# Newsletter

Issue 3

**SmartSCALE by Magnescale**
Find out about the high resolution SmartSCALE series from Magnescale

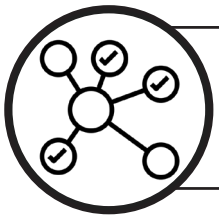
**Digital Gauge from Magnescale**
Explore digital gauges and how they can work for you with a range of display options

**How to use a caliper by Bocchi Control**
Calipers are used in a range of engineering sectors, but how do you use them?


Precision Through Innovation

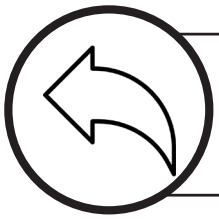
INNOVATIVE MEASUREMENT TECHNOLOGY LTD.

# About us



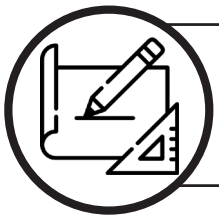
**Extensive product range**

Full range of precision metrology instruments from Sony Magnescale, Metro, Precizika Metrology, IBR & Bower Group



**Product repairs / refurbisments**

Ability to repair products including older discontinued units via our partners



**Customised measurement solutions**

Complete custom measurement solutions including retrofits and acess to other fields of engineering

## Suppliers for some the most well known companies in the industry

Innovative Measurement Technology Ltd is a family run business with collectively over 65 years' experience in this industry.

We are well known as one of the leading distributors of high end metrology products for a broad range of applications.

Established as a limited company in 2008, IMT started off by producing gauging transducers with accompanying electronics, gaining a reputation for our reliability and great customer service. Since then we have

# About us


expanded our lineup to include precision workshop tools with custom options, digital displays from Metro, high resolution Encoders from Precizika Metrology as well as the full lineup of IBR products.

Further strengthening our product line, in 2020 Innovative Measurement Technology took over the distributorship for Magnescale Co Ltd in the UK. The range of products from Magnescale (formally Sony Magnescale) enables us to offer customers a complete metrology system.

In 2021 Innovative Measurement Technology teamed up with Bowers Group which gives our customers access to Bowers own products and other well known brands such as Sylvac, Baty, Moore & Wright, Trimos and more.

We are also proud to be part of the GTMA, a UK based trade association which represents the majority of engineering sectors and seen as great resource for companies searching for quality suppliers.

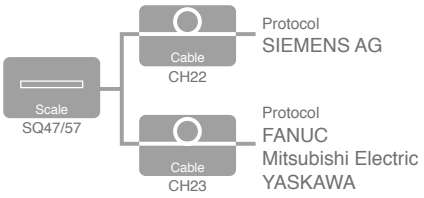
As a company we strive for excellence, Innovative Measurement Technology Ltd wants to be a one stop metrology shop for all your instruments.

# SmartSCALE

by Magnescale

Magnescale

SPEED X PRECISION


**Magnescale SQ47 absolute linear Encoder**

**In the pursuit of environmental resistance and high precision, magnetism was the answer.**

The history of Magnescale began with the invention of a magnetic head with magnetic flux response in 1965 by Mr. Mitsuyoshi Uemura of Sony and others. More than 50 years have passed since then, and today they have magnetoresistive (MR) heads, and the magnetic materials have changed, but the essence is the same: a position detection system that is resistant to adverse environments due to its magnetic detection method. They are not affected by condensation or oil, which are common to machine tools, and they continue to have high vibration resistance and shock resistance characteristics.

It also follows the thermal expansion and contraction of the machine tool table.

The evolutionary form of Magnescale is SmartSCALE, which was released in 2015. This system uses a tunnel magneto-resistive (TMR) device as the magnetic sensor and completely separates the scale from the head by developing new magnetic materials, signal processing circuits, and interpolation algorithms. This is the first system in the industry to achieve both IP67 environmental resistance and high resolution of 5 nm for NC machine tools.

**SmartSCALE achieves high resolution with the interpolation processing technology developed by Magnescale.**

Interpolation processing technology is a technology that accurately divides the signal waveform detected from a magnetic scale to the required pitch (fineness). For example, in the case of a SmartSCALE, two sine waves with a phase shift of 90 degrees are detected from a magnetic scale engraved with a pitch of 400µm.

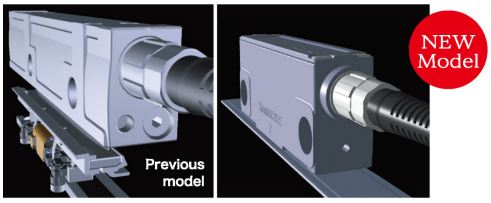
If the signal contains distortion, accurate position information (true value) cannot be obtained. The DC component is removed from the signal detected from the scale, level and phase adjustments are made in real time. The position information with a resolution of 5nm is obtained by dividing the signal into 80,000 segments through advanced signal processing.

