Intra Touch
Intra Contour

Precision shop floor solutions for surface finish and contour measurement

Roughness and contour measurement with one gauge
Roughness and contour measurement with a single gauge

Housed in a rugged casing, the Intra has a proven history of maintaining accuracy of measurement without the need for constant maintenance or support.

Quality, flexibility and ease-of-use have enabled the Intra to become a shop-floor standard across a wealth of different industries.

The Intra combines industry leading specification with simplicity of operation for unbeatable practicality and value.

“Precision shop floor solutions for surface finish and contour measurement”

Advanced contour measurement

Cost effective, self-contained, robust portable contour solution with built in 90 mm Z height adjust and optional 350 mm column to accommodate large or tall components.

Simple, single user interface for calibration, measurement and analysis.

• Patented ball calibration
• Precision glass scale
• Excellent temperature stability
• Roughness and contour on single gauge

Gauge Linearity

Unless your measurements are all taken within the same vertical position of the gauge range and never exceed the amplitude of the step height master, the data you collect may be non-linear which will cause incorrect results.

Using ball calibration is more reliable than the step height master as this eliminates non-linearity.

The Intra is calibrated using a unique patented ball calibration to check linearity of the entire gauge range. Many other systems can only use a few points in the range.

Traverse accuracy

Many roughness checkers are time based, collecting data for a fixed period of time instead of a precise, constant distance. Anything that affects speed of traverse — wear, dirt, slippage, etc. — affects the quantity and spacing of the collected data points which in turn affect the measurement results.

The Intra utilises a glass scale and reading head to ensure that data collection is accurate and consistent. Every measurement on every instrument is calculated from the exact same quantity of identically spaced data points.
Two gauges to meet all of your demands

You can now use a single gauge to measure both roughness and contour. We offer the high precision gauge for small ranges and a wide range gauge for larger ranges up to 32 mm.

High precision gauge

This head leads the industry with up to 2 mm (0.08 in) of range and an outstanding range to resolution ratio of 262,144:1. It has a pivoted and balanced beam to allow measurement in any attitude.

1 mm Stylus - Range / resolution
• 1 mm / 4 nm (0.04 in / 0.16 μin)
• 0.2 mm / 0.8 nm (0.008 in / 0.03 μin)

2 mm Stylus - Range / resolution
• 2 mm / 8 nm (0.08 in / 0.31 μin)
• 0.4 mm / 1.6 nm (0.016 in / 0.06 μin)

Wide range gauge

The wide range gauge provides up to 32 mm (1.26 in) of range with 15 nm (4.8 μin) resolution. Suitable for form and contour measurements.

32 mm Stylus - Range / resolution
• 32 mm / 125 nm (1.26 in / 4.8 μin)
• 6.4 mm / 25 nm (0.25 in / 1.0 μin)

20 mm Stylus - Range / resolution
• 20 mm / 76 nm (0.79 in / 3 μin)
• 4 mm / 15 nm (0.16 in / 0.6 μin)

Four stylus tip options available
• 5 μm roughness tip
• 20 μm chisel tip with 15° included angle
• 0.5 mm (0.02 in) ball tip radius
• 20 μm conical tip with 30° included angle
Measuring brake calliper profile
Measure undercut in two measurements and join them together for analysis
- Intra Contour (wide range gauge)
- 2 mm chisel tip stylus
- TalyProfile Contour software

Measuring worm gear profiles
Analyse the complete profile for quality checking of parts
- Intra Contour (wide range gauge)
- 20 mm chisel tip stylus
- TalyProfile Contour software

Measuring band saw blades
Identify ‘chatter’ and surface finish variations which can cause fatigue
- Intra Touch (high precision gauge)
- 1 mm stylus, column, precision vice and manual Y-stage
- TalyProfile software

Measuring engine valve grooves
Inspection of parts to eliminate expensive rejects
- Intra Contour (wide range gauge)
- 20 mm special knife edge stylus
- TalyProfile Contour software

Measuring bearing groove
Complete profile quality check on bearings
- Intra Touch (high precision gauge)
- 2 mm chisel tip stylus
- TalyProfile Contour software
Key analysis features
Unparalleled measurement capability for surface finish and contour

**Contour & Roughness**
- Angle, radius & distance
- Form error / Pt
- Arc roughness
- Tolerancing

**Roughness & Waviness**
- 150 Parameters
- ISO 4287,
- ISO 13565-2
- ISO 12085

**Advanced Contour**
- V-groove analysis
- Gothic arch analysis
- Auto dimensioning
- DXF import and export

**Screws / Steps**
- Screw threads
- Ball screws
- Bone screws
- Fluid dynamic bearings
Powerful software - TalyProfile

TalyProfile is a dedicated, Windows® software package, designed for use with the Intra range.

