Solartron Metrology

Wigauge™ WHT User Leaflet

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Return of Goods

Solartron Metrology Offices

1.   Introduction & Safety Information

The Solartron Metrology Wireless Handtool (WHT) is one of a series of Wireless Hand tools which will form a group of products under the generic name Wigauge™, providing users with the means of hand gauging without the inconvenience of cables. The WHT is manufactured from hard plastic for robustness and is sealed to IP65 to withstand a machine shop environment. Two major variants are available with or without LCD display.
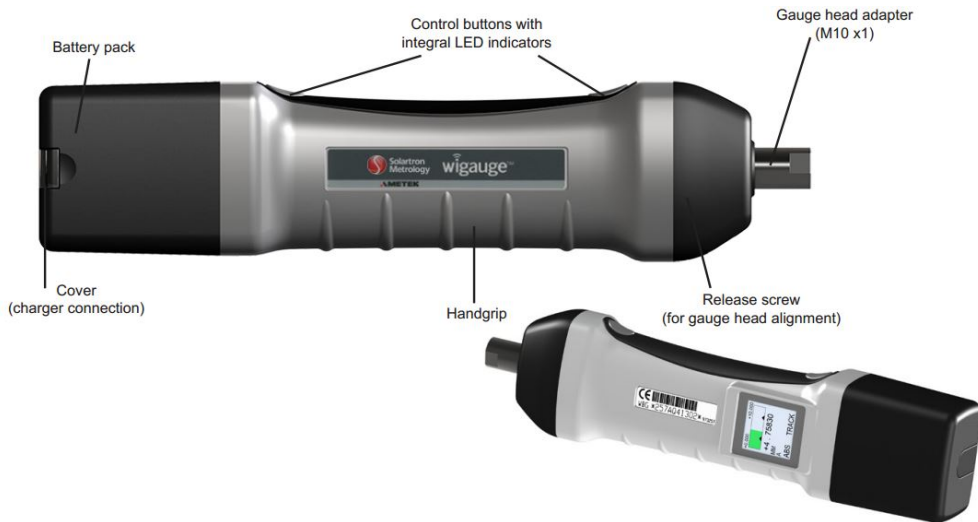
1.1.   Introduction

- Read the instruction manual, safety guide and quick guide (as supplied) carefully and completely before using this product.
- Always include this safety guide when passing product onto a third party
- Do not use an obvious defective product
- Use only accessories as supplied by Solartron
- Do not operate outside of the product specification (refer to product data sheet)

Intended Use

- Industrial use only for the measurement or positioning or parts and components.

Information such as data sheets and technical manuals for this product and the Digital Measurement System can be found on the Solartron web site.

www.solartronmetrology.com

1.2.   Safety Information

Safety Information:

Equipment refers to all parts of the Wireless hand tool System (including but not limited to the hand tool itself, chargers and power supplies).

Terms in this Manual	**WARNINGS**:
WARNING statements identify conditions or practices that could result in personal injury or loss of life **CAUTION** statements identify conditions or practices that could result in damage to the equipment or other property. **Symbols in this manual** This symbol indicates where applicable cautionary or other information may be found	Do not operate any of this equipment in an explosive atmosphere. Do not place, use or store the equipment where it can fall into or be exposed to liquids This equipment is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the equipment by a person responsible for their safety. Do not operate where aerosol spray products are being used or where oxygen is being administered Do not operate if the equipment has been damaged **CAUTION**: Some charger configurations are operated via power packs that connect to the mains supply and suitable precautions must be taken. See separate section on chargers.

1.3. Manufacturer Declaration

WEEE Directive

Please dispose of this product correctly this will help to protect the environment in which we all live.

CE Conformity

- ROSH Directive (2011/65/EU)
- Safety (EN60950-1:2006) plus latest revisions
- EMC EN 61000-2 Emissions and EN 61000-3 Susceptibility

The CE Declaration of Conformity is available from Solartron Metrology if required.

