Installation guide

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OSP60 optical scanning probe

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Compliance information for this product is available by scanning the QR code or visiting **www.renishaw.com/mtpdoc**.

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Contents

Before you begin 1-1
Warranty 1-1
CNC machines 1-1
Care of the probe 1-1
Patents 1-2
OSP60 software notices 1-3
Intended use 1-3
Safety 1-4

OSP60 basics 2-1
Introduction 2-1
OSP60 dimensions 2-2
OSP60 specification 2-3
Typical battery life 2-4
OSP60 calibrated measurement range 2-5

System installation 3-1
Installing the OSP60 with an OMM-S receiver 3-1
Typical installation 3-1
Transmission performance envelope 3-2
Preparing the OSP60 for use 3-4
Fitting the stylus 3-4
Mounting the probe on a shank 3-5
Stylus on-centre adjustment 3-6
Installing the batteries 3-8
Checking the probe for correct battery operation 3-10
Checking the probe status LED indications with probe in operating mode 3-10
Calibrating the OSP60 3-11
Why calibrate a probe? 3-11
Calibration method 3-12

Maintenance 4-1
Cleaning the probe 4-1
Cleaning the probe's front and rear diaphragms 4-2
Checking the battery status 4-4
Changing the batteries 4-5

Fault-finding 5-1

Parts list 6-1

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Before you begin

Warranty

Unless you and Renishaw have agreed and signed a separate written agreement, the equipment and/or software are sold subject to the Renishaw Standard Terms and Conditions supplied with such equipment and/or software, or available on request from your local Renishaw office.

Renishaw warrants its equipment and software for a limited period (as set out in the Standard Terms and Conditions), provided that they are installed and used exactly as defined in associated Renishaw documentation. You should consult these Standard Terms and Conditions to find out the full details of your warranty.

Equipment and/or software purchased by you from a third-party supplier is subject to separate terms and conditions supplied with such equipment and/or software. You should contact your third-party supplier for details.

CNC machines

CNC machine tools must always be operated by fully-trained personnel in accordance with the manufacturer's instructions.

Care of the probe

Keep system components clean and treat the probe as a precision tool.

Patents

Features of the OSP60, and other similar Renishaw products, are the subject of one or more of the following patents and/or patent applications:

CN 100461049
CN 101166953
CN 101432592
CN 101622513
CN 102348957
CN 103328919
CN 103562672
CN 103822603
EP 1877732
EP 2016370
EP 2115387
EP 2267563
EP 2406584
EP 2447665
EP 2479530
EP 2479531
EP 2665987
EP 2665988
IN 307869
IN 376344
IN 419213
WO 2012/098353
JP 5244786
JP 5274775
JP 5632398
JP 5658863
JP 5905189
JP 6010045
JP 6010046
JP 6058109
JP 6058110
TW I424164
TW I458937
TW I458938
US 6810597
US 7866056
US 7885777
US 7900367
US 7970488
US 8890546
US 9454145
US 9471054

OSP60 software notices

This OSP60 product includes embedded software (firmware) to which the following notices apply:

US government notice

NOTICE TO UNITED STATES GOVERNMENT CONTRACT AND PRIME CONTRACT CUSTOMERS

This software is commercial computer software that has been developed by Renishaw exclusively at private expense. Notwithstanding any other lease or licence agreement that may pertain to, or accompany the delivery of, this computer software, the rights of the United States Government and/or its prime contractors regarding its use, reproduction and disclosure are as set forth in the terms of the contract or subcontract between Renishaw and the United States Government, civilian federal agency or prime contractor respectively. Please consult the applicable contract or subcontract and the software licence incorporated therein, if applicable, to determine your exact rights regarding use, reproduction and/or disclosure.

Renishaw software EULA

Renishaw software is licensed in accordance with the Renishaw licence at:
www.renishaw.com/legal/softwareterms

Intended use

The OSP60 probe with SPRINT™ technology is a compact spindle probe with optical signal transmission for performing both scanning and touch point measurement on CNC machine tools.

Safety

Information to the user

This product is supplied with non-rechargeable lithium metal batteries. Refer to the battery manufacturer's literature for specific battery operating, safety and disposal guidelines.

- Do not attempt to recharge the batteries.
- Replace the batteries only with the specified type.
- Do not mix new and used batteries in the product.
- Do not mix different types or brands of batteries in the product.
- Ensure that all batteries are inserted with the correct polarity in accordance with the instructions in this manual and indicated on the product.
- Do not store the batteries in direct sunlight.
- Do not expose the batteries to water.
- Do not expose the batteries to heat or dispose of the batteries in a fire.
- Avoid forced discharge of the batteries.
- Do not short circuit the batteries.
- Do not disassemble, apply excessive pressure, pierce, deform or subject the batteries to impact.
- Do not swallow the batteries.
- Keep the batteries out of the reach of children.
- If the batteries are swollen or damaged do not use them in the product and exercise caution when handling them.
- Dispose of waste batteries in accordance with your local environmental and safety laws.

Ensure that you comply with international and national battery transport regulations when transporting the batteries or this product with the batteries inserted. Lithium metal batteries are classified as dangerous goods for transportation and require labelling and packaging in accordance with the dangerous goods regulations before being offered for transportation. To reduce the risk of shipment delays, should you need to return this product to Renishaw for any reason, do not return any batteries.

In all applications involving the use of machine tools or CMMs, eye protection is recommended.

Information to the machine supplier / installer

It is the machine supplier's responsibility to ensure that the user is made aware of any hazards involved in operation, including those mentioned in Renishaw product literature, and to ensure that adequate guards and safety interlocks are provided.

If the probe system fails, the probe signal may falsely indicate a probe seated condition. Do not rely on probe signals to halt the movement of the machine.

Information to the equipment installer

All Renishaw equipment is designed to comply with the relevant UK, EU and FCC regulatory requirements. It is the responsibility of the equipment installer to ensure that the following guidelines are adhered to, in order for the product to function in accordance with these regulations:

- any interface MUST be installed in a position away from any potential sources of electrical noise (for example, power transformers, servo drives);
- all 0 V/ground connections should be connected to the machine "star point" (the "star point" is a single point return for all equipment ground and screen cables). This is very important and failure to adhere to this can cause a potential difference between grounds;
- all screens must be connected as outlined in the user instructions;
- cables must not be routed alongside high current sources (for example, motor power supply cables), or be near high-speed data lines;
- cable lengths should always be kept to a minimum.

Equipment operation

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Optical safety

This product contains LEDs that emit both visible and invisible light.

OSP60 is ranked Risk Group: Exempt (safe by design).

The product was evaluated and classified using the following standard:

BS EN 62471:2008 The photobiological safety of lamps and lamp systems.

Renishaw recommends that you do not stare at or look directly into any LED device, irrespective of its risk classification.

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OSP60 basics

Introduction

The OSP60 probe with SPRINT™ technology is part of the high-speed on-machine contact scanning system for CNC machine tools, an innovative high-speed analogue scanning system that offers a new concept in part measurement on machine tools.

