



Surtronic® Duo

User Guide



English

Deutsch

中文

日本語

Surtronic Duo

User Guide

This is Taylor Hobson's User Guide for the Surtronic Duo.

All the specifications in this document are correct at time of production and are subject to change. Please contact Taylor Hobson for further information.

K505-444

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Surtronic Duo overview

What it does

The Surtronic Duo is a superior portable surface roughness tester that measures multiple roughness parameters with a 1-button click. Roughness measurement parameters Ra, Rz, Rp, Rv, Rz1max, Rsk, Rq & Rku are displayed on a brightly lit intuitive 2.4" LCD colour display. Its rechargeable battery operation makes it a convenient way of performing fast, easy and precise on-the-spot measurements in almost any environment and surface.

How it does it

The hard-wearing diamond stylus is drawn across the part with a precision motorised traverse mechanism to ensure that the correct horizontal distance is travelled. Vertical movement of the stylus is detected by a high quality piezo-electric pick-up as it travels across peaks and valleys which converts mechanical movement into electrical signals. The electrical signal is digitised and sent to a microprocessor for instant calculation of surface parameters using standardised algorithms.

Charging

The mini USB port can be used for charging with the included mains charger (or with any standard USB charger).



Keeping it simple

The Surtronic philosophy keeps the process simple. It is the perfect tool for any inspector to check surface roughness even in the most demanding applications.

- Incoming inspections
- Final inspection before shipment
- Process control on the production line
- Checking large components or structures

Standards and traceability

The reference standard supplied can be used both to calibrate the instrument and check for stylus wear to ensure the most accurate results are always being achieved.

Measurement	Best capability
Roughness standards (Ra)	$\pm(2\% + 0.004 \mu\text{m})$
Workpiece or component surface texture (Ra)	$\pm 3\%$ of measured value per trace

UKAS calibration and testing

Taylor Hobson provides full certification for artefacts and instruments in our purpose built ISO graded clean room UKAS facility. Our UKAS laboratory is able to measure all of the parameters associated with surface texture, including French, German, USA and Japanese derivatives.

Bluetooth technology

Quick, reliable communication between traverse and display/unit.

Profile graph

Clear detailed graph showing measurement area – excellent for visually identifying defects.

Measure

Tactile measurement button great for challenging orientations.

Simple 3-button navigation

Instant access to menu options and settings.

Separates

Splits into a display/unit and traverse unit via a slide and lock mechanism.

Diamond stylus and piezoelectric pick-up

The hard wearing, robust piezoelectric pick-up stylus with diamond tip assures very reliable measurement.

USB mini charging port

Charge from mains or any standard USB charging port.

Li-Poly battery

Most advanced rechargeable battery technology for unrivalled reliability and battery life.

Rubberised moulding

Enhanced durability and improved grip provides unbeatable protection in harsh shop floor environments.



Fast and reliable

Simply press the measurement button and in a few seconds a full set of traceable measurement results including a detailed profile graph is displayed.

Built to last, by design

Impact resistant rubberised mouldings surround a recessed, Mylar protected high durability screen making the unit robust enough for even the most demanding industrial environments.

InstantOn

By utilising InstantOn technology these instruments are ready to measure in less than 5 seconds from switching on!

In situ measurements

Monitor wear and roughness changes in situ during product's life. E.g. monitoring changes in turbine blade roughness as an early warning sign for defects and efficiency losses.

User-friendly, not user-hostile!

The Surtronic Duo are as simple and easy-to-use as any SmartPhone. Users have the advantage of the intuitive quick access 3-button menu and its crisp 2.4" daylight readable industrial colour LCD screen.

Bluetooth connectivity

This next generation bluetooth technology boasts super efficient connectivity allowing wireless communication between the display unit and traverse unit.

Built for power...

Powered by heavy duty reliable Li-Poly technology, the Surtronic Duo operates 24/7 with over 10,000 measurements from a single charge.

Parameters

Parameters available: ISO 4287 Roughness*				
Rt Total profile height	Rp Maximum profile peak height	Rv Maximum profile valley depth	Rz Maximum height of the profile	Ra arithmetic mean deviation
Other parameters include: Rsk, Rku, Rq, Rz1max * Includes primary parameters				

Surtronic Duo accessories

Portable hybrid solar rechargeable power bank* - Code SC-15

- Portable power bank for charging the Surtronic Duo on the go. Can be charged by USB, mains AC or sunlight.