### Roughness analysis

Two versions are available.

- TalyProfile “Silver” has all functions typically used for a shopfloor inspection.
- TalyProfile “Gold” has all the benefits of TalyProfile “Silver” with the addition of complete laboratory analysis functions.

<table>
<thead>
<tr>
<th></th>
<th>Silver</th>
<th>Gold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patented Ball Calibration</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Multi-language Support</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>EN, FR, DE, ES, IT, BR, PL, CN, KR &amp; JP</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Auto / Manual Levelling</td>
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</tr>
<tr>
<td>ISO 4287 / ASME B46.1 Parameters</td>
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<tr>
<td>ISO 13565 Automotive Parameters</td>
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<tr>
<td>ISO 12085 R&amp;W motifs</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Area of Hole / Peak</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Profile Parameters and Curves</td>
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<td>✓</td>
</tr>
<tr>
<td>Roughness &amp; Waviness Curves</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Distance and Height Measurement</td>
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</tr>
<tr>
<td>Interactive Material Ratio Curve</td>
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<td>✓</td>
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<tr>
<td>Tolerance Limits Pass / Fail</td>
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<td>✓</td>
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<tr>
<td>Auto Step Height Measurement</td>
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<tr>
<td>Form Removal</td>
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<tr>
<td>Filtering by FFT</td>
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<tr>
<td>Thresholding</td>
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<td>Frequency Spectrum</td>
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<tr>
<td>Power Spectrum Density</td>
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<td>✓</td>
</tr>
<tr>
<td>Retouch / Edit Profile Points</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Matlab Script Data Processing</td>
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<td>✓</td>
</tr>
</tbody>
</table>

### Contour analysis

Two versions are available.

- TalyProfile “Basic” Contour
- TalyProfile “Advanced” Contour

Both versions of TalyProfile Contour include TalyProfile “Gold”

### Advanced time-saving analysis templates

A ‘template’ can be created whereby a sequence of analysis functions can be saved and applied to future measurements, turning detailed reporting tasks into routine documents.

### Desktop publishing facility

TalyProfile offers a comprehensive desktop publishing function which allows clear presentation of measurements, results and profiles. Graphs, profiles and results can be arranged from within the TalyProfile software giving complete flexibility in reporting.

### In depth analysis

Profiles can be levelled and zoomed to remove unwanted features or defects from the analysis. Distance measurement between features of a profile are easily achieved and the information can be displayed graphically and numerically. Step height and the area of a valley or peak can also be calculated.

### Full compatibility

Surface finish results from other Taylor Hobson surface roughness instruments can be imported to TalyProfile software, allowing a uniform report style to be used throughout your workshop or laboratory.

### Pass / Fail tolerances

All parameters can be assigned nominal, minimum and maximum values.

### Windows PC specification

**Recommend**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>Windows 10</td>
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<tr>
<td>Screen size</td>
<td>15 inch</td>
</tr>
<tr>
<td>Screen resolution</td>
<td>1920 x 1080</td>
</tr>
<tr>
<td>Memory (RAM)</td>
<td>2 GB</td>
</tr>
<tr>
<td>CPU speed</td>
<td>1.8 GHz</td>
</tr>
<tr>
<td>Hard disc</td>
<td>64 GB</td>
</tr>
</tbody>
</table>
Unique patented ball calibration routine

Artefacts from Taylor Hobson's UKAS approved laboratory are used throughout the process

The benefit
Taylor Hobson’s Intra systems use a patented ball calibration routine to ensure that the dimensional measurement capability and gauge linearity are calibrated in a single, automated operation. This routine uses high-precision spherical calibration artefacts that have been produced to exacting standards and then calibrated for radius, form and surface finish in our own UKAS approved laboratory. Our automated routine delivers a true gauge calibration.

The process
In operation the user simply completes a dialogue confirming parameters such as the percentage of gauge range to be used and the traverse speed. Working from knowledge of the stylus geometry and the dimensions of the calibration standard, the software automatically calculates the measurement properties and drives the traverse unit, completing the calibration with the minimum of operator intervention.

Ultra software – comprehensive surface finish analysis
The Intra system is also compatible with Ultra, which is an alternative to TalyProfile. Fundamental roughness and waviness parameters are included, plus form error analysis, feature exclusion, zoom tool and full programmability for shopfloor applications.