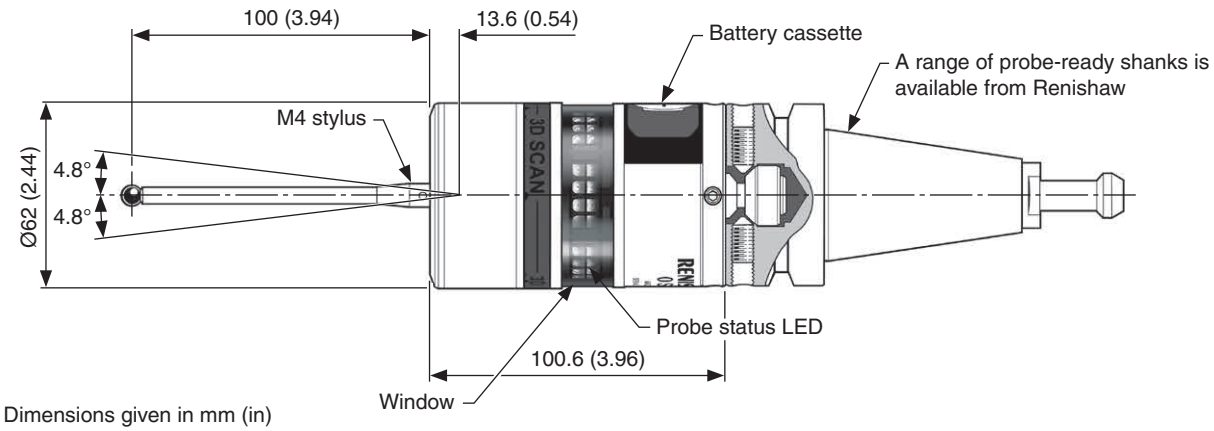
Capable of scanning at feedrates of up to G0, the system measures part surfaces with a high degree of accuracy.

Operating as a 3D analogue scanning probe, the OSP60 is specifically designed to communicate with a machine's CNC controller via the OMM-S receiver and purpose-built OSI-S interface. Two-way communication between the OSP60 and the OMM-S is achieved via robust, high-speed infrared data links.

Unlike conventional machine tool probes that measure individual points from a surface and extrapolate the surface from these points, the OSP60 continually scans the surface with a stylus tip and takes continuous measurement readings at up to 1000 points per second as it is moved across the surface by the machine tool. This high density of data, which results in a high-accuracy, full definition of the part's size, position and shape, provides a greater understanding of the part's fitness for purpose and a fast and accurate way to capture form and profile data from both prismatic and complex 3D components.

The OSP60 probe can be used to scan known surfaces very quickly. It can also be used to find surfaces during initial part set-up, using discrete point measurements in a similar way to traditional touch-trigger probing. As a result, SPRINT scanning technology opens up new process control methods not previously possible with traditional measurement methods.

OSP60 dimensions



Dimensions given in mm (in)

Stylus overtravel limits			
Stylus length	**±X/±Y**	**+Z**	**–Z**
75 (2.95)	7 (0.28)	6 (0.24)	2.2 (0.09)
100 (3.94)	9 (0.35)	6 (0.24)	2.2 (0.09)
150 (5.91)	13.5 (0.53)	6 (0.24)	2.2 (0.09)

OSP60 specification

System principal application	High-speed scanning system for on-machine process control.	
OSP60 (probe)	Analogue scanning probe for machine tools, capable of both 3D scanning and 3D discrete point measurements.	
Transmission type	Infrared optical transmission: up to 1000 3D points per second.	
Probe transmission range	360°. Up to 4.5 m (14.7 ft) with one receiver, or up to 9 m (29.5 ft) with two receivers.	
Probe turn-on time	Less than 0.5 seconds	
Probe weight without shank (including batteries)	1080 g (38.1 oz)	
Battery type	3 × CR123 3 V lithium-manganese dioxide	
Battery life typical at 20 °C	See “Typical battery life” table on **page 2-4**.	
Scanning measurement range [1]	±X, ±Y, ±Z 0.50 mm (0.020 in)	
Sensor type	Full 3D (simultaneous XYZ data output)	
Sense directions	Omnidirectional ±X, ±Y, ±Z.	
Unidirectional repeatability [2 3]	±0.25 µm (10 µin) 2 σ	
3D lobing in X, Y, Z [2 4]	±1.00 µm (40 µin)	
Sensor resolution (µm/digit) [2]	0.025 µm (0.9843 µin)	
Maximum speed [5]	Scanning up to rapid (G0) feedrate, dependent on machine tool performance and application.	
Stylus length range	75 mm to 150 mm (2.95 in to 5.90 in) recommended.	
Stylus ball diameter range	2 mm to 8 mm (0.078 in to 0.31 in) typical.	
Stylus type	Straight styli only. OSP60-specific styli recommended. For further information, see the information leaflet *Styli recommendations for OSP60 scanning probes* (Renishaw part no. H-5465-8102).	
Stylus force XY (typical) Z (typical)	**Spring rate** [2] 0.8 N/mm (4.57 lb/in) 1.5 N/mm (8.57 lb/in)	**Measuring force** [2 6] 0.1 N 10 gf (0.4 ozf) 0.2 N 20 gf (0.7 ozf)
Environment	IP rating	IPX8, BS EN 60529:1992+A2:2013
	Storage temperature	–10 °C to +70 °C (+14 °F to +158 °F)
	Operating temperature	+5 °C to +55 °C (+41 °F to +131 °F)

1 Maximum allowed distance between the nominal scan line and the actual scan line. Full 3D performance on a vertical machining centre with a 75 mm stylus. In some applications, this range can be extended. Contact your local Renishaw representative for more information.