Compact portable carry bag - Code SA-51

- Helps secure the Surtronic Duo and prevent accidental drops especially for applications involving measuring at heights.



USB charger - Code SC-10

- Mini USB charger 5V 1A 110-240 VAC 50/60 Hz with international adapters.



* Not supplied as standard with Surtronic Duo

Hard transport case* - Code SA-55

- Air and water tight case that provides the Surtronic Duo with extra protection for safe storage and/or transportation.



calibration standard - Code CS-20

- For calibrating and checking the Surtronic Duo instrument.
 - Ra 5.81 μm (229 μin)



Magnetic base* - Code SA-41

- Lightweight compact base specially designed to allow for measurements in multiple orientations including upside down on metallic surfaces.



* Not supplied as standard with Surtronic Duo

System information

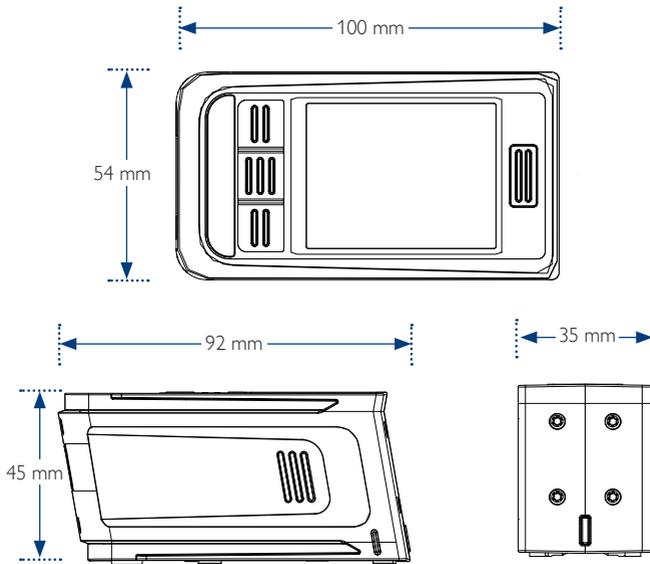
Instrument performance		
Gauge	Resolution	0.01 μm (0.4 μin)
Measurement	Range (Ra)	Up to 40 μm (1600 μin)
	Range (Rz, Rv, Rp, Rt)	Up to 199 μm (7800 μin)
	Repeatability	2 % of value + noise
	Accuracy	5 % of reading + 0.1 μm (4 μin)
	Noise	0.1 μm (4 μin)
Calibration	Process	Automatic software calibration
	Standard	Able to calibrate to ISO 4287 Roughness Standards
Parameters	Standards	ISO 4287
	ISO 4287 (Roughness)	Ra, Rz, Rp, Rv, Rt, Rz1max, Rsk, Rq, Rku
	ISO 4287 (Primary)	Pa, Pz, Pp, Pv, Pt

Technical		
Data output	On-screen	Up to 5 results per page, selectable on-screen graph
Battery	Charger	Mini USB 5V 1A 110-240VAC 50 / 60 Hz
	Charging time	4 hours
Power	Battery life	> 10,000 measurements per charge
	Standby time	5,000 Hours
	InstantOn	Max 5 sec from standby to ready to measure
	Auto-sleep function	5 minutes

Instrument capability		
Pick-up assembly	Pick-up type	Piezoelectric
	Stylus type	Diamond, Radius 5 μm (200 μin)
Gauge	Gauge force	200 mg
	Measurement type	Skidded
Filter	Filter type	Gaussian
	Filter cut-off	0.8 mm
Traverse	Traverse length	5 mm (0.2 in)
	Traverse Speed	2 mm/sec (0.08 in/sec)
Display	Units	μm / μin

Environmental / physical		
Physical specifications	Weight including pickup	0.4 Kg (14 oz)
	Power source	Li-Poly rechargeable battery
Operating conditions	Temperature	5 - 40 °C (41 - 104 °F)
	Humidity	0 - 80 % non-condensing
Storage conditions	Temperature	0 - 50 °C (32 - 122 °F)
	Humidity	0 - 80 % non-condensing

Surtronic Duo dimensions



What is a skid?