Trademark and Copyrights

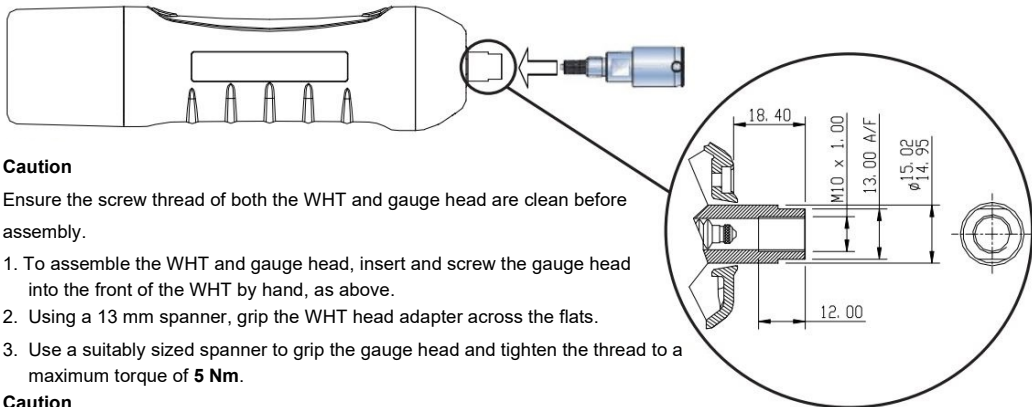Wigauge™ is a registered trademark of Solartron Metrology Ltd.

Microsoft®, Windows® and the .NET Framework are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Bluetooth® is a registered trademark of Bluetooth SIG.

2.   Installing a Gauge Head

The WHT is designed to interface to industry standard gauge heads.

The standard WHT unit will interface directly to an M10 x1 threaded gauge head; M6 x0.75 and threaded gauge heads of other sizes require the use of an adapter.

Caution

Ensure the screw thread of both the WHT and gauge head are clean before assembly.

1. To assemble the WHT and gauge head, insert and screw the gauge head into the front of the WHT by hand, as above.
2. Using a 13 mm spanner, grip the WHT head adapter across the flats.
3. Use a suitably sized spanner to grip the gauge head and tighten the thread to a maximum torque of **5 Nm**.

Caution

It is essential to use a spanner to hold the WHT when tightening the gauge head to avoid damaging the hand tool.

Exceeding the maximum torque on the WHT and gauge head assembly can cause damage to both components.

3.   Mechanical Adjustments

Once the gauge head has been installed its rotational position can be adjusted by approximately 180º about the mounting axis.

USE 3mm A/F ALLEN KEY
FOR M6 GRUB SCREW
TORQUE SETTING 6.5 - 7.5 Nm
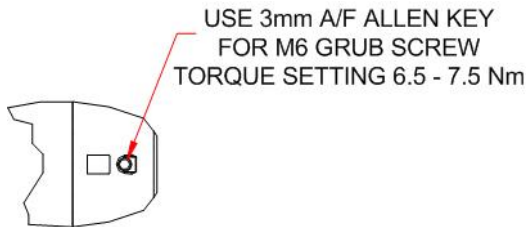
1. Using a 3 mm A/F Hex key, undo the M6 grub screw pictured above.

2. Rotate the gauge head to the desired position.

3. Tighten the M6 grub screw to a recommended **1.3-1.5 Nm** torque.

Note

Large gauge heads may require a higher torque setting on the grub screw to prevent rotation through use.

Caution

Care must be exercised when using a large gauge head to avoid damaging the grub screw or WHT.

4. Wireless Handtool Implementation Options

The Wireless Handtool range of products have been designed to seamlessly integrate into an Orbit network or operate as stand-alone Bluetooth devices.

4.1. Orbit Solution

Solartron's WCM (Wireless Communications Module) is a device that enables the wireless handtool devices to be integrated into an Orbit network. The WCM removes the need to use Bluetooth libraries and PC Bluetooth interfaces leading to a robust and simple integration method. Multiple WCM modules can be put onto an Orbit Network and each module can communicate with 6 wireless handtool devices this overcomes the Windows/PC limitation of only having six devices connected. The Orbit Solution is detailed in the Orbit manuals that are included as part of the Orbit®3 Support Pack For Windows®

4.2. Standalone Solution

When used as stand-alone Bluetooth devices, their setup and reading of measurements is greatly simplified using Solartron's utilities and Solarton.NET library. These also help the user with integration into bespoke software packages

Note. Sections 5 & 6 of this document are only applicable to the Standalone Solution.

5.   Set up and Installation

The WHT uses *Bluetooth*® technology to communicate with a *Bluetooth*® enabled PC running Windows 7 or later. This requires an initialization process to pair the WHT with the PC. The Bluetooth should be plug and play.

