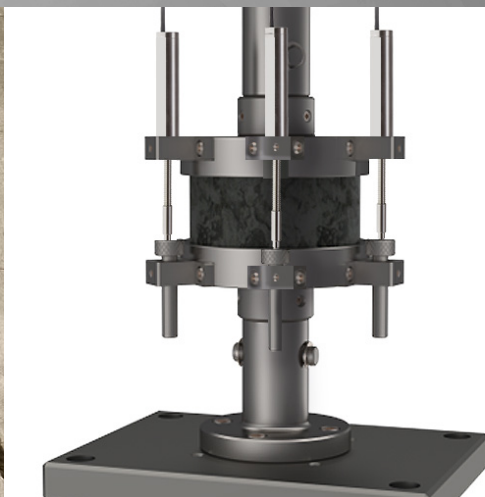


SENSORS FOR TEST & MEASUREMENT



LONG LASTING DURABILITY

LABORATORY, MATERIALS TESTING, AUTOMOTIVE COMPONENT TESTING,
INFRASTRUCTURE MONITORING, LIQUID & GAS MONITORING, POWER STEAM
TURBINES, MEASUREMENT IN EXTREME NATURAL ENVIRONMENTS &
COUNTLESS OTHER LINEAR MEASUREMENT APPLICATIONS

Experts In Metrology

Established in 1946, Solartron Metrology is a world leader in the innovation and manufacture of linear measurement sensors, and associated instrumentation.

All products are assembled in our UK facility, with a worldwide support network. This includes the manufacturing of high precision Gauging Probes and Low Tip Force Probes for more delicate materials, Specialized Gauging Sensors, Displacement Transducers, Non-Contact Sensors, as well as Linear Encoders and other offerings.

In the lab, on the shop floor, or in the field, Solartron Metrology sensors provide precise measurements for Test and Measurement, Process Engineering, as well as Quality Control. In the Quality arena, Solartron sensors are used everywhere from Electric Vehicles, Automotive, Aerospace, Glass, Electronics, Semiconductor, Bearings, as well as any other industry where accuracy and repeatability are critical to the process.



Solartron Metrology has a network of sales offices operating throughout the world.

This means that wherever you are, whatever your linear measurement requirement, Solartron Metrology has the local knowledge and the international support to provide market leading precision measurement solutions, sensors and transducers for you.



RUGGED BUILD & LONG DURABILITY

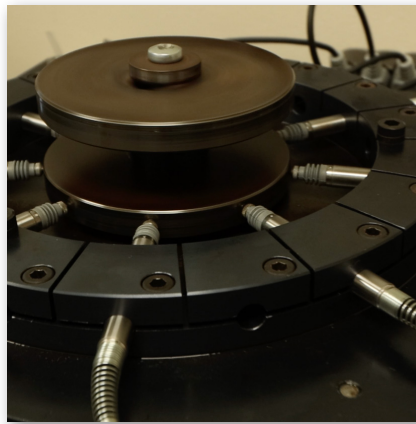


Solartron Metrology has manufactured linear measurement sensors in the UK for decades. Only the finest materials are used so that sensors consistently output steady readings for years. Additionally, our operators are highly skilled experts who are meticulously trained to build only the best quality products with speed and efficiency.

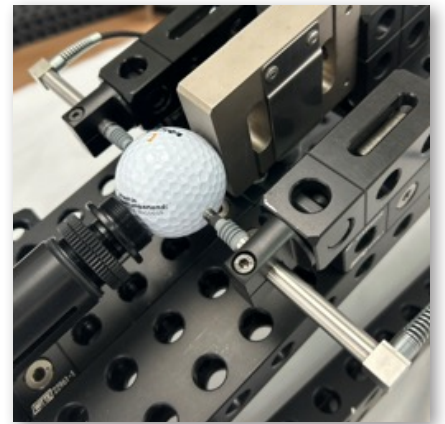
- 
High Resolution: Solartron transducers have resolution up to 0.01 microns, providing readings even the slightest shift in materials.
- 
Rapid Response: Solartron LVDT probes provide a near instant response, with no timing loss.
- 
No "Drift" of Measurement: Solartron LVDT sensors can maintain their accuracy and repeatability over several years, with no loss or drift of readings over time.



A transducer coil being wound by hand



Gauging probe designs are put through tough, rugged, CAM tests



Probes measuring how much a golf ball expands as it is compressed



Configurations & Customisation

Enhance your instrument operation

Between Solartron Gauging probes and displacement transducers, the configurations are endless.

Solartron can also built customized sensors for specific applications. Contact your local Solartron Representative for more information.



G-Type

G-Type transducers have the signal conditioner mounted at the end of the probe. DC and 4-20mA output available.

S Series

S Series from ± 2.5 to ± 150 or 0-5 full range minimum and 0-300 mm full range maximum in Digital, Current and Unipolar Voltage/DC product variants. Free Core, Guided, as well as with Universal Joint options. IP65, IP 67, as well as Hi -Temp versions are available.

OP Series

The OP Series has a 9.5 mm body, and offers ranges from ± 1.5 or 0-3 mm up to ± 25 or 0-50 mm range. Free Core, Guided, as well as with Universal Joint options.

Miniature Displacement

Compact Displacement transducers for applications where space is limited.

Temperature

High Temp Sensors up to 200 °C. Special probes with 316L stainless steel for low temperatures down to -40 °C.

Environmental Resistance

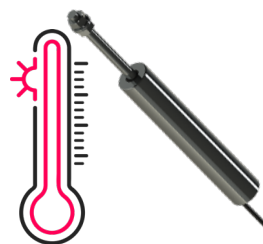
A Solartron Sensor body consists of 316L Stainless Steel, making it highly resistant to corrosive, salty, humid environments.

Vented Transducers

Special Vented transducers for pressurized environments up to 2000 bar.

IP 68 Sealed Probes

These probes sport a high ingress protection, allowing for use in wet or oily environments.



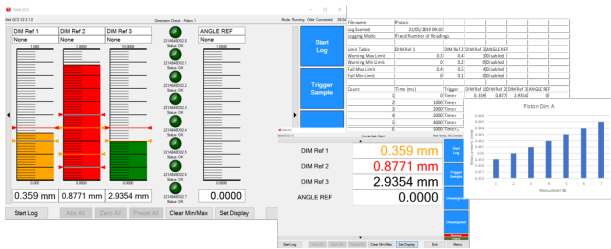
Analogue & Digital Output



Conditioning Electronics



Compass SCD1 Single Channel Signal Conditioning Unit



Orbit® Gauge Software

Wide range of options...

