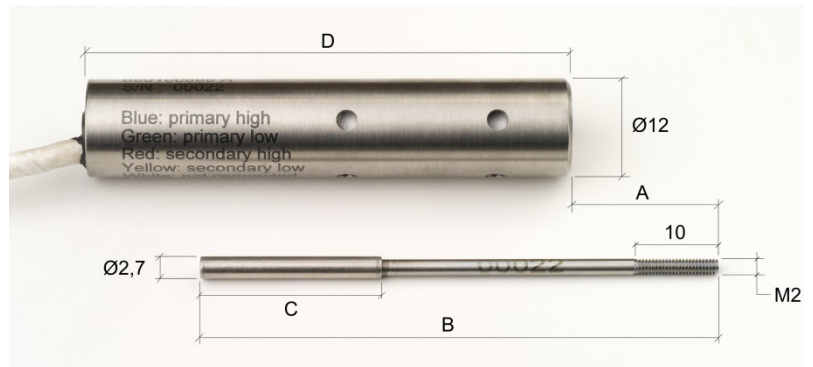


A LVDT-clamping device is mounted into a triaxial pressure cell. The device is equipped with an integrated fine-adjustment for up to three displacement transducers in a distance of 120° to each other

# LVDT Displacement Sensor

## Technical Data

- Measurement ranges
  - $\pm 3$  mm
  - $\pm 5$  mm
  - $\pm 10$  mm
  - $\pm 20$  mm
  - $\pm 30$  mm
- Housing
  - Material: stainless steel
  - Protection IP 65
  - Mass: 18 – 80 g
- Electrical Data
  - Excitation 2.2 Vrms at 3500 Hz nominal
  - Sensitivity 9 – 60 mV
  - Non-linearity 0.15 % FS, option 0.1 % FS
- Environment
  - Operating temperature: -40 to 200°C (-40 to +400°F) (Option: up to 235°C)
  - Operating pressure: up to 200 MPa (30,000 psi)
  - Usable in mineral oil as pressure medium
- Connection
  - Bare leads
  - Lemo OS 4-line
  - Customised



Physical dimensions for different measurement ranges

range in $\pm$ mm	3	5	10	20	30
<b>A</b>	33.0	33.0	40.4	50.2	59.8
<b>B</b>	61.8	61.8	85.5	116.0	136.0
<b>C</b>	21.7	21.7	29.3	40.8	41.4
<b>D</b>	58.5	58.5	86.5	116.5	136.5
<b>Diameter in mm</b>	12.0				



Set-up for a triaxial test including in-vessel load cell, three axial displacement transducers and one diametral extensometer.