Surtronic Duo is a skidded device. The skid guides the pick-up along the workpiece, with the workpiece itself forming the datum for measurement. This method usually eases set-up by reducing the need for leveling. It also reduces the effects of vibration due to a much smaller measuring loop.

The skid is an integral part of the gauge and has a radius large enough to prevent movement in and out the roughness characteristics of the surface. The stylus and the skid are independent in their height (Z) movement but move together in the measurement direction. Surface deviations are recorded as the difference between the stylus and the skid movement in the Z direction.

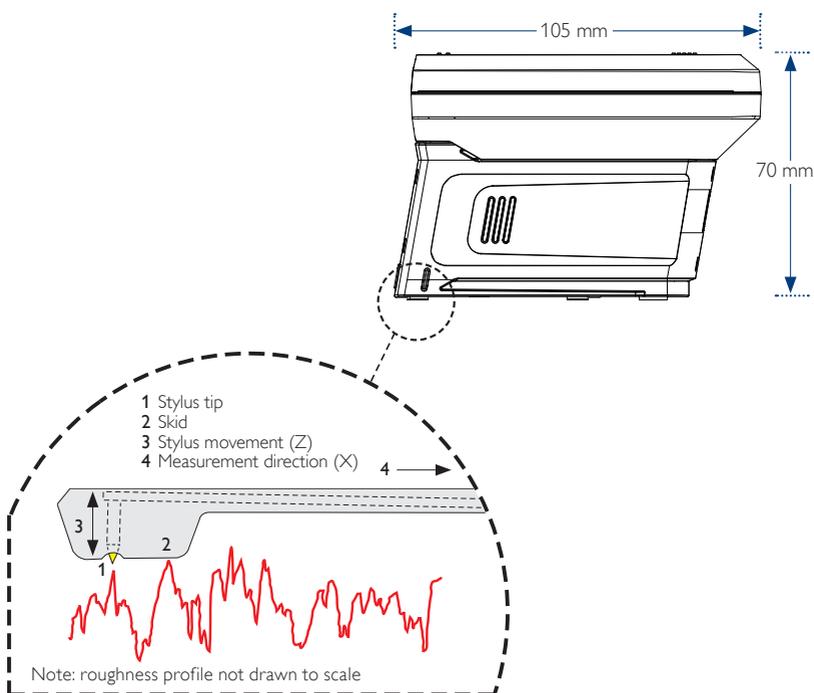
The skid will act as a mechanical filter, taking out much of the general form of the component. Also, wavelengths greater than the diameter of the skid will not register.

How much difference does the stylus tip size make?

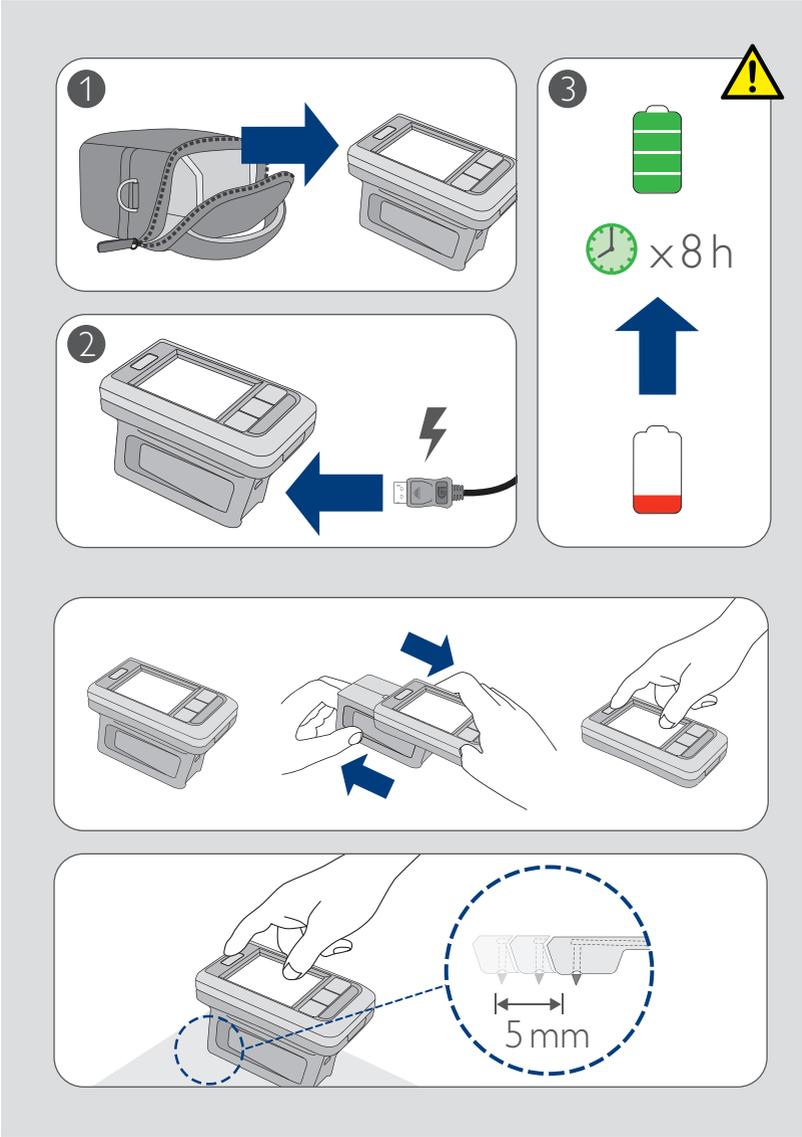
These instruments use a $5\ \mu\text{m}$ ($200\ \mu\text{in}$) stylus tip radius. This suits their purpose as a portable tool for checking roughness in three ways:

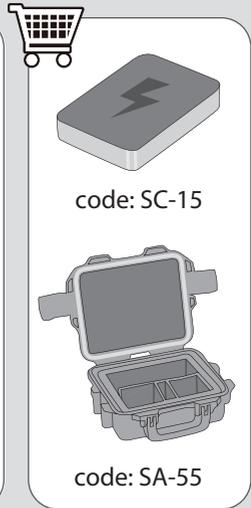
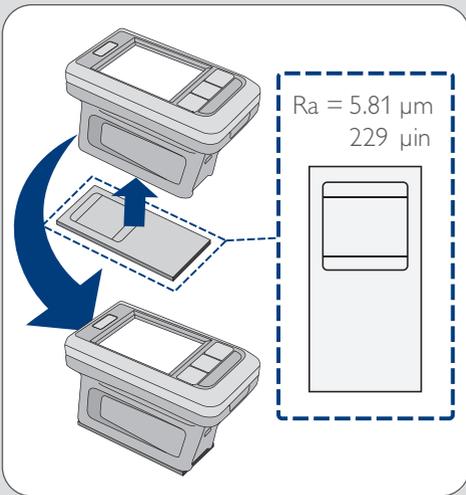
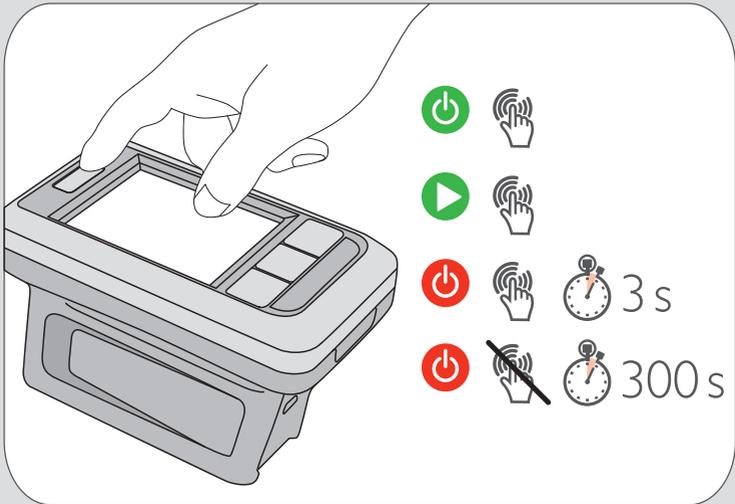
- **Durability** – It is less likely to be damaged even when subjected to mishandling.
- **Maintenance** – It is easier to remove dirt and oil that collects on the tip during use.
- **Suitability** – It acts as a filter to remove the highest surface frequencies that are more reliably measured in a controlled environment.