Solartron offers both digital and analog options for signal output to PC, PLC, Datatrackers, and others. Signals over USB, Ethernet, Wireless, analog DC or 4.20 mA are also available.

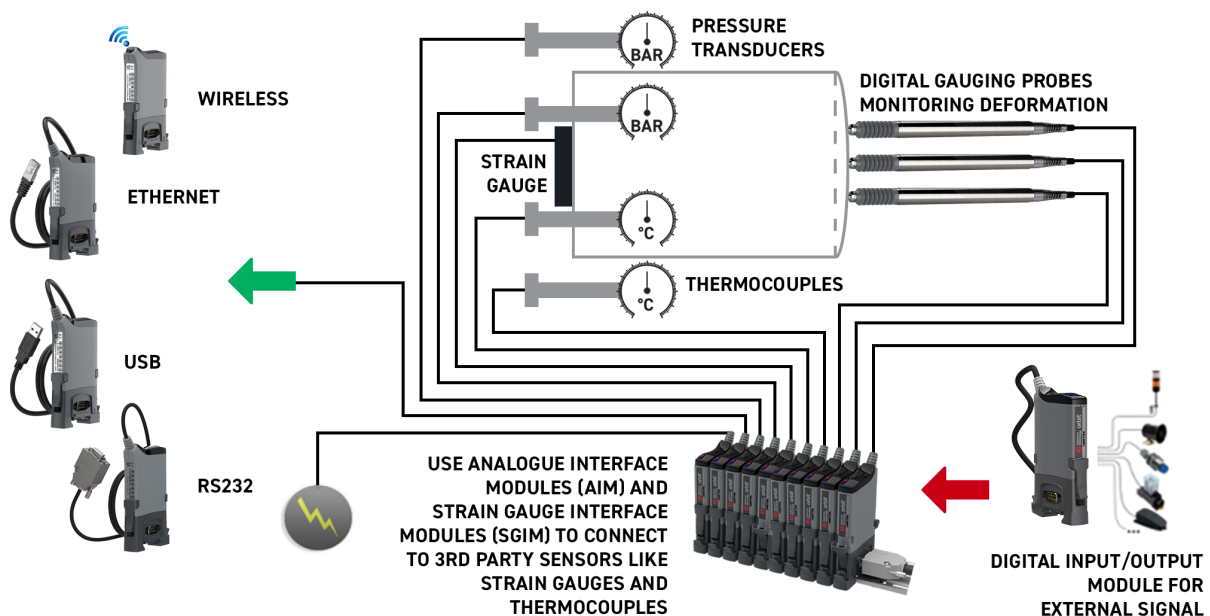
Solartron's Orbit® Network can connect Probes, Displacement transducers, Lasers, and Third party sensors on one stack, and easily output to a PC or other.

...and Solutions

Readings can be output to Excel, Orbit® Gauge software, or third party software such as Labview via Orbit® Drivers.

Solartron's new Compass line of signal conditioners offers LVDT connections, with DC output, Serial, I/O, or output to PC.

Solartron also offers a multitude of DC, TTL, and Current Signal conditioners.



Orbit® Digital Measurement Network Capabilities

Third Party Connectivity

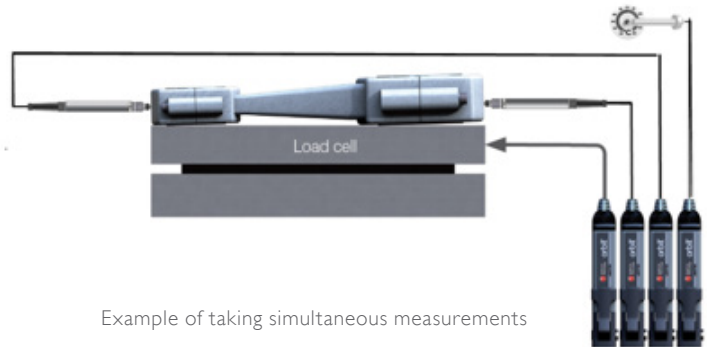
Powered by ORBIT® Digital Network

Solartron's third party connection modules can be customized to connect to a wide variety of sensors, from thermocouples to load cells.

All can be easily be connected together on one modular Orbit® network.

Simultaneous measurements

In this application, a load cell, two contact probes, and a thermocouple are connected all on one synchronized network.