2 Typical for a 100 mm stylus.

3 Productivity+ discrete point measurement on a DMG Mori DMU40.

4 Productivity+ 100 point 3D sphere discrete point measurement on a DMG Mori DMU40.

5 Maximum feedrate for over deflection protection is F40000 in Z and F60000 in XY.

6 Force at which the status signal changes for touch trigger. Assumes a trigger threshold of 0.125 mm (0.0049 in).

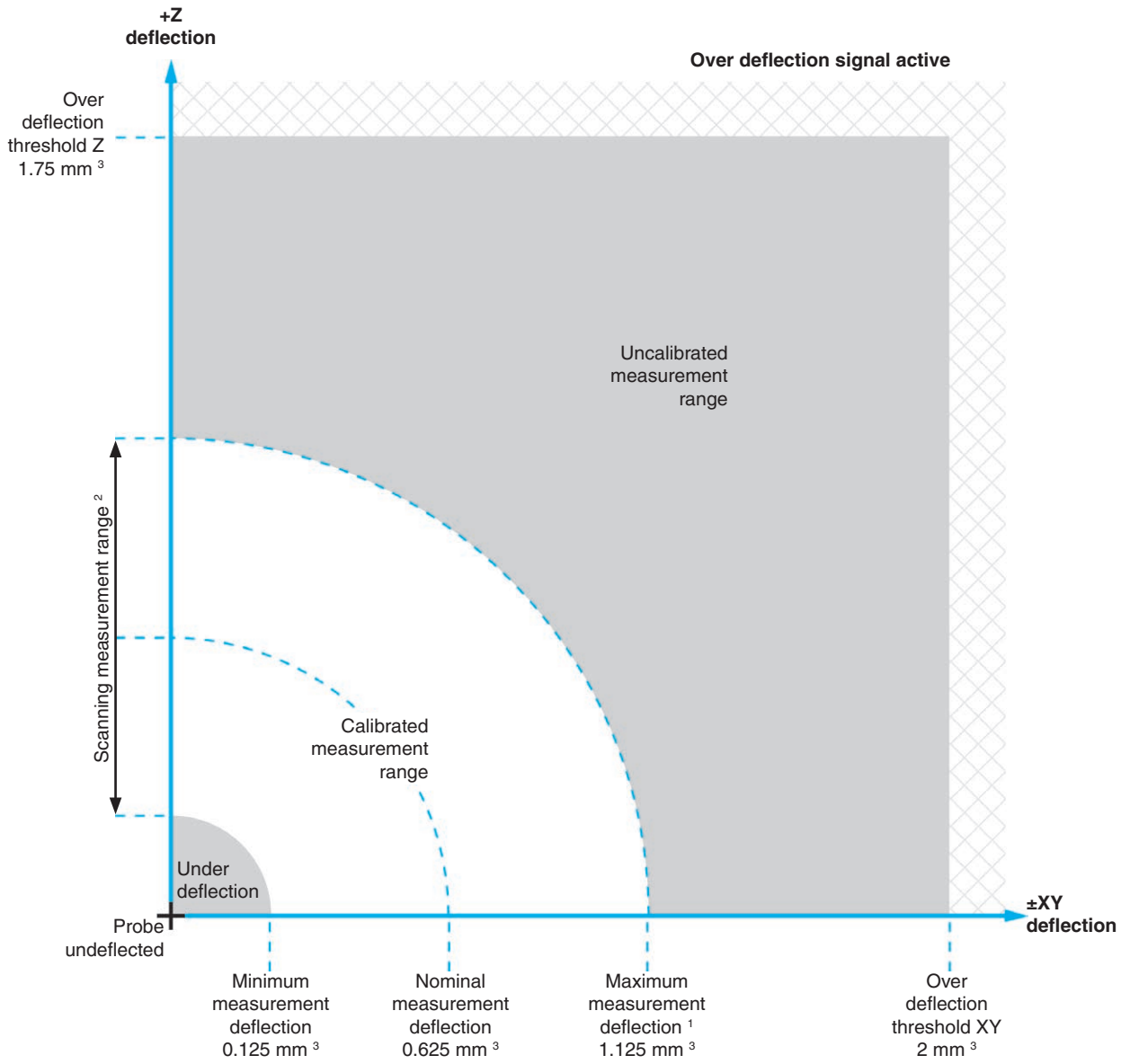
Typical battery life

Operating mode	Battery Life (Figures quoted were achieved using Duracell Ultra DL 3 V lithium-manganese dioxide batteries)
	Scanning probe
Operating life: full optical power at 4.5 m (14.76 ft) range and continuous operation.	16 hours
Operating life: ⅛ optical power at 1 m (3.28 ft) range and continuous operation.	31 hours
Operating life: full optical power at 4.5 m (14.76 ft) range with a 5% duty cycle.	320 hours [1]
Operating life: ⅛ optical power at 1 m (3.28 ft) range with a 5% duty cycle.	620 hours [1]
Standby life.	121 days

[1] Calculated value.

Rechargeable lithium-ion batteries may be used as long as they support a 125 mA continuous current drain and meet the dimensional requirements of BS EN IEC 60086-2. However, if rechargeable batteries are used, the customer will need to establish battery life data based on their own usage.

OSP60 calibrated measurement range



1 When deflected normal to the surface

2 As measured by ISO 230-10 scanning 3D performance test

3 All values typical for 100 mm stylus

Maximum overtravel 3	
+XY	+Z
9 mm (0.35 in)	6 mm (0.24 in)

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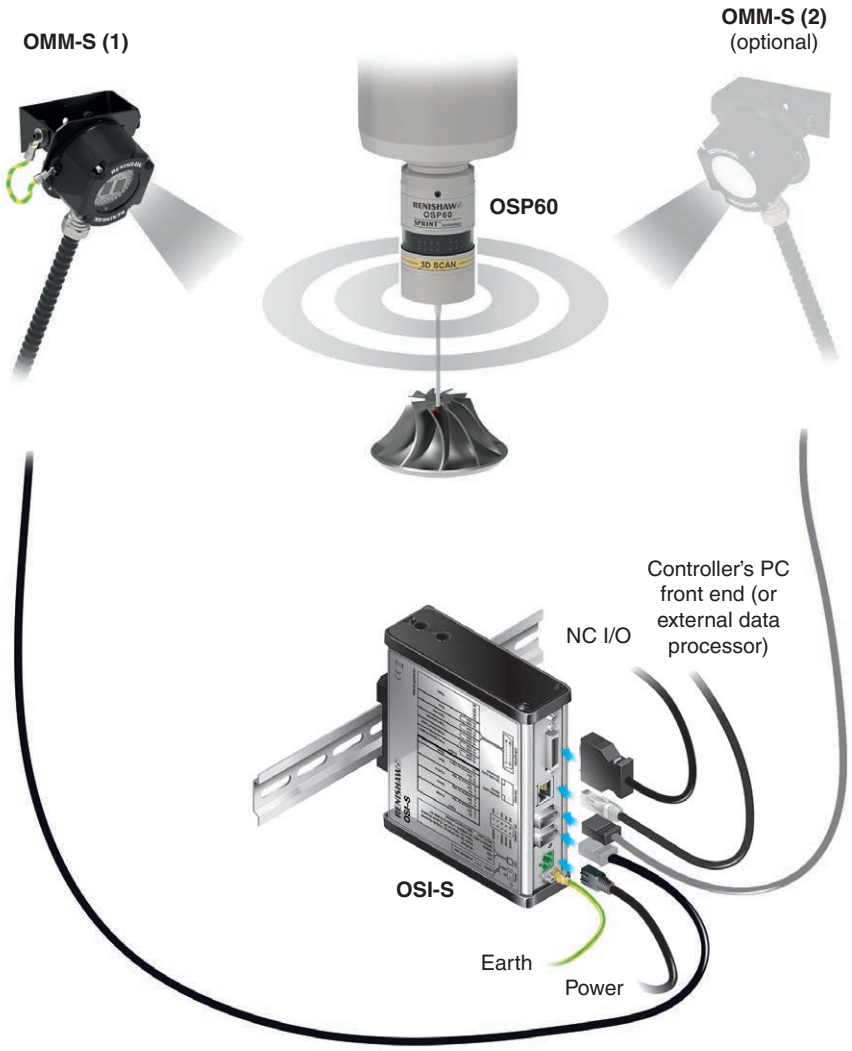
System installation

Installing the OSP60 with an OMM-S receiver

Typical installation

CAUTION: Due to the sophisticated nature of its optical transmission protocol, the OSP60 is only compatible with the OMM-S receiver. Do not use the OSP60 with any other Renishaw receiver.