Your WHT should appear in the list of names as WHT_xxxxxxxxxx (the x's will be replaced by a string of characters to form a name similar to:
WHT_167A820301 (if it doesn't appear after a while check the WHT is turned on then click 'Refresh'.))
The WHT pairing code/password is 61735
It will now show the final screen containing the list of *Bluetooth*® connections which can now be closed.
Your WHT Connection is now Set up!

Note.
Before running the Wireless Handtool Manager, make sure that you have paired your Handtools and have them switched ON (Steady Blue light at the Gauge end of the Handtool).

5.1.   Enhanced Security Function

- The latest Bluetooth protocol no longer supports legacy pairing and therefore we have now introduced our own security protocol at the application layer. This is achieved by allowing a device to be passcode enabled, requiring a set passcode to be sent once connected, that will prevent it from communicating until the sent passcode has been verified. This feature is disabled by default in the latest devices to ensure backwards compatibility with existing applications.
- Use the Configuration Manager to configure the passcode per device.
    - See the separate Configuration Manager manual for details.
- Once the passcode is activated, any user program must send the Passcode command to the tool as the first command after connection.
    - See the Handtool RS232 manual for command details.
    - Our Wireless Handtool Manager program does this automatically.
- Note. If passcode is enabled and Streaming is set ON, streaming will not commence until the passcode has been sent.

6. Wireless support pack

The Wireless support Pack for Windows®, available for download from the Solartron website, contains the following WHT specific files:

- Wireless Handtool Manager application for Windows PCs (Windows 7onwards)
  - This enables users to quickly get up and running and provides access to the full range of commands and provides data logging capability.
- The Wireless Handtool Manager's .NET library is available for linking into user applications
  - The associated .Net manual is included.
- The Handtool can also be controlled directly by a user application using a virtual Com port.
  - The associated RS232 command list manual is included.
- The Configuration Manager application, which allows the WHT passcode to be activated.
- WHT Port Testing application & its C# source code are provided.
  - This demonstrates a reliable way of Bluetooth port opening and closing.

The Orbit®3 Support Pack also needs to be installed if WHT firmware updates are required. This is also available for download from the Solartron website.

The support packs both require the Microsoft® .Net Framework 4.0 or newer to be installed on the PC.

When installed, the WHT files and the Configuration Manager are available via the Wireless Suite shortcut that is installed on the desktop as part of the Wireless support pack.

6.1. Wireless Suite Dashboard

The dashboard provides easy access to all of the Wireless applications, manuals and example programs.

After installing the Wireless Support Pack for Windows®, a shortcut will appear on the Desktop and the 'Wireless Support Pack for Windows will appear in the 'All apps' list:
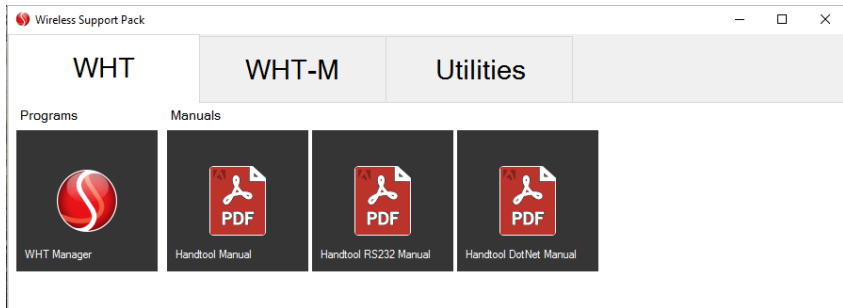
If you want to create a desktop shortcut to a particular application, right click the mouse and select 'copy Shortcut'.

For applications, the following will appear:
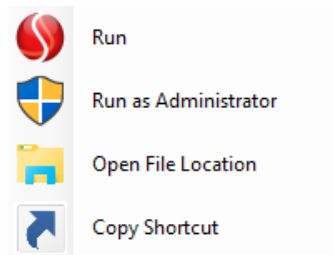
For manuals, the following will appear:

7.   Operating Modes

7.1.   DATA TRANSMISSION

7.1.1.   STREAMING

In this mode the WHT continually sends data to the controller.