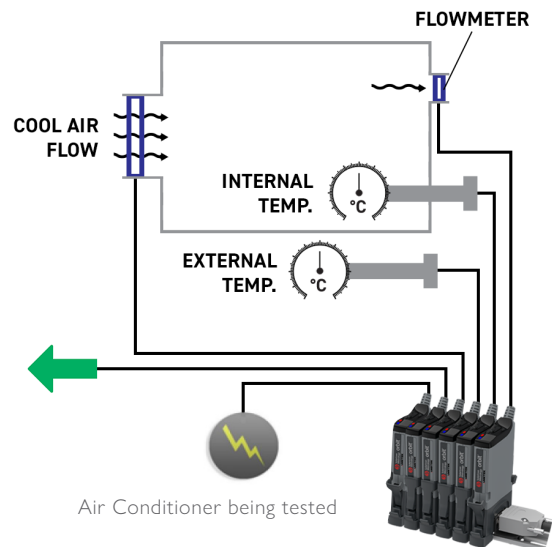


Example of taking simultaneous measurements

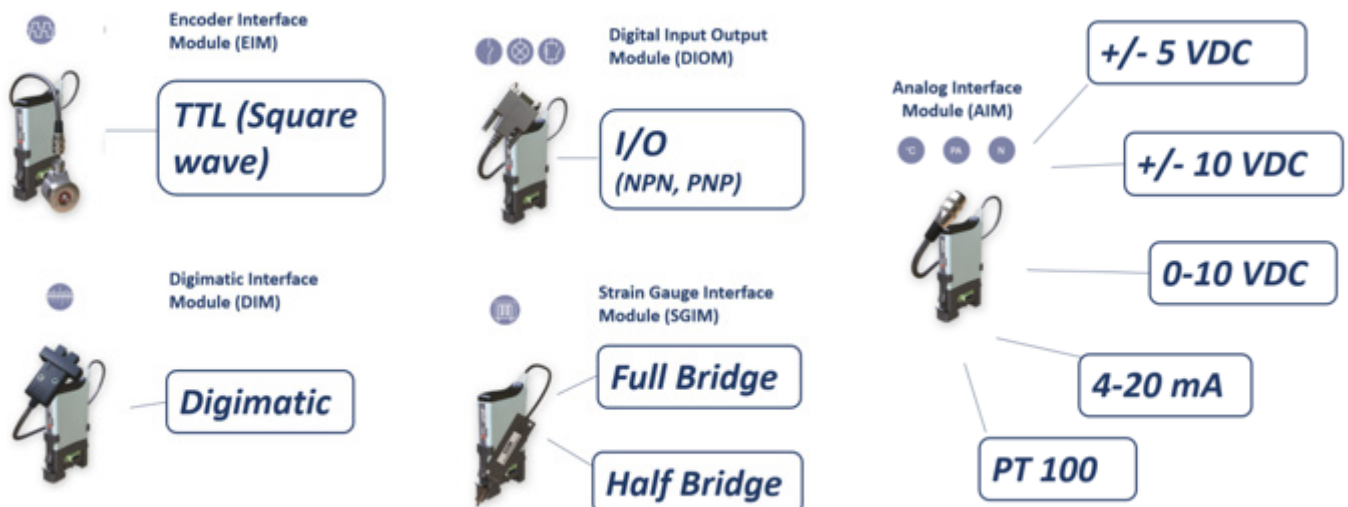
Record data from any type of sensor

In this application, an air conditioner is being tested, with flowmeters measuring air intake and discharge, and thermocouples measuring internal and external temperatures.

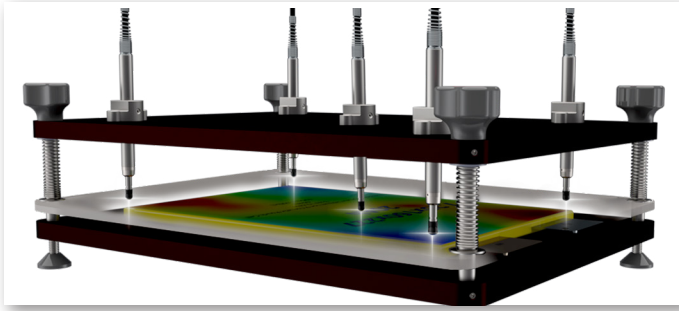
Several labs worldwide have used Orbit® purely for the modular connections and interfaces. Dynamic reading collection is available.



Air Conditioner being tested



High performance



EV Battery Cell expansion being checked by Gauging Probes

Solartron Displacement sensors and gauging probes have been used in multiple laboratory settings.

Advantages include high performance in a rugged package, as well as multiple output options.

Monitor component expansion or contraction

Solartron Feather Touch probes were used to monitor how an EV Battery cell expanded when incurred with a charge. Solartron sensors were chosen, as the slightest movement could be read with their high resolution, and the soft contact force meant it would not press down on the battery casing.



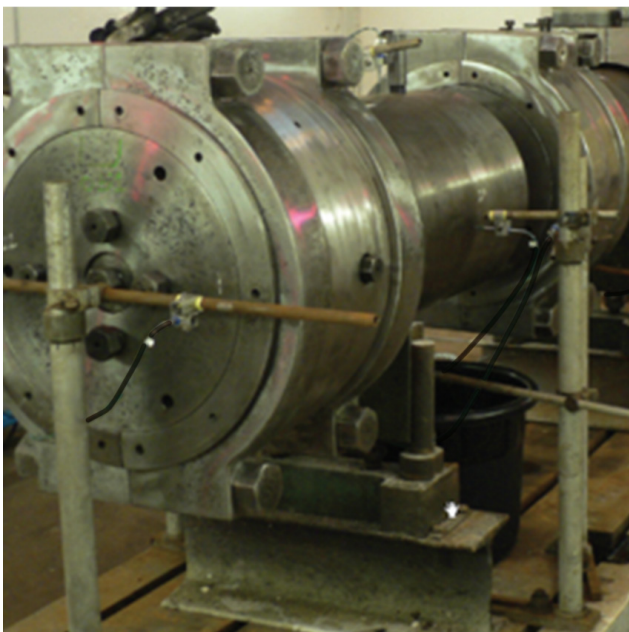
Gauging Probe checking rail shifts under stress and heat

Measure change under stress

Here a Solartron probe is being used at Ladocim in Spain to monitor how much a rail shifts under stress and heat. Solartron sensors were selected due to their rugged build, and continual operation in high temperatures.

Pressure vessel

Solartron sensors have been used to monitor deformation and strain in oil and hydrogen tanks under increased internal pressure. Here, the high resolution of these probes enabled to detect the slightest change in expansion.



Gauging Probe checking for deformation and strain on oil and hydrogen tanks



Closeup of Gauging Probe checking for deformation and strain on oil and hydrogen tanks

Automotive Component Testing

Rugged sensors

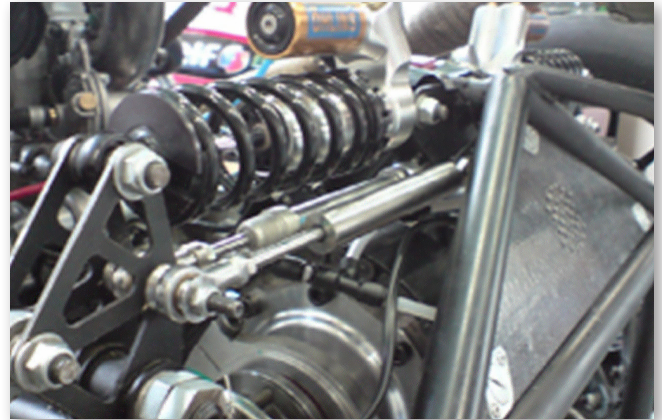
Solartron sensors have been used in both a laboratory and outdoor settings to monitor the change in an automotive structure and other components.