• Form analysis
  Measure and evaluate radius, angle (slope) and dimension

• Simple user interface
  Combines simple calibration, measurement and analysis to deliver a true shop floor solution.

• Dual profile analysis*
  Allows comparison of measurements for wear, tolerancing, etc.

• TalyMap 3D analysis
  Software utility for topography applications; special hardware is also required.

* Ultra Software licence options
Expanding your capability

Everything you need to begin using Intra touch is supplied as standard. However, for more demanding measuring requirements, we have a range of styli and accessories that may be ordered separately.

Stylus options

1 mm / 2mm (high precision gauge)

- **112-2009**
  - Type: Diamond
  - Reach: 50 mm
  - Shank Clearance: 5.3 mm
  - Tip radius: 2 μm
  - Tip angle: 90°
  - Minimum bore: 10 mm

- **112-2010**
  - Type: Ball
  - Reach: 110 mm
  - Shank Clearance: 11.5 mm
  - Tip radius: 0.5 mm
  - Tip angle: N/A
  - Minimum bore: 17 mm

- **112-2011**
  - Type: Diamond
  - Reach: 50 mm
  - Shank Clearance: 11.3 mm
  - Tip radius: 2 μm
  - Tip angle: 90°
  - Minimum bore: 17 mm

- **112-2012**
  - Type: Small bore diamond
  - Reach: 50 mm
  - Shank Clearance: 0.42 mm
  - Tip radius: 2 μm
  - Tip angle: 90°
  - Minimum bore: 1.6 mm

20 mm (wide range gauge)

- **112-5444**
  - Type: Chisel
  - Reach: 105 mm
  - Shank Clearance: 20 mm
  - Tip radius: 20 μm
  - Tip angle: 15°
  - Minimum bore: 27 mm

- **112-5446**
  - Type: Diamond
  - Reach: 105 mm
  - Shank Clearance: 20 mm
  - Tip radius: 5 μm
  - Tip angle: 60°
  - Minimum bore: 27 mm

- **112-5462**
  - Type: Ball
  - Reach: 105 mm
  - Shank Clearance: 20 mm
  - Tip radius: 0.5 mm
  - Tip angle: N/A
  - Minimum bore: 27 mm

32 mm (wide range gauge)

- **112-5445**
  - Type: Chisel
  - Reach: 173 mm
  - Shank Clearance: 32 mm
  - Tip radius: 20 μm
  - Tip angle: 15°
  - Minimum bore: 40 mm

- **112-5447**
  - Type: Ball
  - Reach: 173 mm
  - Shank Clearance: 32 mm
  - Tip radius: 0.5 mm
  - Tip angle: N/A
  - Minimum bore: 40 mm

- **112-5463**
  - Type: Diamond
  - Reach: 173 mm
  - Shank Clearance: 32 mm
  - Tip radius: 5 μm
  - Tip angle: 60°
  - Minimum bore: 40 mm

* 1.6 mm up to 6 mm deep, 2 mm up to 13 mm deep, 3 mm up to 25 mm deep and 5 mm up to 50 mm deep.

+ 1.6 mm up to 6 mm deep, 2 mm up to 13 mm deep, 3 mm up to 25 mm deep and 5 mm up to 50 mm deep.
Standard Intra accessories

1 Calibration ball/hemisphere
Glass standards for calibrating the Intra systems.
• 12.5 mm (0.49 in) radius
  112-2062*
• 38.76 mm (1.526 in) radius
  112-5417*

2 Step height and roughness master
• 3 Line (2.5 μm + 0.4 μm) and Ra (0.8 μm)
  112-557*
• 0.3 μm Ra glass standard
  112-4304*
• 1.6 μm Ra glass standard
  112-4303*

3 Ball joint vice
Provides universal positioning via 360° rotation and 180° tilt; especially for lightweight or small components.
112-2695

4 Precision vice
High carbon steel construction with precision ground faces, 90° vee on clamping jaws.
112-2694

5 Manual Y-stage
Precision stage assembly with Y-axis positioning for component fixturing and cresting.
112-3163

6 Y-stage with vee block
Simple stage assembly with Y-axis positioning, 90 x 90 mm (3.5 x 3.5 in)
112-3067

7 Vee blocks (pair)
For the positioning and support of large, cylindrical components.
112-1645

8 Right angled attachment
Allows the stylus and gauge (1 mm & 2 mm only) access to components at 90° to the traverse unit.
112-4485