IMPORTANT: Ensure the OMM-S and OSI-S have low impedance earth connections to the machine chassis, using all indicated star washers to cut through paint and oxide layers. Failure to ensure a low impedance earth connection on both OMM-S and OSI-S will result in reduced operating range.

The OSP60 is a high-speed analogue scanning probe designed to be robust enough to withstand conditions in the machine tool environment. It has an analogue sensor with 0.025 µm (0.9843 µin) resolution. The OSP60 is powered by three CR123 3 V batteries and has an optical range of 4.5 m (14.7 ft).

Unlike conventional Renishaw probes that transmit trigger data only, the OSP60 probe transmits probe data including X, Y, Z co-ordinates, internal probe temperature, low battery indication, overtravel status and signal quality.

The OMM-S is designed to be mounted within the machining environment in line-of-sight of the OSP60. The OMM-S has a range of 4.5 m (14.7 ft), which can be extended by connecting a second OMM-S receiver to the OSI-S interface.

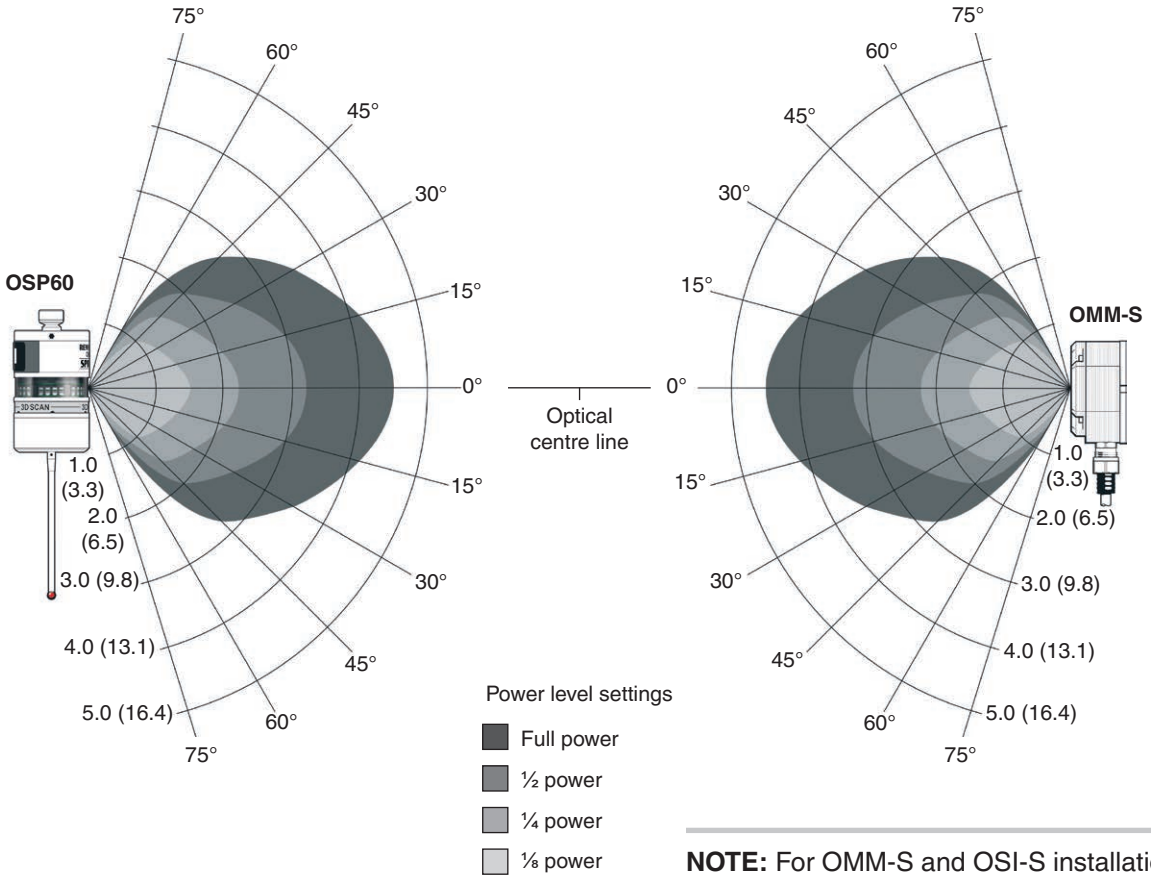
Transmission performance envelope

The system performance envelope and range is shown below.

The system components should be positioned so that the optimum range can be achieved over the full travel of the machine's axes, taking into account likely part positions on a moving machine table. The system uses optical infrared transmission and requires line-of-sight.

The power level of the OMM-S receiver is set by default to full power, however this can be reduced if problems are encountered with interference from systems on other machines. It is recommended that the optical power of the OSP60 probe remains at the default, automatic power, setting.

Optical power transmission levels for the OSP60 and OMM-S can be set within the scanning software.



Typical plot at +20 °C (+68 °F)
360° transmission around probe axis in m (ft)

NOTE: For OMM-S and OSI-S installation instructions, see the *OSI-S interface and OMM-S receiver* installation guide (Renishaw part no. H-5465-8540).

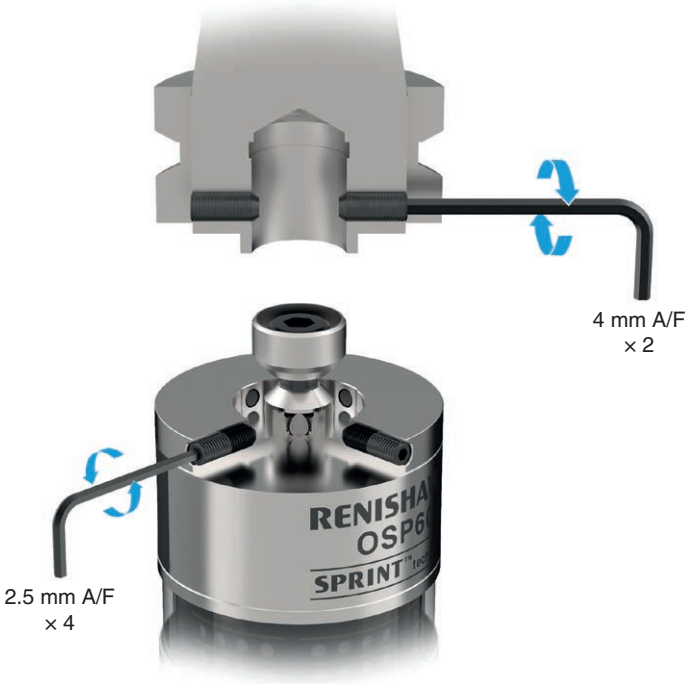
Preparing the OSP60 for use

WARNING: The OSP60 has a glass window and uses ceramic styli. Use eye protection as necessary and handle with care if broken to avoid injury.

Fitting the stylus

NOTE: The use of a proper stylus tool (Renishaw part no. M-5000-3707) is recommended to avoid over-tightening and possible damage to the OSP60 probe or stylus. A stylus tool is supplied with the OSP60 probe.