Frame testing

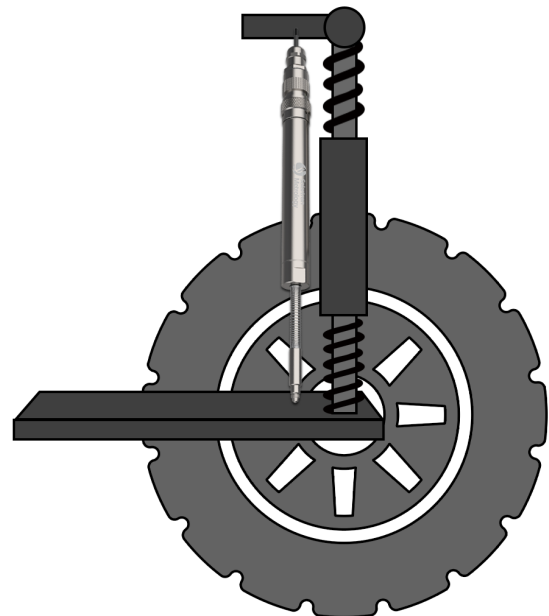
Solartron transducers have been used to monitor how a car frame reacts under different stresses, whether it be in a laboratory or while being driven on a test track. Solartron transducers can endure the higher temperatures and vibration, and still provide repeatable readings.

Suspension testing

Solartron LVDTs have been used to monitor how much suspensions will compress from forces placed on a tire. The long ranges and rugged properties of the Solartron sensor make it ideal for this test.



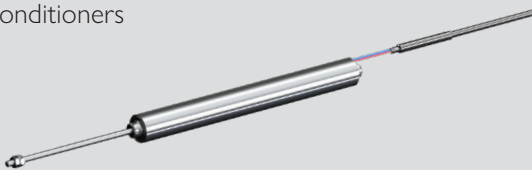
Frame testing performed by S-Series Displacement Sensors



Suspension testing using S-Series Displacement Sensors

Did You Know?

Special Solartron Optimum (OP) Series Transducers were built for the Bloodhound SSC highspeed vehicle (now known as Bloodhound LSR) that attempted to attain 1000 mph. Solartron was selected, as they could provide a customized sensor that could rapidly output a high resolution signal despite the extreme conditioners



Wide variety of materials

Solartron Displacement sensors and gauging probes have been used in a wide variety of materials testing, from concrete, to asphalt, to even soil.

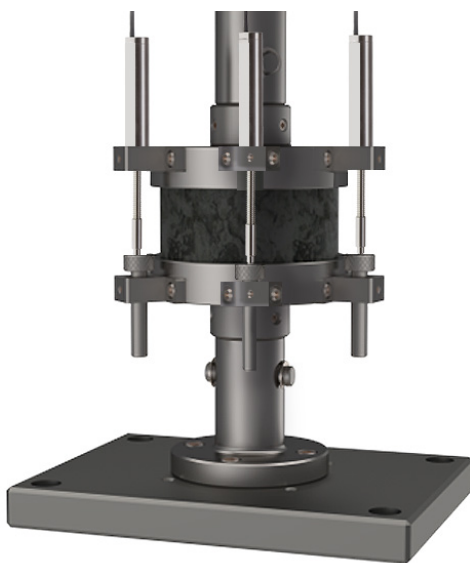
These types of tests require extreme resolution, as well as a rugged build for tougher environments.



Triaxial Testing using vented sensors

Triaxial test

In this test, a soil or rock sample undergoes pressure from all sides in a chamber. For this, special “vented” transducers have been crafted to monitor distances. Solartron sensors have been chosen due to their customizability, as well as the ability to perform in these high compression environments. These probes can withstand 2000 bar and 200°C environments.



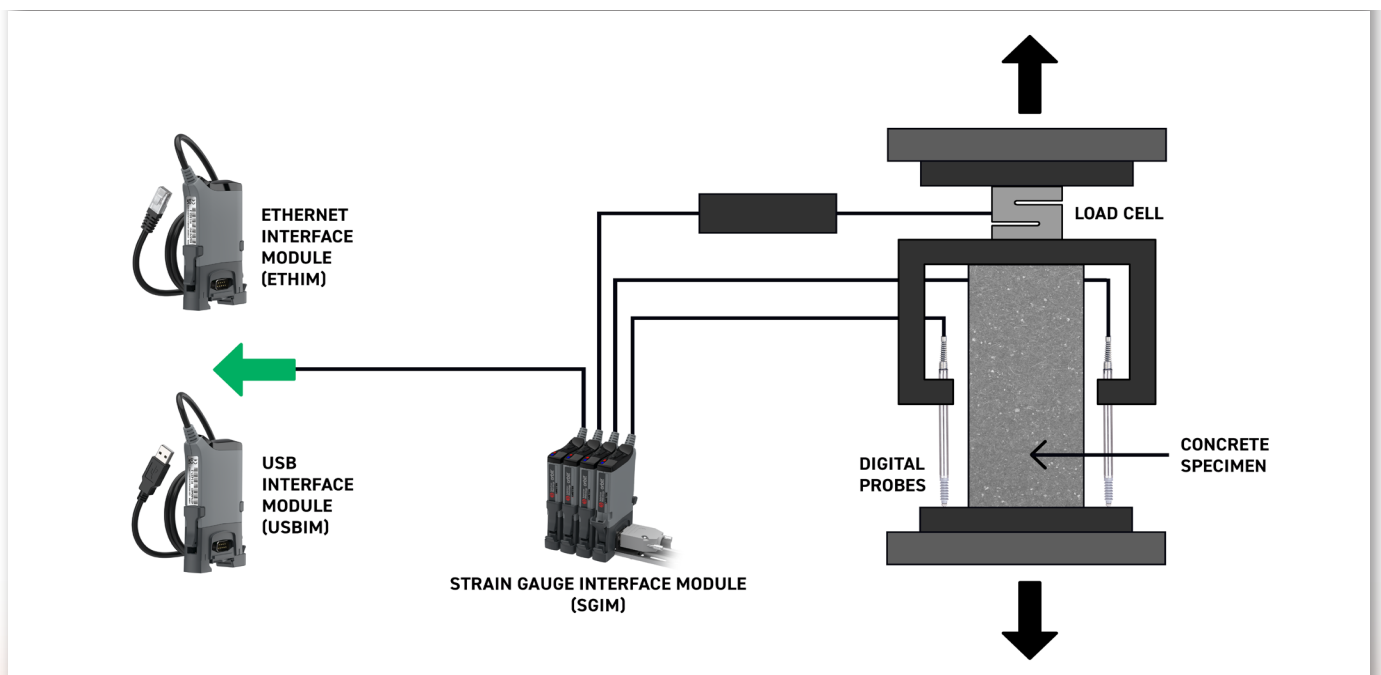
Asphalt/Concrete Compression

Asphalt or concrete compression

For this type of testing, you need high response, high resolution sensors that detect the slightest movement. Solartron Displacement transducers can detect up to 0.01 μm change in distance, making them ideal for these applications.