## Stronger resistance to harsh environments

Air purging not necessary

## High durability and no air purging required

The bearing-less and compact design saves space enabling installation close to the work piece and facilitates multiple installations on a single axis.

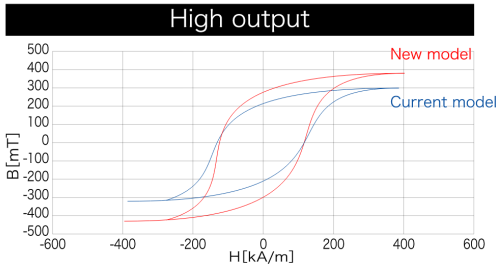



## Detection Principle

A thin-film MR element with a high-precision, low-distortion pattern arrangement is used as the detecting element. The resistance value of the MR element changes when the magnetic field acting on the element changes due to an alteration in the relative position between the element and the magnetic media. This change in resistance value is read electronically to detect the amount of positional change.

## Development of a new magnetic medium

The output detection signal has improved 30% by changing the composition and consistency of the magnetic medium.

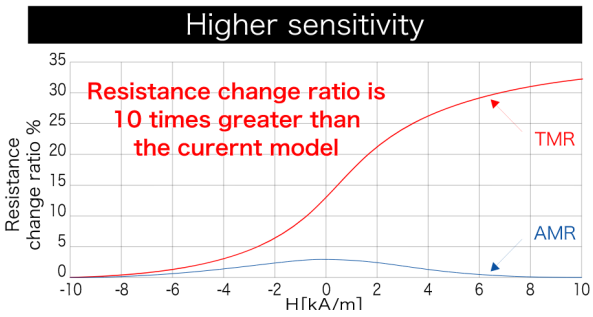



## Features of the SQ47 absolute linear Encoder

- Wide gap and clearance tolerance
- Effective Length: 90 - 6240mm
- Individual non-contact component design
- MRS: 200m/min (with serial communication)
- 5nm high resolution
- Accuracy: ±(1.5+1.5L/1000)µm
- Sealed structure with IP67 protection grade
- Operating temperature: 0˚C - 50˚C
- Protocol: FANUC, Mitsubishi, YASKAWA, SIEMENS AG

## Development of a high sensitivity sensor using new TMR device

Utilizes a low strain sensor enabling 10 times greater sensitivity compared to the current model by the development of a TMR element based on the Spin-Valve method



# How to use a caliper

by Bocchi Control

Calipers are instruments used for measuring millimetre lengths. Mechanical engineering, automotive and carpentry are the sectors in which professional calipers are widely used.

But how do you use the caliper ?

Bocchi Control shows you how.....

## How to use a caliper

The caliper is an instrument used to measure the thickness, width and distance between two opposite and symmetrical elements. Or it can be used to measure the depth of a groove or hole with millimetre precision, ranging from one tenth to one fiftieth of a millimetre, up to a hundredth of a millimetre.

The gauges are provided with a fixed main body, or ruler, and a slider, or a vernier. A scale in millimetres is engraved on the caliper body, while a second scale, in fractions of a millimetre, is engraved on the vernier for precision reading.

The vernier can be divided into 50 parts, 20 parts or 10 parts, according to the degree of precision needed to obtain the measurement.

## How do you read the gauge?

Understanding how to read a gauge is quite simple. After tightening the two jaws of the caliper around the object to be measured, the vernier is locked and two measurements are taken: the first on the rule, the second on the vernier.

The reference for the first measurement is the vernier zero: the value on the ruler to the left of the vernier zero is the measurement in millimetres.

For the second measure the user must search, (among the notches engraved on the vernier) the one that most aligns with one of the notches engraved on the ruler. Once the notch is identified, the number of notches on the vernier is counted.

Based on the fraction of the twentieth or fiftieth vernier, the resolution will be 0.05 or 0.02 mm for each notch.

The exact measurement consists of the value measured on the fixed scale plus the value detected by the vernier reading.

Digital gauges on the other hand are simple and more intuitive to use. Each digital gauge made by Bocchi has a display that shows the measured values. Furthermore, parameters can be set and modified and operations can be automated.

