Features

- Miniature penetrometer design with three different tips: (i) T-bar - ⌀5x20 mm, (ii) Ball - ⌀10 mm, (iii) Cone - ⌀5 mm
- Stainless steel construction
- Performance load-cell with robust strain relief
- Serviceable & interchangeable design

Applications

- Laboratory testing
- Centrifuge testing
- Offshore/field testing

General description

The miniature penetrometer series is specifically designed to investigate soil strength profiles in either centrifuge or laboratory equipment to a very high precision. The product offers an exceptionally miniaturised design with a 5 mm shaft and three different penetrometer tips: (i) ⌀5 mm Cone, (ii) ⌀5 x 20 mm T-bar, and (iii) ⌀10 mm Ball. The different tips allow testing in clay or sand-based materials.

Manufactured from 'marine grade' stainless steel, these miniature penetrometers are of robust construction, resisting pitting and other corrosive effects of water.

The tension and compression load-cell provides high precision measurements with temperature compensation. It has a non-linearity and hysteresis of +/- 1% of the rated output.

The penetrometer assembly is serviceable by the user and damaged parts (e.g. load cell) can be easily replaced.

In addition to the standard devices shown, MSMT Solutions has the engineering capability to design penetrometers to specific individual requirements. Through careful consideration of the configuration, operating environments, compatibility and other important performance characteristics, our engineering team can design, build and test instruments for your needs.

Specifications of penetrometers

Penetrometers			
Type	Tbar - 200 N	Ball - 200 N	Cone - 1000 N
Tip dimensions	Tbar - ⌀ 5 mm x 20 mm	Ball - ⌀ 10 mm	Cone - ⌀ 5 mm
Shaft dimension	⌀ 5 mm x ~ 300 mm (Reduction at tip to ⌀ 4.3 mm for T-Bar and Ball)		
Material	Stainless Steel - SS316		
Mounting	Attachment via M10 x 1.5 bolt (supplied)		

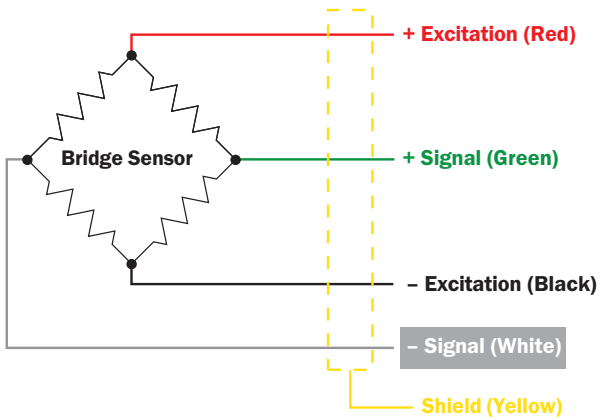
Performance characteristics of load cells

Performance	
Nonlinearity	± 1% of RO
Hysteresis	± 1% of RO
Nonrepeatability	± 1% of RO
Electrical	
Rated Output (RO)	1–1.5 mV/V
Excitation	3–12 V
Bridge Resistance	>700 Ω
Insulation Resistance	>5000MΩ @ 50 VDC
Connection	⌀ 2 mm, #28 AWG, 4 conductor, shielded cable, 4 m long
Mechanical	
Safe Overload	150% of RO
Ultimate Overload	200% of RO
Material	Stainless steel
IP Rating	IP66
Temperature	
Operating Temperature	-20 to +40°C
Compensated Temperature	-20 to +60°C
Temperature Shift Zero	± 0.05% of RO/°C
Temperature Shift Span	± 0.05% of RO/°C

RO: Rated Output, FS: Full Scale

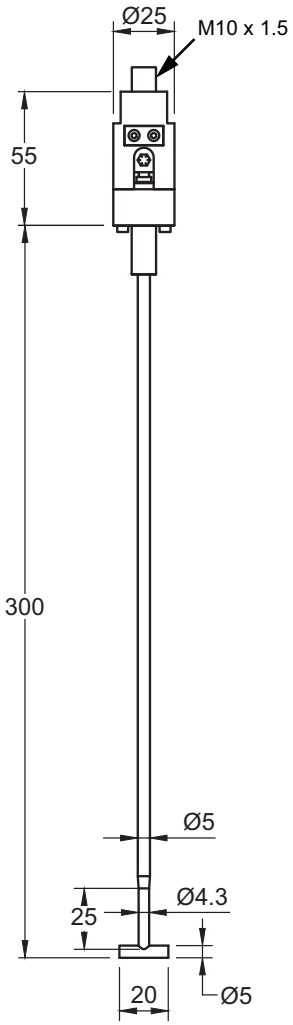
Circuit diagram

Wiring Code	
Red	+ Excitation
Black	- Excitation
Green	+ Signal
White	- Signal
Yellow	Shield

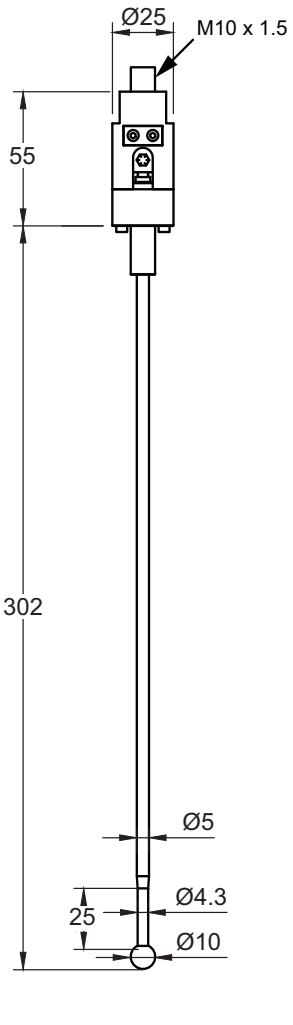


Drawings of penetrometers
(Dimensions in mm)

Tbar
Capacity: 200 N | 2,000 kPa



Ball
Capacity: 200 N | 2,546 kPa



Cone
Capacity: 1,000 N | 50,930 kPa