Mounting the probe on a shank



Stylus on-centre adjustment

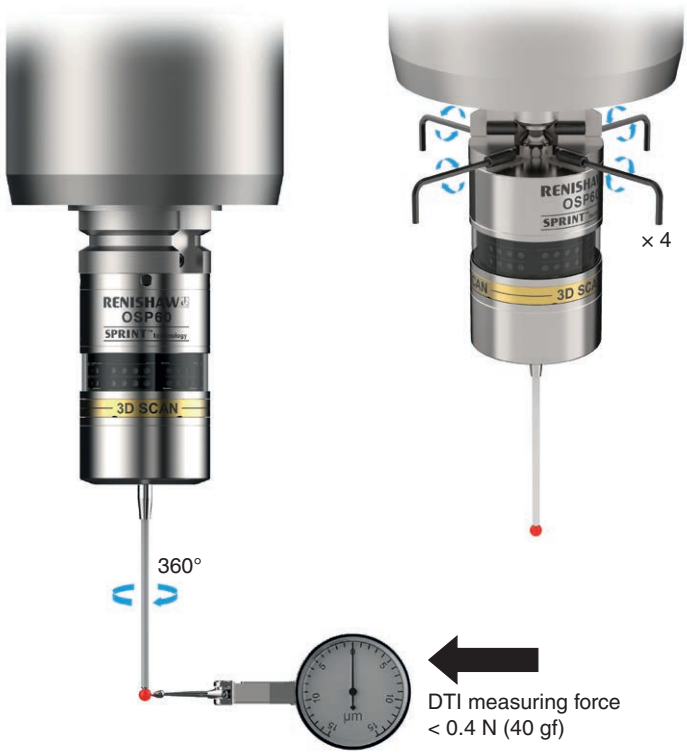
NOTES:

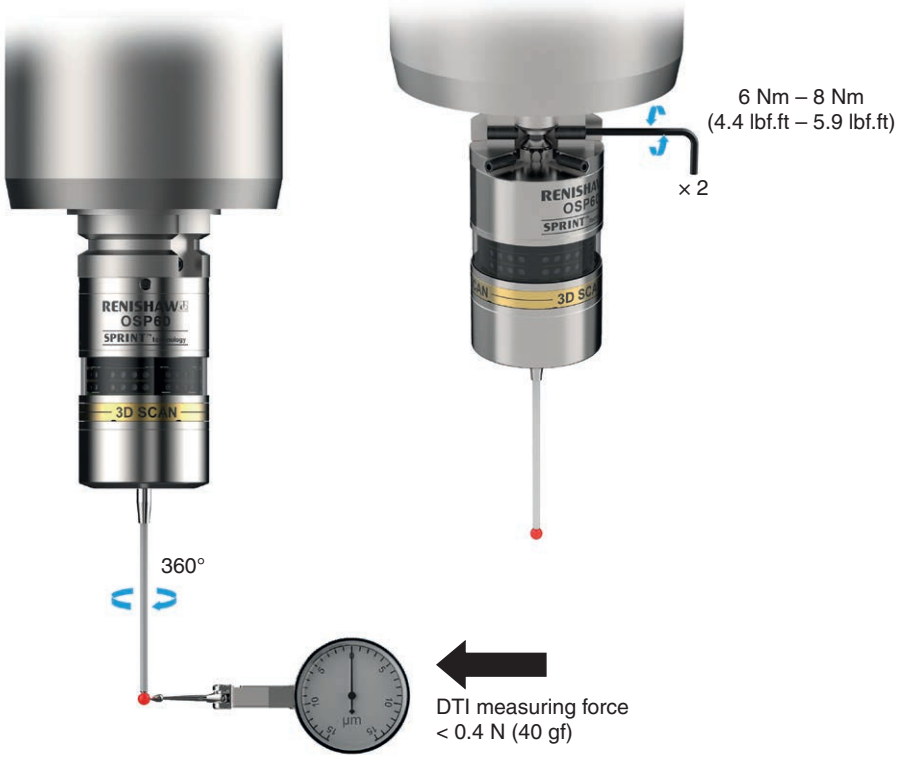
If a probe and shank assembly is dropped, it must be rechecked for correct on-centre adjustment.

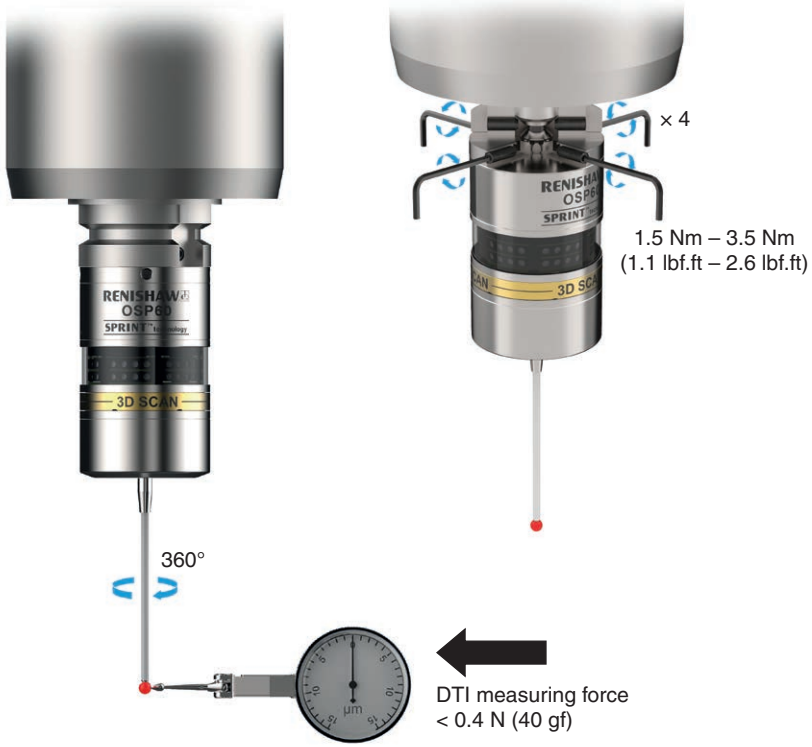
Do not hit or tap the probe to achieve on-centre adjustment.

The probe should be “clocked” to within 50 µm (2000 µin). However, it is recommended that the probe is “clocked” to within 20 µm. If using an imperial dial test indicator (DTI), “clock” to within approximately 1000 µin.

Care must be taken when “clocking” the OSP60 probe, as the spring force is much lower than a conventional touch-trigger probe. In order to minimise the amount of probe deflection during the “clocking” process, use the lowest DTI measuring force necessary (less than 0.4 N (40 gf)) to maintain constant contact between the DTI plunger and the stylus tip.




6 Nm – 8 Nm
(4.4 lbf.ft – 5.9 lbf.ft)
× 2
360°
DTI measuring force
< 0.4 N (40 gf)


× 4
1.5 Nm – 3.5 Nm
(1.1 lbf.ft – 2.6 lbf.ft)
360°
DTI measuring force
< 0.4 N (40 gf)

Installing the batteries

CAUTIONS:

Do not allow coolant or debris to enter the battery compartment.