BOCCHI

**"Proud to contribute to the development of "MADE IN ITALY" in a sector of advanced technological level."**

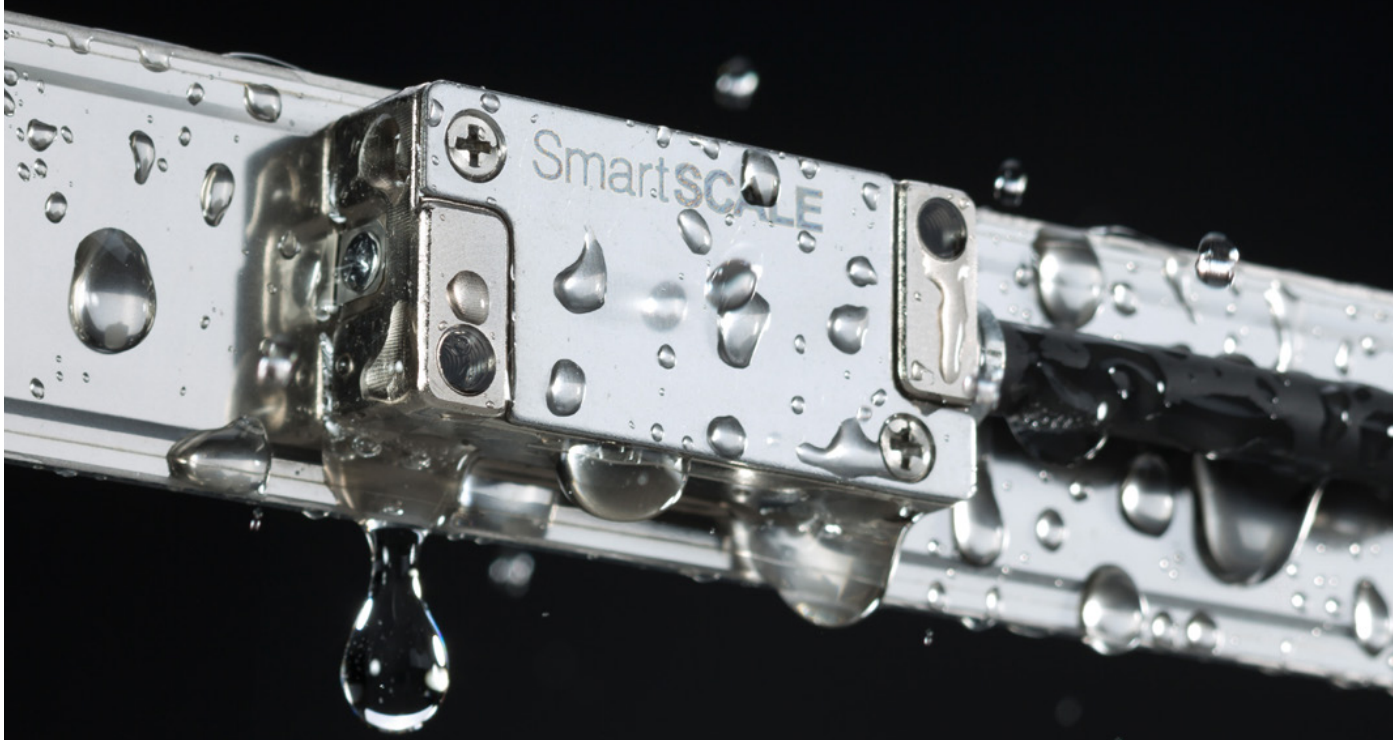
Find out more from Bocchi Control on our website or directly from Bocchi

**www.bocchicontrol.it**

INNOVATIVE
MEASUREMENT
TECHNOLOGY LTD.

# SmartSCALE

BY Magnescale




## ABSOLUTE AND
Incremental Precision
## SCALE SYSTEM

50nm Maximum Resolution

innovative-measurement-technology.co.uk


# Digital Gauge

by Magnescale

The Magnescale Digital Gauge products use a high-grade magnetic recording and detecting principle which has been developed over 50 years.

The Digital Gauge products embody the reliability and quality that Magnescale is known for.

Magnescale Digital Gauges feature high resolution and high accuracy, along with environmental, shock and vibration resistance that are a unique feature to our magnetic detecting principle.

Sub-micron repeatability and improved torsion resistance comes from an innovative spindle design that enables environmental protection up IP67, allowing for a wide range of applications.

## MR Sensor

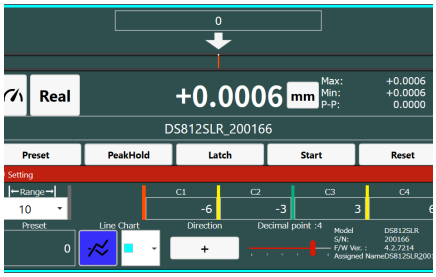
Precise magnetic recordings are applied to a special proprietary magnetic material. Using a MR (Magneto Resistive) sensor with a unique detecting pattern allows for high accuracy, and also allows for high environmental resistance and strong resistance to temperature changes.

## Ball spline spindle construction

The Digital Gauge has been improved with both repeatability and spindle performance due to the ball spline spindle construction. Long operational life, with excellent shock and vibration resistance help reduce overall maintenance costs.

## Traceability

Magnescale Co., Ltd. is an authorized calibration contractor. An accuracy chart is attached with every product. Measurement data is generated by equipment traceable to national standards. Magnescale can also issue a calibration certificate after a products ships.