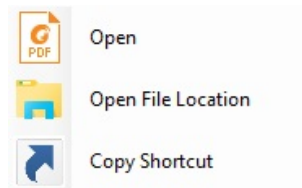The stream rate is fixed for the Orbit Solution, but can be adjusted on the Standalone Solution.

If a button is pressed in this mode the measurement being taken at the time the button is pressed is tagged.

This tagged data can be captured by the controller.

7.1.2.   SINGLE SHOT

Tagged data is sent each time the button is pressed

Note the button must be set to the correct state to ensure tagged readings are sent, this is the normal or default mode, but it is possible to set the buttons to other modes – see section below on Button allocation

7.2.   MEASURMENT TYPES

The WHT can be set to measure in different modes, these are;

7.2.1.   ABSOLUTE

The WHT transmits the absolute value of the measurement.

7.2.2.   ZERO

The current measurement is forced to zero and all subsequent measurements are taken from this zero. Zero can be applied either from the WHT buttons or from the controlling software. To use the WHT button, the button state must be first set up – see section below on Button allocation. Zero can only be cleared from the controller.

Limitations to where Zero and Preset can be asserted are applied using the ZeroPresetAssertMIN/MAX settings.

7.2.3. PRESET

The current measurement is forced to a preset value and all subsequent measurements are taken from this preset value. Preset can be applied either from the WHT buttons or from the controller. To use the WHT button, the button state must be first set up – see section below on Button allocation. Preset can only be cleared from the controller.

Limitations to where Zero and Preset can be asserted are applied using the ZeroPresetAssertMIN/MAX settings.

7.2.4. SCALING **

The measurement from the WHT may be scaled by a multiplication factor, The scaling can only be set or cleared from the controller software

7.2.5. MAX (PEAK+)

The WHT can be set up so that the most positive measurement is displayed. This can be set up only from the controller. The MAX (PEAK+) can only be reset from the controller

7.2.6. MIN (PEAK-)

The WHT can be set up so that the most negative measurement is displayed. This can be set up only from the controller. The MIN (PEAK-) can only be reset from the controller

7.2.7. DIFF

The WHT can be set up so that the difference between MAX and MIN is transmitted. This can be set up only from the controller. The DIFF can only be reset from the controller

All of the above modes are either continuous transmission or on a button press.

7.3. *LIMITS*

Limits can be set to indicate within limit, a warning limit or out of limit. Red/Green limit LED's and Audible Buzzer only active when button is pressed to tag measurement.

7.3.1. UPPER AND LOWER LIMITS

Red out of limit, Green within limit

7.3.2. UPPER AND LOWER WARNING LIMITS **

Flashes Red/Green when enabled. The warning limits can only be enabled by the controller.

7.3.3. AUDIBLE LIMIT

Single beep or 3 slow beeps can be selected for either in or out of l limit

The WHT can be set up so that the limit LED's are as below

	IN LIMIT	OUT OF LIMIT	WARNING, If ENABLED
Off	No Indication	No Indication	No Indication
In Limit	Green	No Indication	Red/Green
Out of Limit	No Indication	Red	Red/Green
In and Out of Limit	Green	Red	Red/Green

7.4. BUTTON ALLOCATION

Each button can be programmed to perform a number of different functions. In addition to this the WHT can be put into Advanced or Enhanced modes which adds further functionality to the buttons.

7.4.1. Normal Mode

Function	Description
Tag	Send the current measurement each time the button is pressed or tag the current measurement if in streaming mode.
Zero	Force the current measurement to Zero
Preset	Force the current measurement to a Preset value.
Reset	Clear the current Min/Max readings

7.4.2. Advanced mode

In Advanced mode the function of the WHT may be changed using the WHT buttons. This mode should be used carefully.

As with Normal mode the function of each button can be assigned using the controller. To used Advanced mode to change the WHT MEASUREMENT MODE, without using the controller, hold one button down and press the other in succession as below.

Note the button mode must be set to Advanced by the controller to allow this.

Button 1	Button 2 – Number of presses	Function
ON	1	Zero
	2	Preset
	3	Normal
	4	Max
	5	Min
	6	Difference
	7	Normal tagged
	8	Max tagged
	9	Min tagged
	10	Difference tagged

7.4.1. Enhanced mode

In Enhanced mode each button can be assigned a function for a momentary press and an additional function that is performed if the button is held for over 2 seconds.