Other Taylor Hobson instruments use a stylus with a tip radius of $2\ \mu\text{m}$ ($80\ \mu\text{in}$). This smaller radius coupled with an inductive gauge head having low contact force enables analysis of even the smallest surface imperfections.



Quick start guide



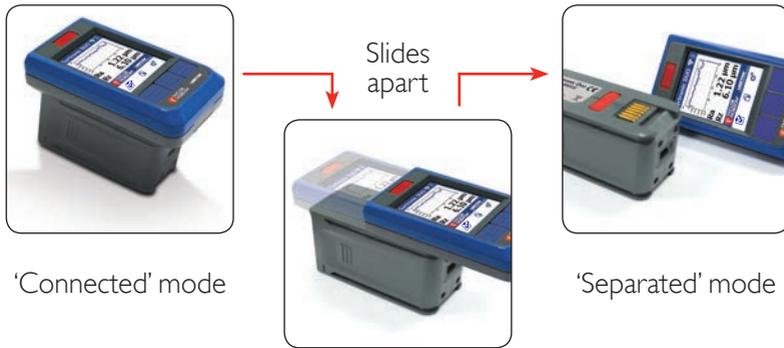


Using the instrument

Overview



Surtronic Duo Operation mode



Surtronic Duo Storage mode



Function buttons

Unit power / Measure button - Separated mode

Power

- Both the display unit and the traverse unit will need to be powered On/Off individually. There is no specific order of preference. Hold the red power button for 3 seconds or more to switch Off/On.

Measure

- Press the red button on the display unit for < 3 seconds



Unit power / Measure button - Connected mode

Power

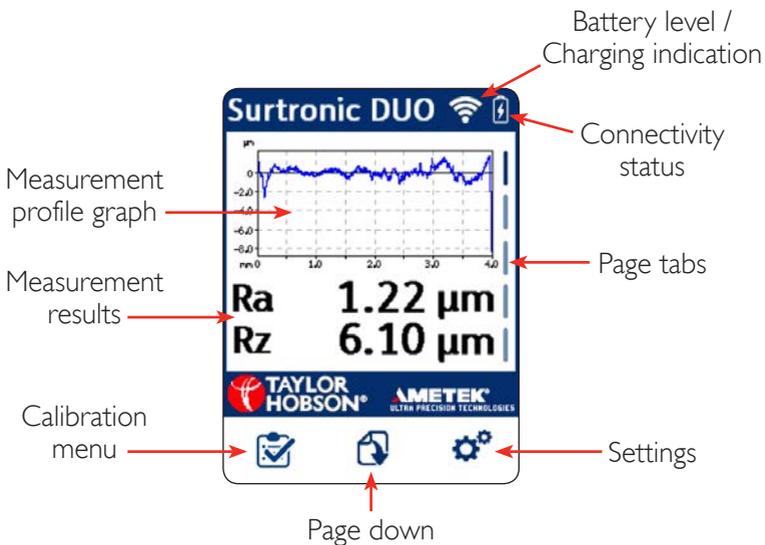
- Both the display unit and the traverse unit can be switched on in Connected mode configuration when the only the display unit power button is pressed. However, to power OFF, both traverse and display unit will need to be powered off individually. Hold the red power button for 3 seconds or more to switch OFF / ON.

Measure

- Press the red button on the display unit for < 3 seconds



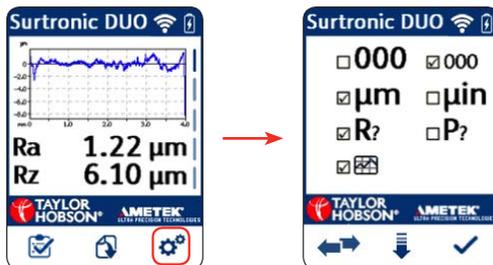
Device icons



Menu

Font size (Large/Small)