**MeasureViewer PC software for USB Digital Gauge**

Digi

Magnescale

**Legendary reliability, quality and Magnescale technology are all part of the Digital Gauge products**


## High resolution
**DF, DK, DS Series**

Maximum resolution: 0.1µm
Measuring range: 5- 30mm

Slim shape with stem diameter of Φ8 mm and high durability ball spline bearing.

**DF800S:** By combining with CE34, MF10, and MG50 series (sold separately), it can be compactly connected to PLCs and other control devices.

**DK800S:** Our unique signal processing technology enables measurements that require high accuracy and real-time performance.

**DS800S:** Simply connect it directly to the USB port of your PC, and it can operate without an external power supply or additional interface unit. It can also be used simultaneously with multiple axes via a USB hub. Easy-to-use dedicated measurement application and communication software also available.

## General purpose
**DT Series**

Maximum resolution: 1µm
Measuring range: 12- 32mm

**DT:** A general-purpose model that supports a wide range of applications from judgemental use such as assembly verification to dimensional measurement.

It can be used for a wide range of applications while keeping costs low.

## Robust, long stroke
**DK, DS Series**

Maximum resolution: 0.5µm
Measuring range: 10- 205mm

**DK:** Product line-up capable of measuring up to 205 mm.
The robust structure creates superior environmental resistance and rigidity, and is able to be used in a wide range of applications.

**DS:** Directly connect to the USB port of PC, and operate without an external power supply or additional interface unit.
Multiple axes can be used simultaneously via USB hub. Easy-to-use dedicated measurement applications and communication software available. Long measurement range allow for objects of various sizes (105mm maximum)
The robust structure creates superior environmental resistance and rigidity, and is able to be used in a wide range of applications.

ital Gauge

PRECIZIKA METROLOGY

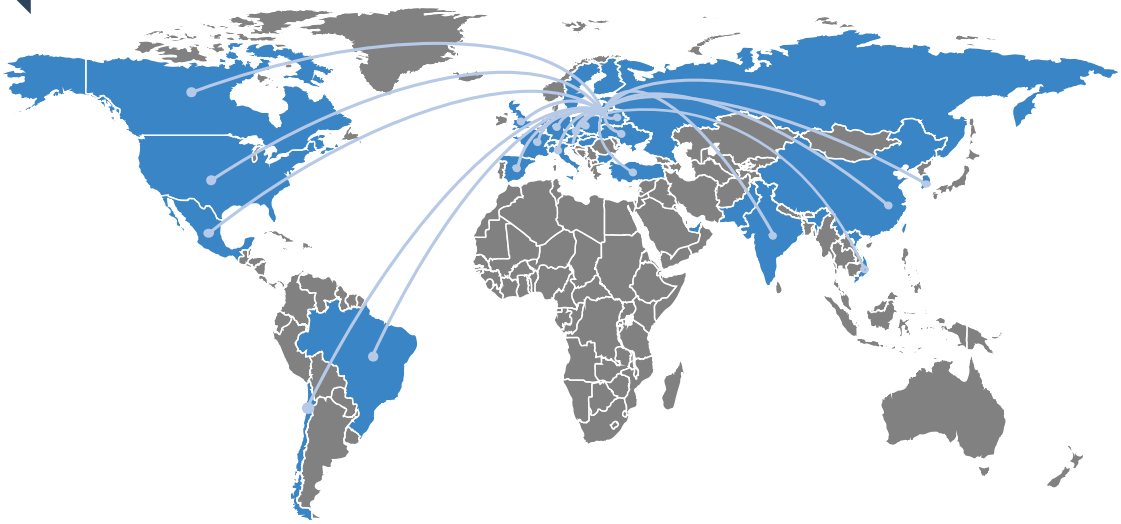
## ROTARY AND LINEAR ENCODERS

Superior Quality Products • High Precision • Individual Technical • Solutions • Unique Glass Production Technology • Over 50 Years of Experience.

- MILLING / BORING / DRILLING CNC MACHINES
- HIGH-PRECISION MACHINE TOOLS
- TURNING MACHINES & CENTERS
- ROTARY TABLES
- RETROFITTING
- MAINTENANCE

SSI · BiSS INTERFACE · HD · µm

## MAIN EXPORT COUNTRIES



50 YEARS OF EXPERIENCE

INNOVATIVE MEASUREMENT TECHNOLOGY LTD. IMT

**Precision Through Innovation**

Suppliers of precision metrology equipment helping to keep industry innovating.

Unit 3E Vinnetrow Business Park
Vinnetrow Road, Chichester
West Sussex, PO20 1QH

+44 (0) 1243 942010
sales@imeasure.co.uk

**innovative-measurement-technology.co.uk**