Concrete creep

In this test a concrete sample is stretched until failure. For this, Solartron’s Orbit® Digital Measurement Network can be used to synchronise the readings from a Load Cell, as well as multiple transducers for when the material fails.

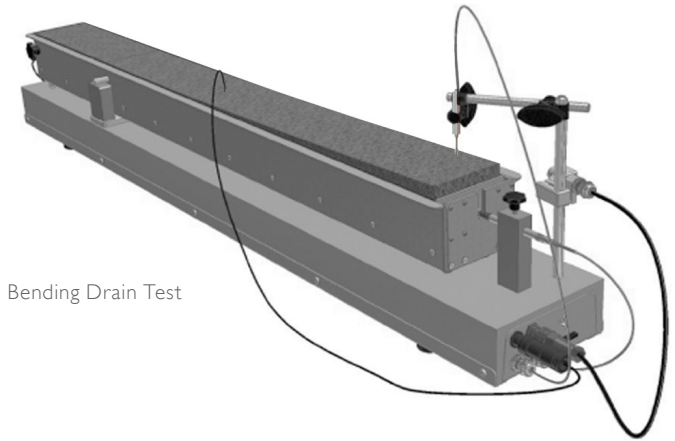


Concrete Creep

Materials Testing (Continued)

Bending drain

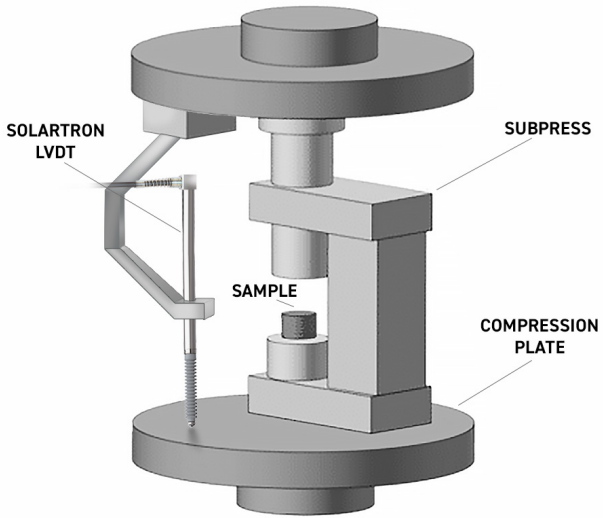
In these types of tests, wet concrete is poured into the drain, and then monitored for shrinkage and bending as it solidifies. The chemical composition of cement, as well as the surrounding humidity, could damage a regular sensor's body, cutting its function short. For this, Solartron transducers can be used to monitor any linear changes, with a quick response, extreme resolution, and hostile environment resistance, making them perfect for these types of tests. For non-contact solutions, Orbit® LT lasers can be used. A Feather Touch probe is also a viable option for concrete that has not set yet, due to their low tip force (from 0.18 N to 0.03 N) which prevents marring.



Bending Drain Test

Soil compression

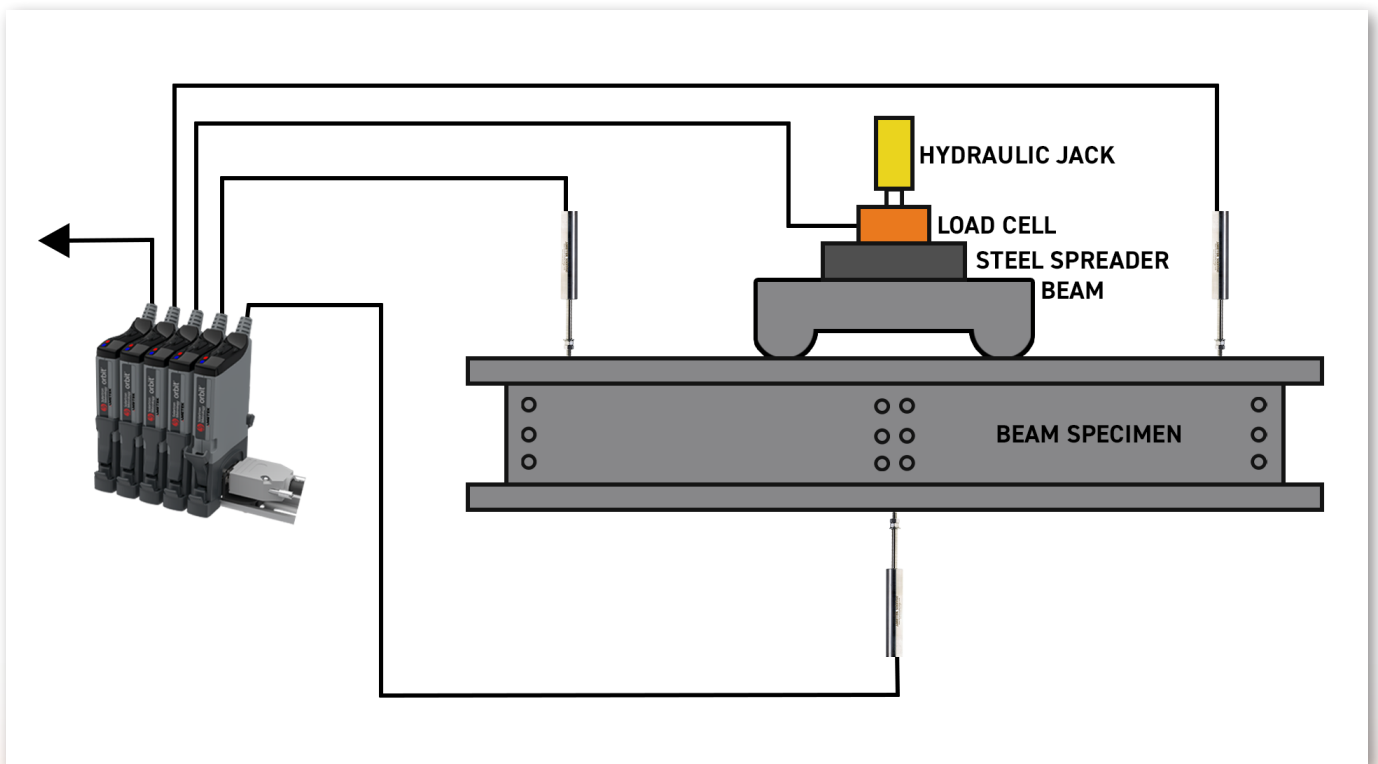
For embankments and soil related structures, laboratories will often employ "soil compression" testers to see how soil specimens respond to various axial loads. Solartron transducers have been used to monitor the changes in distance, as it can provide repeatable measurements over long periods of time, and will not have any "drift."