Do not mix new and used batteries, or battery types, as this will result in reduced life and damage to the batteries.

When inserting batteries, check that the contact springs are not damaged and that the battery polarity is correct, as failure to do so may be a fire hazard.

Take care to avoid damaging the battery contact springs and the battery cassette gasket.

NOTES:

Maximum battery life is achieved when using high-quality batteries from a reputable manufacturer. It is recommended that the batteries are installed after the probe has been located in the machine spindle.

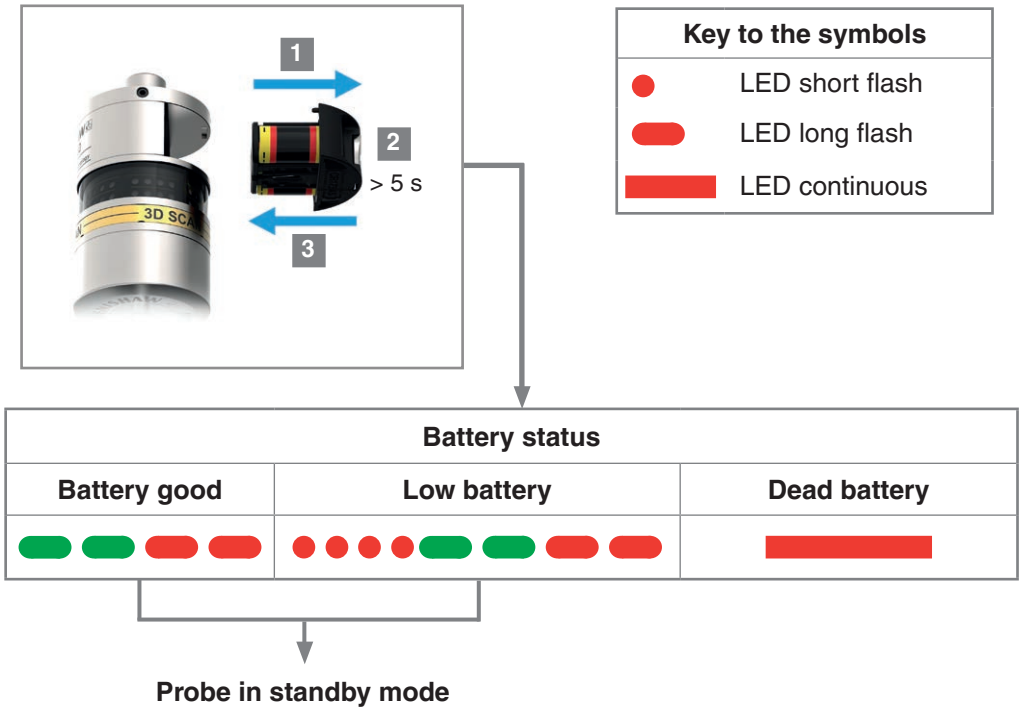
Always ensure that the cassette gasket and mating surfaces are clean and free from dirt before reassembly.

If dead batteries are inadvertently inserted, the LEDs will remain a constant red (or unlit).

Recommended battery types
Lithium-manganese dioxide × 3
✓ CR123 (3 V) or CR17345 (3 V)

Checking the probe for correct battery operation

Following insertion of the batteries, the battery status LEDs should flash green twice and then flash red twice. There is no Trigger Logic™ functionality incorporated into the OSP60 probe and, as a result, all probe configuration must be controlled via the scanning software.



Checking the probe status LED indications with probe in operating mode

Probe status	
Probe seated in operating mode	
Probe triggered in operating mode	
Probe seated, low battery	
Probe triggered, low battery	
Dead battery	

NOTE:

If your OSP60 scanning probe shows a SPRINT™ logo like the one shown in the graphic opposite, please refer to the installation documentation supplied with that probe.

Calibrating the OSP60

Why calibrate a probe?

The OSP60 is just one component of the measurement system which communicates with the machine tool. Each part of the system can introduce a constant difference between the position that the stylus touches and the position that is reported to the machine. If the probe is not calibrated, this difference will appear as an inaccuracy in the measurement.

Calibration of the OSP60 is required to enable the accurate calculation of workpiece surface data and to facilitate correct toolpath construction. This ensures that the probe tip is obtaining measurement data from the correct surface of the part. Once calibrated, probing software can be used to compensate for any difference between the position that the stylus touches and the position that is reported to the machine.

During normal use, the difference between the touch position and the reported position does not change, but it is important that the probe is calibrated in the following circumstances:

- when a probe system is to be used for the first time;
- when a new stylus is fitted to the probe;
- when a new shank is fitted to the probe;
- when on-centre adjustment has been carried out;
- when it is suspected that the stylus has become distorted or that the probe has been crashed;
- at regular intervals to compensate for mechanical changes of your machine tool;
- whenever the OSP60 is moved between machine tools;
- when very tight tolerances need to be achieved [1];
- when there is a need to take into account temperature changes in the machine environment [1];
- if repeatability of relocation of the probe shank is poor. In this case, the probe may need to be recalibrated each time it is selected [1].

[1] Offsets-only calibration (which takes a few seconds) is available to remove tool-change repeatability. This may improve the accuracy by up to about 2 µm in cut-measure-cut processes, or where measurements before and after a tool change are compared.

It is good practice to set the tip of the stylus on-centre, because this reduces the effect of any variation in spindle and tool orientation (see “Stylus on-centre adjustment” on **page 3-6**).

Calibration method

The probe is calibrated on the machine using a sphere of known size. Typically a sphere of Ø25 mm (or Ø1 in) is used, but other sizes can also be used. The calibration routine consists of three parts:

- establishing the probe datum;
- determining the location of the calibration sphere and stylus ball radius;
- scanning the calibration sphere.

Maintenance

You may undertake the maintenance routines described in these instructions.

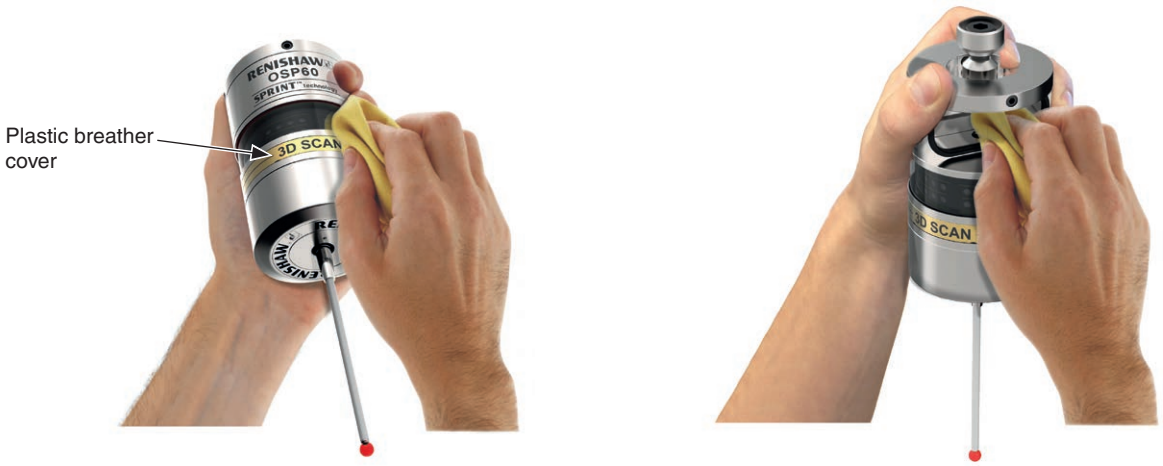
Further dismantling and repair of Renishaw equipment is a highly specialised operation, which must be carried out at an authorised Renishaw Service Centre.