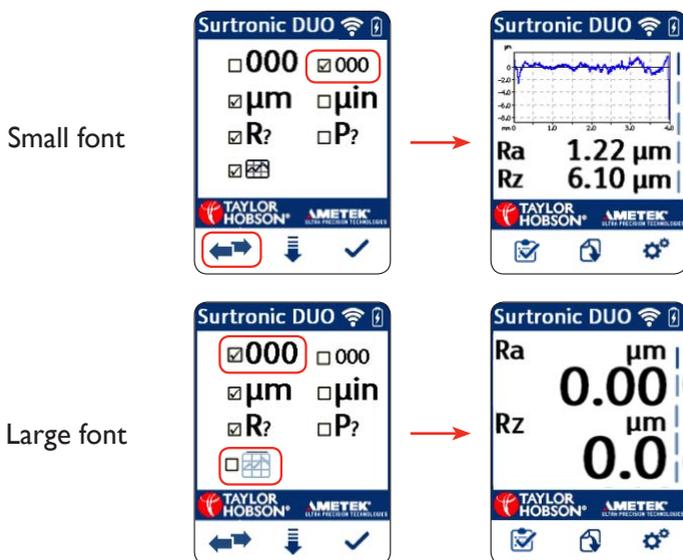
Press the settings button to enter the settings menu



Select the size of font to use in displaying the measurement results. There are two size options available to choose from – Large and Small. Press the  to toggle between the 2 options. Press the tick button to accept the setting and exit the settings menu.

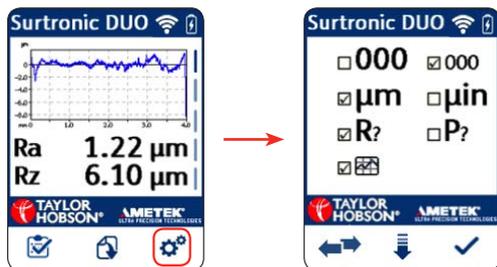
Note

The large style font cannot be used in together with the profile graph option. When the large font is selected, the profile graph option is automatically set to 'no graph' (greyed out).



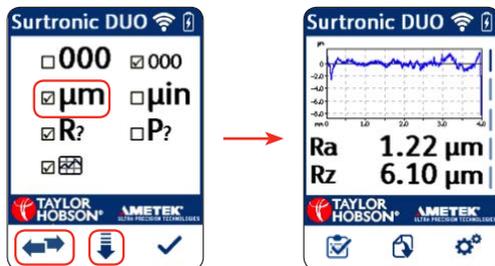
Units (μm / μin)

Press the settings button to enter the settings menu

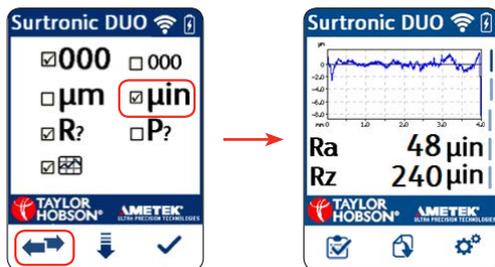


Press the down arrow button to scroll down to the units selection line. Press the \leftrightarrow to toggle between the 2 options – μm (Metric) or μin (English). Press the tick button to accept the setting and exit the settings menu.

Metric
units (μm)

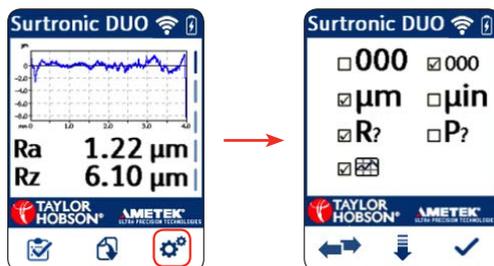


English
units (μin)



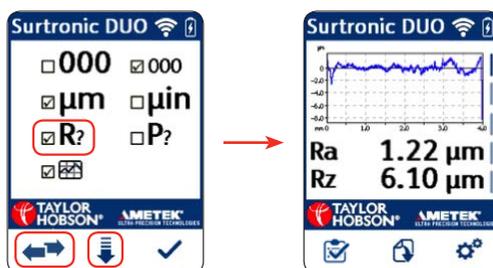
Parameters (R? / P?)

Press the settings button to enter the settings menu

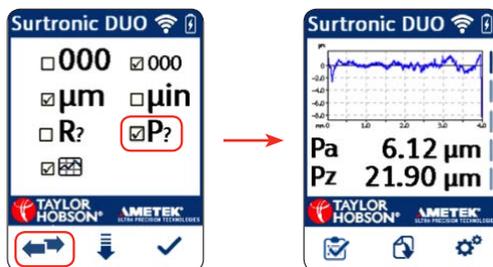


Press the down arrow button to scroll down to the Parameter setting line. Press the  to toggle between the two ISO 4287 parameter options available to display – Roughness (R) or Primary (P). Press the tick button to accept the setting and exit the settings menu. Either selection will display all the parameters available for that particular option on the results screen.