Soil Compression Test

Flexural test

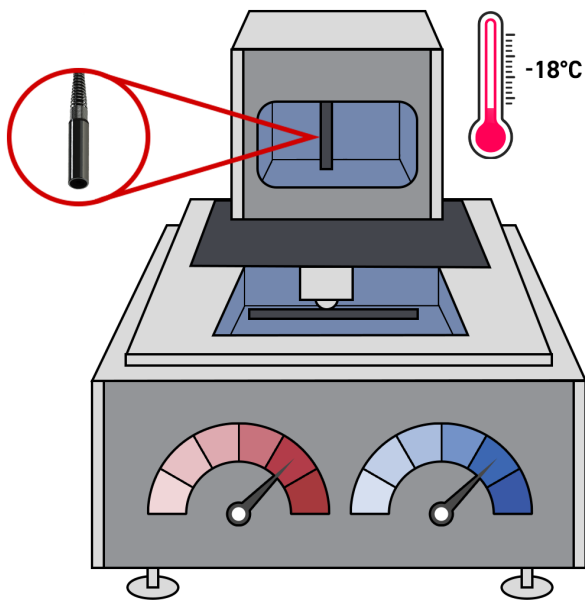
In this test, a steel or concrete beam undergoes a load from a hydraulic jack. For this, multiple points along the beam will be measured under stress. With Solartron's Orbit® Network, all points can be easily connected and synchronized for data output.



Flexural testing on a beam specimen

Hardness testing

Hardness testing is an indentation testing method. In this case, the indent can be measured by an SM/1 sensor that was mounted internally. For these tests, you must have sensors that can rapidly detect the slightest change in distance.



Bending Beam Rheometer

Bending beam rheometer

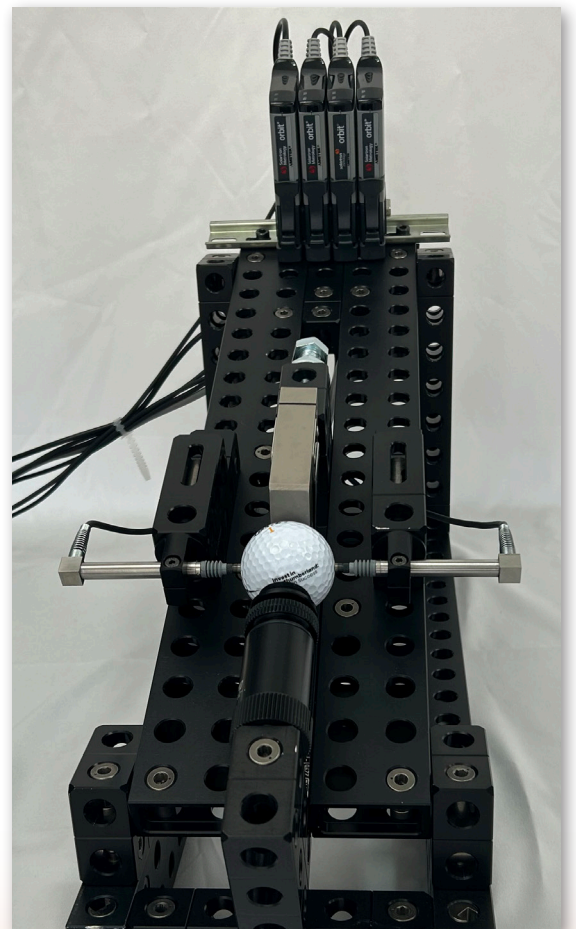
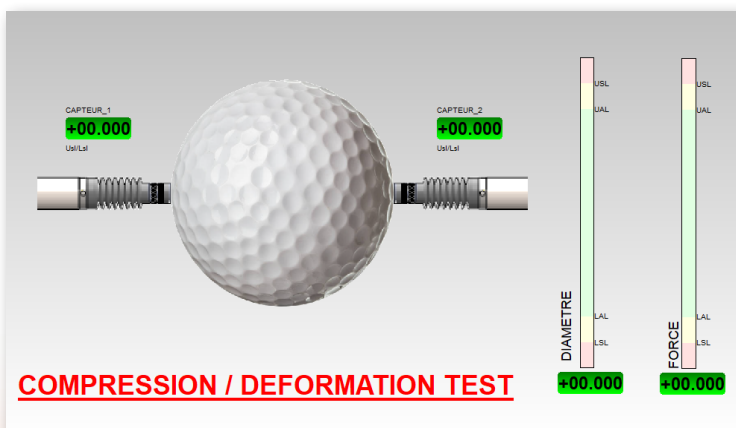
Transducers such as Solartron's MD series can be used to test binders for asphalt at different temperatures on a Bending Beam Rheometer. The compact size means it can easily fit into a tight compartment, and still deliver top performance.

Shear test

A shear apparatus subjects a material specimen to a variety of shear loads. A Solartron LVDT can be used to monitor the various reactions to the stress, with an immediate response.

Golf ball compression

Sport equipment companies will test how much golf balls react under stress, which helps determine their behavior when hit by a club. With the Orbit network, both probes and a load cell can be connected, with rapid, synchronized readings to a PC.



Two gauging probes with flat tips measure how much the golf ball expands as it is compressed, with readings output via an interface module

Infrastructure Monitoring

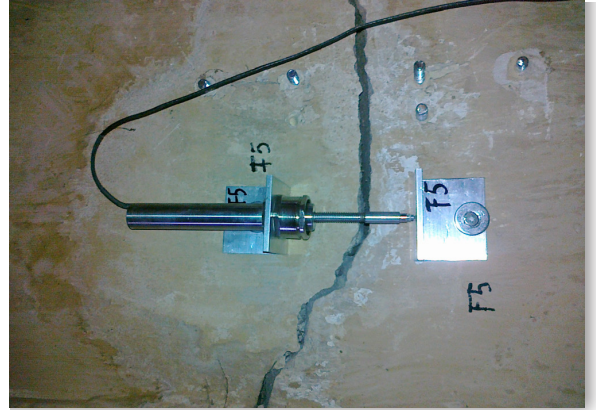
High resistance to stress

Solartron sensors have been used to monitor everything from cracks in a dam to support beams on a bridge.