As with Normal mode the functions of each button can be assigned using the controller. The available actions for each button on a momentary press are show below:

Function	Description
Tag	Send the current measurement each time the button is pressed or tag the current measurement if in streaming mode.
Zero	Force the current measurement to Zero
Preset	Force the current measurement to a Preset value.
Reset	Clear the current Min/Max readings

The available actions for each button upon hold are show below:

Function	Description
None	No action is taken when the button is held
Zero	Force the current measurement to Zero
Preset	Force the current measurement to a Preset value.

7.5. WIRELESS HAND TOOL MANAGER OPERATING MODES

The WHT Manager provides the user with a simple way to set up tools, log data, save their settings and observe the readings as they come in.

For further details see the WHT Manager Documentation provided with the Wireless Support Pack.

7.6. DISPLAY

LCD display which shows current measurement mode and limits. It can be orientated via a serial command on the WHT manager software.

7.7. INDICATIONS

The WHT can provide both visual and audible indications to the operator. Some of these indications can be switched On or Off using the Controller Software. The table below summarizes the indications.

LED	Colour	Indication	Programmable	Function
LED 1 (nearest battery)	Green	In Limits	ON or OFF	Green for 3 seconds when button pushed and measurement in limit
LED 2	Red	Out of Limits	ON or OFF	Red for 3 seconds when button pushed and measurement in limit
LED 3	Red	Battery Status	Not Programmable	OFF – Battery OK Slow Flash – Battery Low Warning Fast Flash – Battery requires charging (measurements disabled)
LED 4	Blue	Power and Bluetooth Status	Not Programmable	OFF – No Power ON – Power ON FLASHING, 2 times a second- Bluetooth Connection FLASHING, 4 times a second - Awaiting passcode (if activated)

8.   Battery Packs and Charging

The Wigauge system can be supplied with different battery packs and chargers for different applications.

8.1.   Battery packs

There are two types of battery pack as shown in the table below.

| Battery Pack	Description	Pack Colour	Capacity
Standard Battery Pack	Used with either a smart charger or trickle charger connected via a jack plug	Mid grey	8 hours continual running
Inductive charged battery pack	Used with an inductive charger cradle (no connection point for conventional chargers is fitted)	Dark Grey/Black	5 hours continual running

Note: Battery packs are supplied fully charged.

## *8.2.   Removal and Replacement of Battery Packs*

Prior to removal ensure the tool and pack is clean to avoid contamination of internal connectors

To remove the battery pack for replacement of charging turn the locking screw 90 degrees anticlockwise. Then pull the battery pack from the WHT.

To replace the pack onto the WHT ensure that the locking screw is in the release position (see diagram), replace the pack onto the tool and lock by turning the locking screw 90 degrees clockwise.
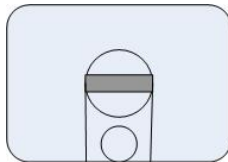
Release Position
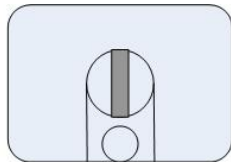
Locked position

8.3. Chargers

There are three types of chargers:

Charger Type	Battery Pack Type	Charger Description
Standard Smart Charger	Standard Battery Pack	Smart charge with integral Led that indicates charge status
Trickle Charger	Standard Battery Pack	Trickle charger (100mA) continual charge
Inductive Charger / Cradle	Inductive Battery Pack	Inductive charger cradle with integrated charging indication

WARNING: Use of the wrong type of charger can cause damage to the equipment, ensure that the correct charging method is used for the application.

CAUTION: Do not charge in ambient temperatures of more than 30 ◦C. (86 ◦F.) as this may degrade battery life.

8.3.1. SMART CHARGER

The smart charger operates on three cycles, fast charge (1.5 A approx.) until it detect that the batteries are almost at full charge, top up where the batteries are brought to maximum capacity with a pulsed charging current with a lower average current and trickle (30 mA) to sustain charging. The smart charger is designed to charge battery packs offline. For maximum battery life do not leave the charger connected to the battery pack.

If using the smart charger in an application where it is left connected to the tool/battery for any length of time observe the following:

- Each time the charger is disconnected from the battery for more than 20 seconds it will reset. This forces the charger into high charge mode; it takes a minimum of 10 minutes before it switches into top up.