Equipment requiring repair, overhaul or attention under warranty should be returned to your supplier.

Cleaning the probe

Wipe the window, battery compartment and plastic breather cover of the probe with a clean cloth to remove machining residue. This should be done on a regular basis to maintain optimum transmission and performance.

WARNING: The OSP60 has a glass window and uses ceramic styli. Use eye protection as necessary and handle with care if broken to avoid injury.



Cleaning the probe's front and rear diaphragms

CAUTIONS:

Under no circumstances should compressed air be used to clean/dry the OSP60, as this can damage the diaphragms.

Do not attempt to remove the overtravel stop ring.

The OSP60 probe mechanism is protected from coolant and debris by two diaphragms. These provide adequate protection under normal working conditions.

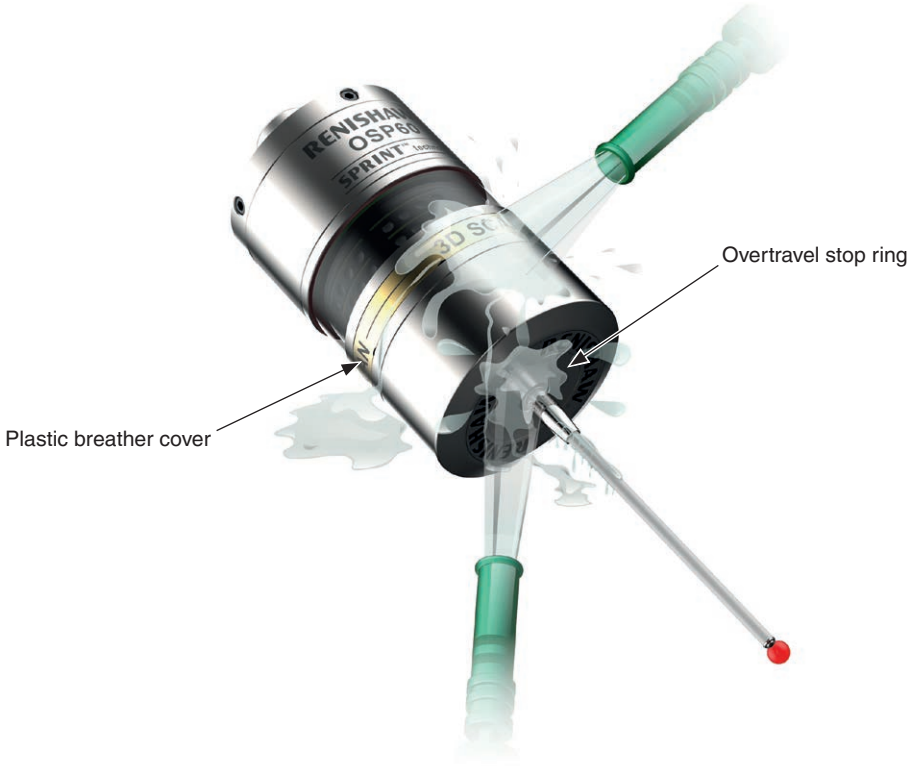
The plastic breather cover next to the optical window must be kept clean, particularly the breather holes leading to the rear diaphragm. These can be cleared by removing any debris with a clean lint-free cloth.

The airway behind the breather holes in the plastic cover should also be cleaned periodically. This is done by flushing the body of the OSP60 under a flow of clean running water (water temperature 40 °C (104 °F) maximum). The following recommendations should be followed:

1. Aim a moderate flow of clean running water at each of the six breather cover cut-outs.
2. Manually shake/spin the probe to ensure the water reaches the rear diaphragm.
3. Continue with this cycle until the water ejected from the breather holes runs clear.

Periodically, the area behind the overtravel stop ring (where the stylus joins the probe) should also be cleaned. This can be achieved by flushing the area under a flow of clean running water (water temperature 40 °C (104 °F) maximum). The following recommendations should be followed:

1. Aim a moderate flow of clean running water at the gap between the stylus and the overtravel stop ring.
2. Manually shake/spin the probe to ensure the water reaches the front diaphragm.
3. Continue with this cycle until the water ejected from the area runs clear.



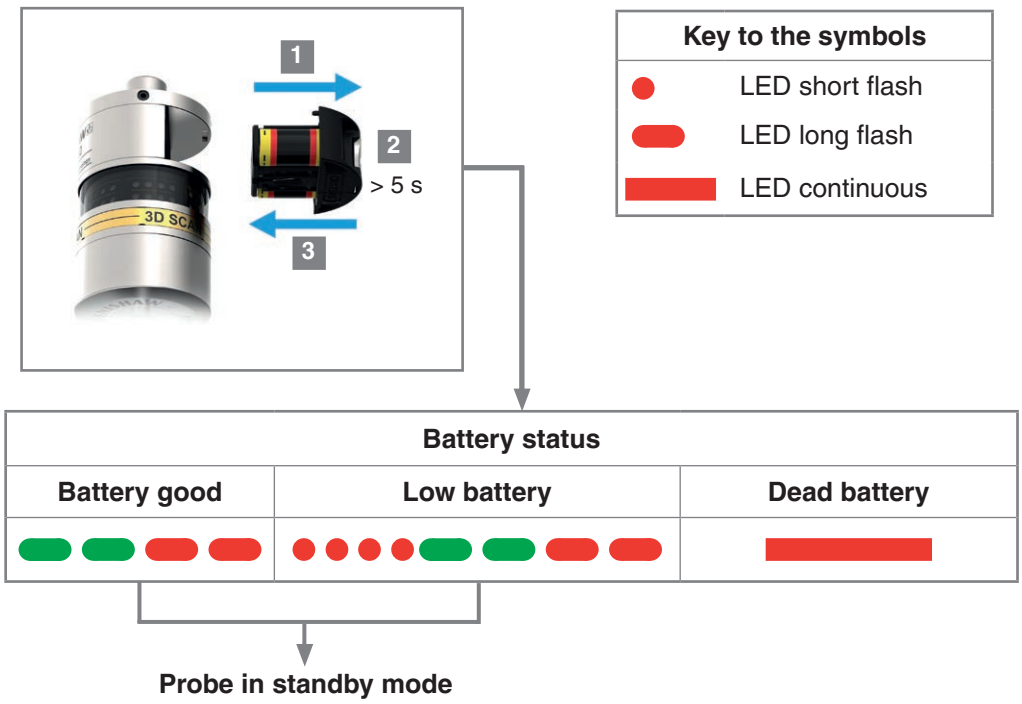
Cleaning the front and rear diaphragm

Checking the battery status

To check the battery status:

1. Remove the battery cassette.
2. Wait for a period of more than 5 seconds.
3. Replace the battery cassette, taking care not to damage the battery cassette gasket.
4. Observe the probe LEDs to determine battery status.