Solartron is chosen due to the rugged build of the sensors, which can last for years, as well as no "drift" in measurement over a long period of time.

Monitor cracks in Infrastructure

Compared to a potentiometer where contact between the measured and moving points is required, a Pencil Probe utilises a non-contact principle between the core and the bobbin, leading to long lasting and durable functionality for decades. Solartron probes also maintain repeatability in all elements of weather, making them ideal for monitoring cracks in infrastructure



Monitoring Cracks in a Church Basement Wall

Steel structures

With Solartron transducers, engineers can monitor shifts in a bridge from wind, earthquakes, and other stresses.

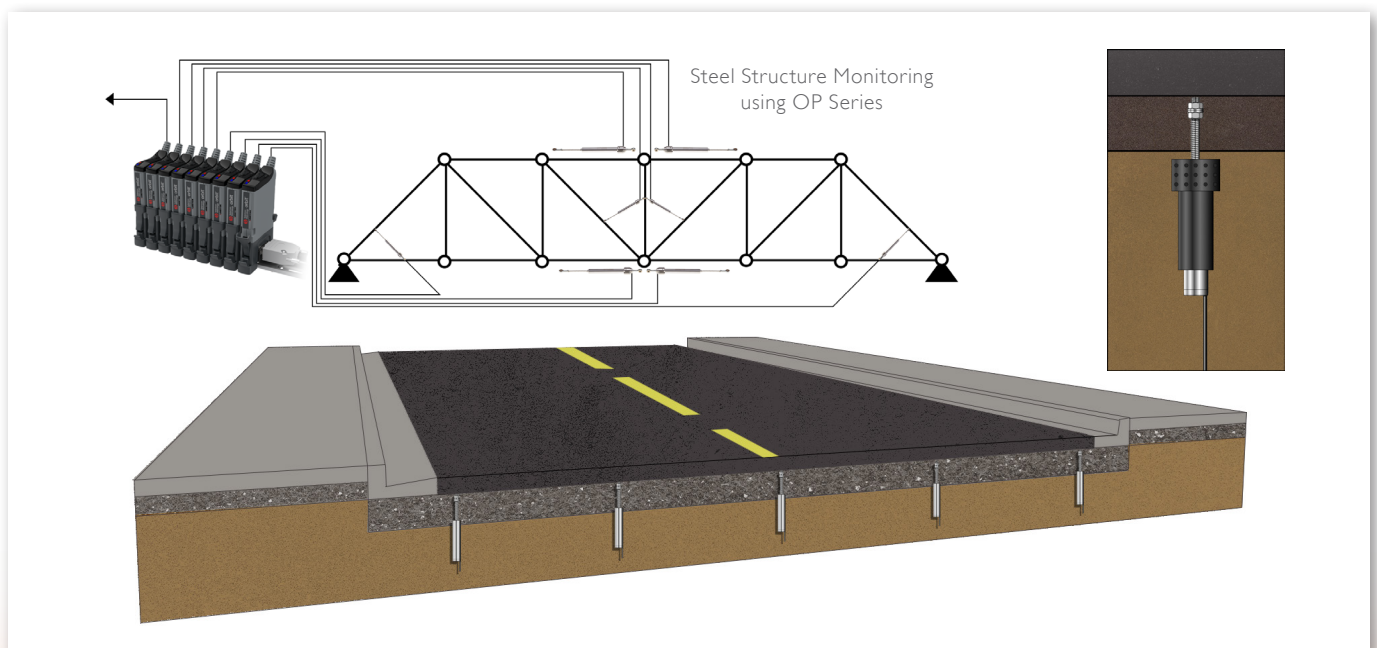
Pavement monitoring

Infrastructure firms and laboratories must sometimes monitor the movement of road asphalt or concrete from traffic and other elements. With an available IP 67 rating and a rugged build, Solartron transducers can withstand the abuse from these abrasive tests.

Displacement sensors have also been used to measure the impact of jetliners landing on airport runways.



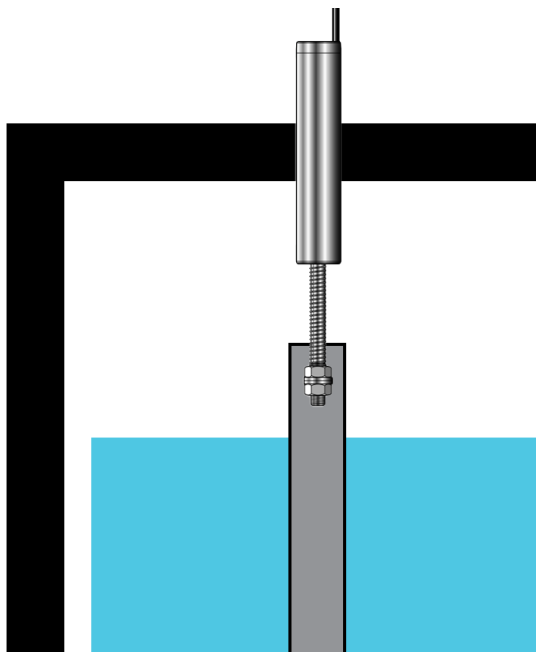
Steel structure monitoring



Pavement Monitoring using G-Type



Gas flow testing using an LVDT



Liquid Level Monitoring

Environmental resistance

Liquid & Gas monitoring requires high environmental resistances in measurement sensors.

Solartron provides a range of customisation options such as high temperature tolerances, 316L Stainless Steel for better corrosion resistance, high ingress protection, and more.

Gas flow testing

An LVDT can be used to monitor pressure in a pipe and provide immediate feedback.

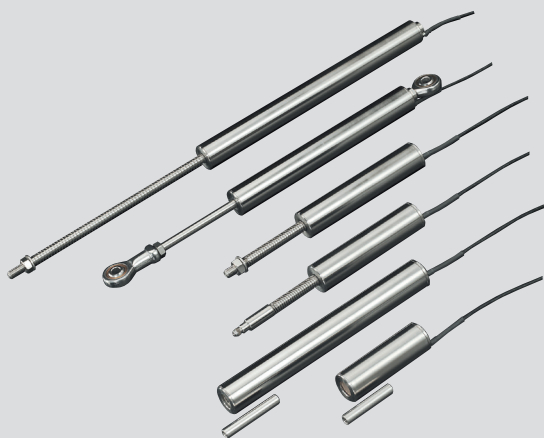
Liquid level monitoring

In applications where water in tanks or similar situations, an LVDT will provide even the slightest change in readings.