   If the charger is continually connected/disconnected this can result in the batteries being exposed to too much fast charge and result in overheating of the batteries.

8.3.2. TRICKLE CHARGER

The trickle charger provides a continual charge of 100 mA, this is sufficient to keep batteries charged in applications where the tool is continually being connected/disconnected from the charger and avoids overheating. Continual trickle charging does shorten the battery life.

8.3.3. INDUCTIVE CHARGER

The inductive charger and cradle (used with the inductive battery pack only) charges the batteries when the tool is placed in the cradle. The inductive charger is powered from a 5Vdc power block. One power block can power up to 4 chargers.

There are two indication lights: green: power connected to cradle, blue: charging.

If the tool is not placed correctly into the cradle charging will not take place.

When using the inductive charger ensure the following:

- Only use the chargers for the purpose intended as described in this manual. Do not use with devices that are not approved by Solartron.
- Do not operate if the equipment has been damaged
- Do not use on heated surfaces or in ambient temperatures greater than 30 ◦C. (86 ◦F.)
- Do not insert metallic objects inside the cradle of the inductive charger unit.

9. Troubleshooting FAQ

This section contains Troubleshooting solutions in an FAQ format.

9.1.   I cannot get my COM port to work properly?

If you have difficulty connecting the Bluetooth® WHT to your application software it may be because the default COM port is being held by Windows. In this case use the custom setup and select a port manually.

9.2.   Why is the WHT measuring in the opposite direction to the one expected?

The WHT is factory configured to be functionally compatible with industry standard Internal Diameter gauge heads. This means that the probe inside the hand tool will read a decreasing count as its tip is pushed inwards. If using a gauge head that measures an External Diameter or dimension, the SET DIRECTION command should be used to change the hand tool's direction of count.

10.   Declaration of Conformance

10.1.   Europe

Solartron Metrology Ltd declares that this product complies with the CE safety requirements and the electromagnetic compatibility requirements, in compliance with the following directives.

The devices have been designed, assembled and tested in compliance with the standards detailed below

Electrical Interference and Radiation	
Immunity	As per the D of C
Emissions	As per the D of C. Note. The WHT will radiate in the 2.4GHz band as this is the Bluetooth® transmission frequency
Bluetooth® Class 1	The WHT uses a pre-qualified Bluetooth® module which is not modified in any way and therefore is Bluetooth® compliant.
Safety	As per the D of C. The WHT operates at voltages below 20V and therefore does not provide any electrical hazard to the user.

10.2.   USA

This device complies with Part 15 of the FCC Rules. This device shall not cause harmful interference or be impacted by received emissions that may cause undesirable operation.

Caution: changes or modifications not approved by the party for compliance could void the user's authority to operate the equipment.

10.3.   CANADA

This device shall not cause harmful interference or be impacted by received emissions that may cause undesirable operation.

Caution: changes or modifications not approved by the party for compliance could void the user's authority to operate the equipment.

Declaration of Conformity in accordance with the Directive 1999/5/EC (R&TTE Directive)

Manufacturer / Responsible Person	Solartron Metrology Ltd Steyning Way Bognor Regis West Sussex PO22 9ST United Kingdom
Declares that the product	WIRELESS HAND TOOL MK1 & MK2
Part Number(s)	973255, 973261K-EU, 973261K-US, 973261K-UK, 973284, 973278, 973279 ,973176K-US, 973177K-EU, 973177K-US, 973280 973284 973314
As a radio transmission module complies with the essential requirements of §3 of the EU directive 1999/5/EG (R&TTE) and the other relevant provisions.	
Harmonised standards	EN 301 489-17 V2.1.1 (2009-05) EN 300 328 V1.8.1
Electro magnetical compatibleness	EN 61000-6-2 :2005 EN 61000-6-3:2007 EN 61000-6-3:2007/A1:2011 EN 61326-1:2013
Electrical Safety	EN 60950-1:2006 EN 60950-1:2006/A11:2009 EN 60950-1:2006/A1:2010 EN 60950-1:2006/A12:2011
This device is usable for the following	Industrial use only for the Dimensional Measurement of Parts
Operating Purpose	Dimensional Measurement of parts
Description of electronic interface	Class 1 Bluetooth
Bognor Regis: 13th March 2015 (Place, Date placing into market)	*N J Deadman* Nick Deadman, Technical Director