ISO 4287
Roughness
parameters (R)

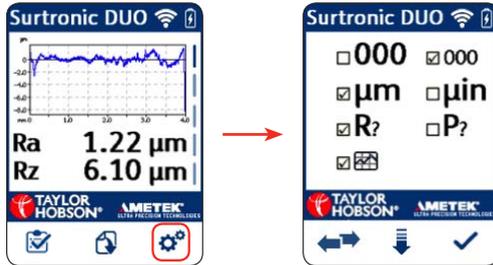


ISO 4287
Primary
parameters (P)



Profile graph (On / Off)

Press the settings button to enter the settings menu

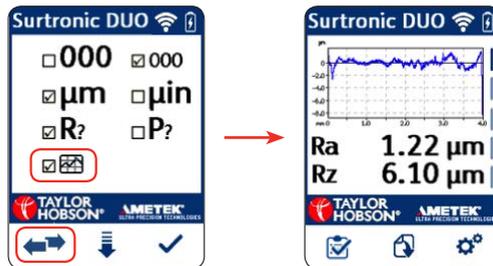


Press the down arrow button to scroll down to the Graph option line. Press the  to toggle between the option of displaying or not displaying the graph on the results screen. Press the tick button to accept the setting and exit the settings menu.

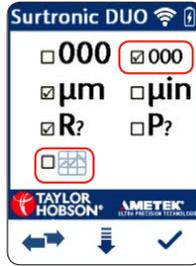
Note

For the graph option to be selected, the Small font option must be used.

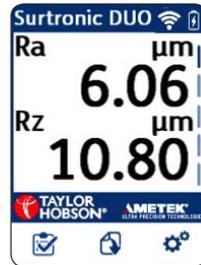
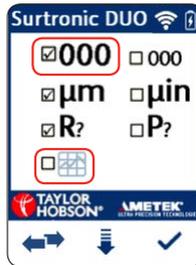
Graph with Small
Font



No graph with
Small Font

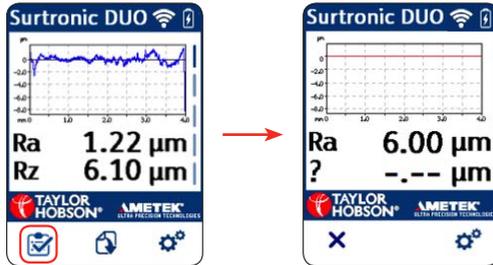


No graph with
Big Font

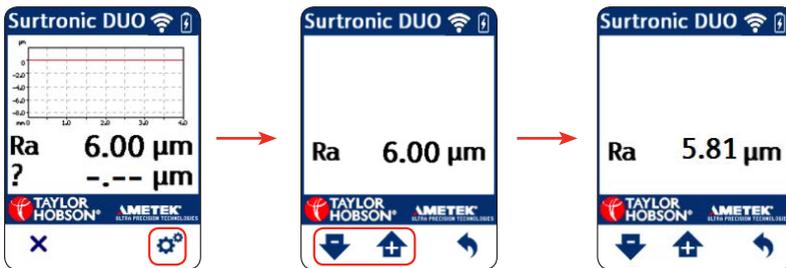


Calibration

Press the calibration button to enter the calibration menu



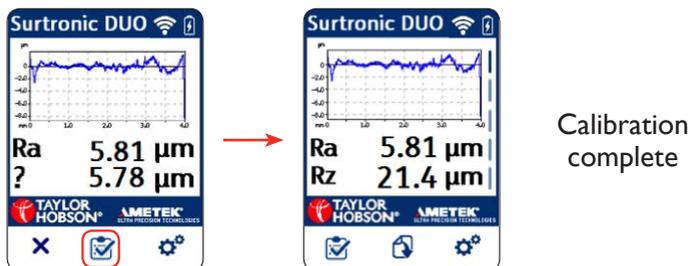
In the calibration screen, the default or last saved calibration Ra value will be displayed. To change this calibration value, press the settings icon. Then use the up (+) and down (-) buttons to adjust the calibration Ra value to the desired number. Press the back button to accept the value and return to the calibration screen.