9 Ball and roller unit
Special fixture for circumferential inspection of surface finish.
112-3219

10 Roller plates
Cylindrical roller plates for balls with diameters of 1 - 16 mm (0.04 - 0.63 in) - set of 3, fits to 112-3219.
112-3248

Ball roller plates
Ball roller plates for balls with diameters of 1 - 25 mm (0.04 - 0.98 in) - set of 4, fits to 112-3219.
112-3247

11 6-Jaw component chuck
Self centring with removable jaws, can be used internally or externally. Mounts kinematically onto table top.
112-1859

Customised solutions
Our strategy for success is simple, instead of just selling products, we provide solutions. If our standard instruments and accessories do not satisfy your needs, we can customise a solution to exactly match your application.

Specifications are subject to change without notice.
* UKAS calibration available. Add ‘UC’ to code.
Intra range dimensions

Dimensions:
- Length: 421 mm
- Width: 305 mm
- Depth: 38 mm
- Diameter: Ø 8 mm
- Height: 149 mm
- Height at the front: 116 mm
Surtronic® product range

**Surtronic® Duo** measures surface roughness at the touch of a button and shows the result on a large colour screen. Cycle time is 5 seconds and the result is saved until another measurement is taken.

- Ready to use out of the box
- Battery life more than 10,000 measurements

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ra</td>
<td>40 μm (1600 μin)</td>
<td>0.01 μm (0.4 μin)</td>
</tr>
<tr>
<td>Rz, Rv, Rp, Rt</td>
<td>199 μm (7800 μin)</td>
<td>0.1 μm (4 μin)</td>
</tr>
</tbody>
</table>

**Surtronic® R-100 Series** is a range of roughness testers robust enough for the shop floor and flexible enough for any inspection room.

- Unique stylus lift for total flexibility
- Long traverse length & extended pick-up reach
- Powerful PC software included

<table>
<thead>
<tr>
<th>Feature</th>
<th>Inductive pick up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge range / resolution</td>
<td>400 μm (0.012 in) / 0.01 μm (0.4 μin)</td>
</tr>
<tr>
<td>Accuracy (5 μm diamond tip)</td>
<td>1% of reading + LSD μm</td>
</tr>
</tbody>
</table>

**Surtronic® R-100 Series** is a range of roundness systems, robust enough for the shop floor but accurate for any inspection area, giving a flexible solution for all roundness and form measurement.

- Robust, fast and easy-to-use
- Includes Rapid Centre™
- Throughput 3 parts / minute including set-up

<table>
<thead>
<tr>
<th>Feature</th>
<th>Gauge resolution</th>
<th>±25 nm (0.98 μin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spindle accuracy</td>
<td>6 nm (0.24 μin)</td>
<td>±15 nm (0.59 μin)</td>
</tr>
</tbody>
</table>

**Talyrond® R-170 Raceway** is a high speed roundness measurement system designed specifically to address the extreme demands of high volume bearing production measurement.

- Fully active anti-vibration and active levelling
- Robustness - suitable for 24/7 operation
- Ease of use - touchscreen software

<table>
<thead>
<tr>
<th>Feature</th>
<th>Gauge resolution</th>
<th>±15 nm (0.59 μin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spindle accuracy</td>
<td>6 nm (0.24 μin)</td>
<td>±15 nm (0.59 μin)</td>
</tr>
</tbody>
</table>

* Centering attachment is supplied as standard with R-120/125 models, or available to purchase as an accessory on other models.
Established in 1886, Taylor Hobson is the world leader in surface and form metrology and developed the first roundness and surface finish measuring instruments.

www.taylor-hobson.com

Service department
Email: taylor-hobson.service@ametek.com
Tel: +44 (0) 116 246 2900

- Preventative maintenance – protect your metrology investment with an AMECare support agreement.

Sales department
Email: taylor-hobson.sales@ametek.com
Tel: +44 (0) 116 246 2900

- Design engineering – special purpose, dedicated metrology systems for demanding applications.
- Precision manufacturing – contract machining services for high precision applications and industries.

Centre of Excellence department
Email: taylor-hobson.cofe@ametek.com
Tel: +44 (0) 116 276 3779

- Inspection services – measurement of your production parts by skilled technicians using industry leading instruments in accord with ISO standards.
- Metrology training – practical, hands-on training courses for roundness and surface finish conducted by experienced metrologists.
- Operator training – on-site instruction will lead to greater proficiency and higher productivity.
- UKAS calibration and testing – certification for artifacts or instruments in our laboratory or at customer’s site.

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