Solartron displacement transducers are hermetically sealed. IP 68 Submersible displacement transducers are available with minimum quantity orders.

Control valve

Use an LVDT like the G-Type to regulate fluid flow through a control valve.



Did You Know?

Solartron S-Series sensors are built to withstand hostile environments by using 316L ST/ST, polymer bearings, FEP Cables, IP67 sealing with better options available, and more.

The S-Series also offers high magnetic resistance, as a result of the magnetically screened coils.

For harsher applications, the S-Series has been expanded to include the SR (Rugged range).

Power Steam Turbines

Reliable & long-lasting

Solartron sensors have been used in power plants and similar settings for various steam turbine applications.

Monitor intake

Solartron displacement sensors have been used to monitor the air intake, as well as steam into a turbine to generate power. High temperature versions are available.

Shell/Case expansions

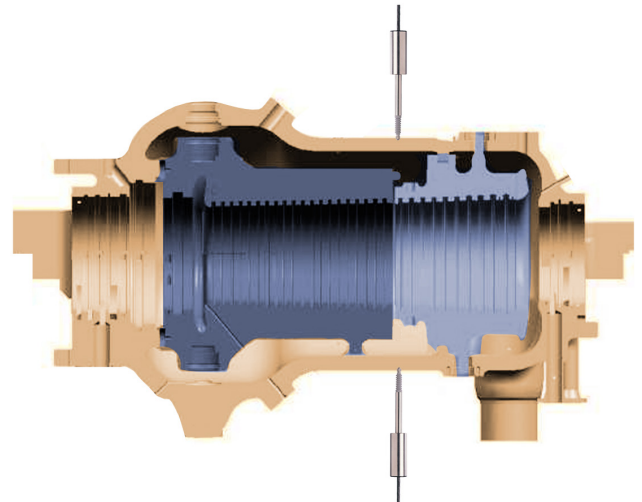
Solartron transducers have been used to monitor the thermal growth of the shell or machine casing at start up, as well as normal operation. For this type of application, the sensor must be extremely reliable and long lasting.

Monitor turbine bearings vibration

Solartron LVDT probes can be used to monitor vibration in bearings, making sure the turbine is not out of balance or encountering unnecessary vibration.



Power Steam Turbine Factory



Machine Shell Casing being monitored by G-Type

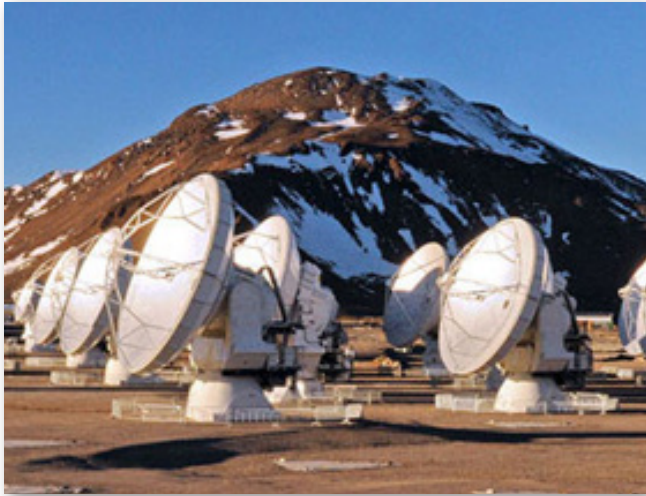
Did You Know?

The G-Type of analogue DC/DC displacement probes are based on the LVDT sensing principle and features a high accuracy and long life linear ball bearing (as AX-Series).

All models incorporate a Linear Variable Differential Transducer (LVDT) as the measuring element, together with high performance conditioning electronics for low noise and superior linearity while being able to cope with a wide input supply range with no change in output.



High resolution measurements



ALMA Project Field



Specialised AXR Sensor

With climate change becoming a larger issue, scientific analysis is performed worldwide to study its effects on anything from plant growth to irrigation.

Solartron displacement sensors can provide long lasting, high resolution measurements in extreme weather settings.

Measurement in extreme elements

Solartron can build custom sensors that can with stand the most extreme heat and cold. One example is a builds a custom AXR probe that can operate down to $-40\text{ }^{\circ}\text{C}$.

They are mounted on antennas at the ALMA project (Atacama Large Millimeter/submillimeter Array) in Northern Chile, where temps vary from -20 to $+40\text{ }^{\circ}\text{C}$.

The probes, which measure the angle change in the antennas, were chosen over two competitors due to their rugged build and high resolution.

Monitor tree and branch growth

Solartron sensors have been used to measure growth of natural elements, such as plants and trees, and must maintain repeatability in all elements of weather

Microedrometers: Tree measurement thickness device with D03 Transducer. Maintained by INRAE, a French Laboratory.

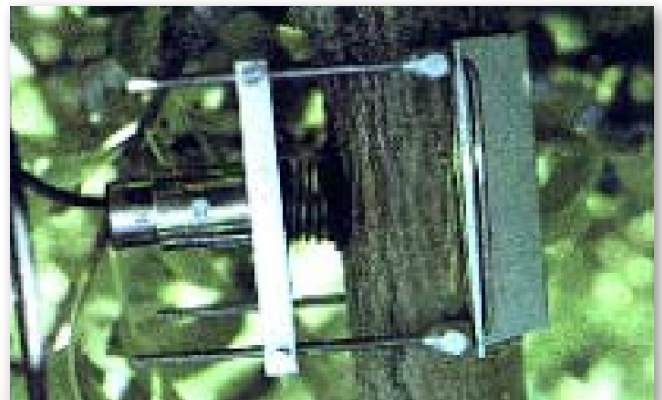
Solartron sensors have even been used to monitor the growth of fruit, such as apples or pomegranates, as shown on the left (LVDT mounted on bottom).



Dendrometry of a pomegranite using Solartron Sensors



Demonstration of an adapted fixture fixed to the tree sample



Displacement sensor monitoring tree development

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REAL PRECISION. REAL SOLUTIONS.

In the laboratory, on the shop floor or in the field, Solartron Metrology's products provide precise linear measurements for quality control, test and measurement and machine control.

Solartron Metrology is a world leader in the innovation, design and manufacture of precision digital and analogue dimensional LVDT gauging probes, displacement sensors, optical linear encoders and associated instrumentation.



Solartron Metrology pursues a policy of continuous development. Specifications in this document may therefore be changed without notice.



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