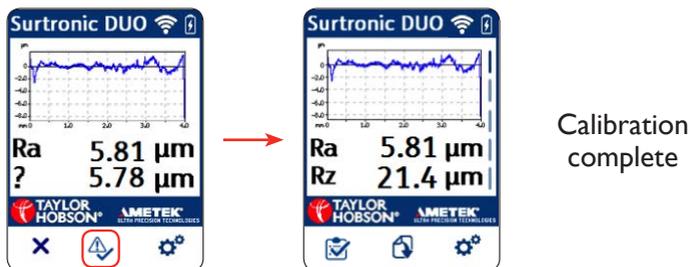
Place the Duo on the calibration standard provided with the unit (or any other certified standard). Press the measure button to take a measurement on the calibration standard.

The measured Ra value will be displayed at the end of the measurement. To accept and complete the calibration, press the tick button.

At any time, press the cross (x) button to exit the calibration menu.

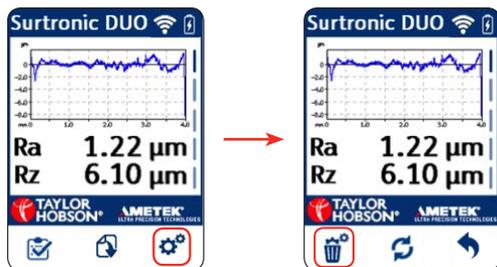


If the calibration error is more than 10% then a warning is shown. To complete and accept the calibration, press this icon.



Factory reset

To reset the Duo to factory settings, hold the settings button for about 3 seconds.

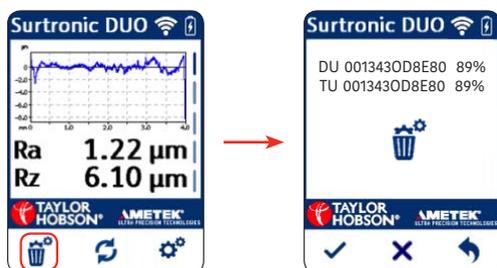


Press the delete settings button.

In the reset screen, press the tick button to do a factory reset or the cross(x) button to exit and return to the main results screen.

Press the back arrow at any time to exit and return to the results screen.

In the factory reset menu, the battery percentages of both the display unit and the traverse unit will be displayed along with their Bluetooth address.

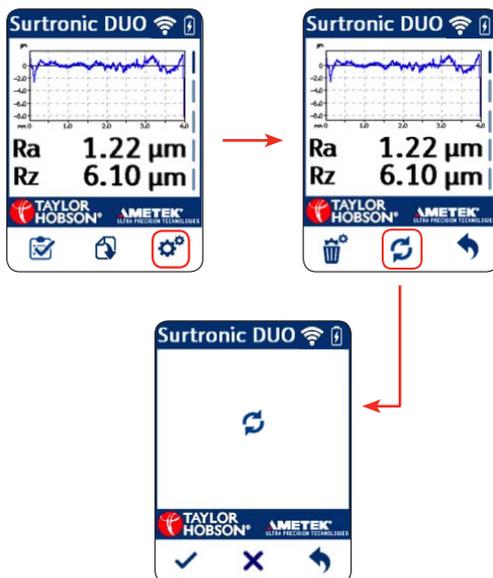


The factory reset function works only when the Duo is paired (either via Bluetooth or in connected mode).

Test mode

Test Mode is initiated when the settings button is held for 3 seconds and the test mode icon is pressed. This is for internal service and diagnostic purposes and **should NOT** be used by the customer.

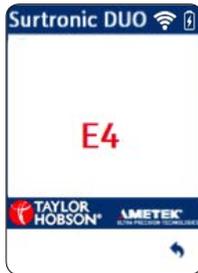
If at any time the test mode is inadvertently activated, switch off the unit completely and switch back on to return the unit to normal operation.



Error codes

The following are the error codes associated with the Duo and their meanings:

- E1 => Motor sensor failure
- E2 => Motor sensor misaligned
- E3 => Motor speed failure
- E4 => Traverse unit settings lost, returned to default
- E5 => Display unit settings lost, returned to default



If any errors occur and are displayed, use the back button to continue.

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