If required, change the batteries. See “Changing the batteries” on **page 4-5** for details on changing batteries.



Changing the batteries

CAUTIONS:

Do not leave dead batteries in the probe.

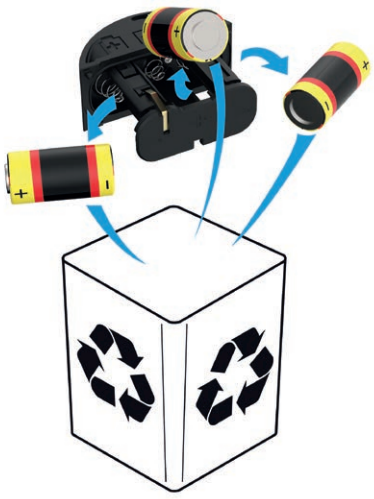
When changing batteries, ensure the probe is clean and dry. Do not allow coolant or debris to enter the battery compartment or seal.

When inserting batteries, check that the contact springs are not damaged and that the battery polarity is correct, as failure to do so may be a fire hazard.

Take care to avoid damaging the battery contact springs and the battery cassette gasket.

Only use specified batteries.

CAUTION: Dispose of dead batteries in accordance with local regulations. Never dispose of batteries in a fire.



Recommended battery types
Lithium-manganese dioxide × 3
✓ CR123 (3 V) or CR17345 (3 V)

NOTES:

Do not mix new and used batteries or battery types, as this will result in reduced life and damage to the batteries.

Always ensure that the cassette gasket and mating surfaces are clean and free from dirt before reassembly.

If dead batteries are inadvertently inserted, the LEDs will remain a constant red (or unlit).

Fault-finding

NOTE: The following fault-finding information is specific to the OSP60 probe. For further fault-finding information, see the scanning software and the installation guide *OSI-S interface and OMM-S receiver* (Renishaw part no. H-5465-8540).

Symptom	Cause	Action
OSP60 probe fails to power up (no LEDs illuminated, or fails to indicate battery status).	Dead batteries.	Change batteries (see **page 4-5**).
	Unsuitable batteries.	Change batteries (see **page 4-5**).
	Batteries inserted incorrectly.	Check battery insertion (see **page 4-5**).
OSP60 probe fails to switch on or switches off unexpectedly.	Dead batteries.	Change batteries (see **page 4-5**).
	Unsuitable batteries.	Change batteries (see **page 4-5**).
	Batteries inserted incorrectly.	Check battery insertion (see **page 4-5**).
	OSP60 probe is out of transmission range.	Increase optical power setting in the associated software or reduce the range between the OSP60 and OMM-S.
	Beam obstructed.	Clean the OSP60 probe and OMM-S window and remove any obstructions (see **page 4-1**).
	Poor earth connection.	Check earth connection of the OMM-S and OSI-S.

Symptom	Cause	Action
Machine stops unexpectedly during a probing cycle.	Optical link failure / OSP60 probe is out of range.	Check the OSP60 probe and OMM-S and remove obstruction. Clear alarm.
	Dead batteries in OSP60.	Change batteries (see **page 4-5**) and clear alarm.
	Over deflection.	Check that the part is correctly positioned or change the safety plane height and clear alarm.
	OSP60 probe length offset is missing/incorrect.	Enter the correct probe length and recalibrate the probe. Clear alarm.
Poor OSP60 probe repeatability and/or accuracy.	Debris on part or stylus.	Clean the part and stylus.
	Damaged/distorted stylus.	Replace the stylus and recalibrate the OSP60 probe (see **page 3-11**).
	Poor tool change repeatability.	Recalibrate the OSP60 probe after each tool change (see **page 3-11**).
	Loose probe mounting on shank or loose stylus.	Check and tighten as appropriate. Recalibrate the OSP60 probe (see **page 3-11**).
	Calibration feature has moved.	Correct the position.
	Measurement occurs within the machine's acceleration and deceleration zone.	Increase the lead on / lead off or arc on / arc off radius.
	Probing speed too high or too slow.	Perform simple repeatability trials at various speeds.
	Temperature variation causes machine and workpiece movement.	Minimise temperature changes and recalibrate offsets frequently.

Symptom	Cause	Action
Poor OSP60 probe repeatability and/or accuracy (continued).	Machine tool faulty.	Perform health checks on the machine tool.
	Embedded swarf or debris in or around the front diaphragm.	Visibly inspect the front diaphragm for debris and swarf by manipulating the position of the stylus. Do not remove the overtravel stop ring. If swarf or debris is identified, then flush the area with clean running water as described on **page 4-2**. If the front diaphragm appears to be damaged, or cannot be cleared of swarf or debris, then the OSP60 probe should be returned to Renishaw.
Reduced range.	Incorrect power setting.	Check power settings. It is recommended that the power level of the OMM-S receiver is set to full power, and the optical power of the OSP60 probe is set to automatic power.
	Poor alignment.	Check orientation of the OMM-S and line-of-sight. Add a second OMM-S if necessary.
	Poor earth connection.	Check earth connection of the OMM-S and OSI-S.

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Parts list

Type	Part number	Description
OSP60 kit	A-5465-2001	OSP60 probe kit, includes tool kit and support card.
Tool kit	A-4038-0304	Tool kit comprising: stylus tool, 2 mm hexagon wrench, 2 × 2.5 mm hexagon wrench, 4 mm hexagon wrench, 2 × M8 ×12 mm long screws.
CR123 3 V battery	P-BT03-0006	Lithium-manganese dioxide battery 3 V 1400 mAh.
Battery cassette	A-5465-2304	OSP60 battery cassette.
Breather cover	A-5465-2305	OSP60 breather cover.
Battery cap gasket kit	A-5465-2300	OSP60 battery cap gasket kit comprising: 1 × gasket and 1 × support ring.
Stylus tool	M-5000-3707	Tool for tightening or releasing the stylus.
Publications. These can be downloaded from our website at **www.renishaw.com**.		
OSP60 installation guide	H-5465-8504	Installation guide: for set-up of the OSP60 optical scanning probe.
OSI-S and OMM-S installation guide	H-5465-8540	Installation guide: for set-up of the OSI-S interface and OMM-S receiver.
Taper shanks data sheet	H-2000-2011	Data sheet: Taper shanks for machine tool probes.
Styli recommendations for OSP60 scanning probes information leaflet	H-5465-8102	Information leaflet: Styli recommendations for OSP60 SPRINT™ scanning probes.
Styli	H-1000-3200	Technical specifications guide: Styli and accessories – or visit our Online store at **www.renishaw.com/shop**.
System data sheet	H-5465-8200	Data sheet: OSP60 / OSI-S / OMM-S.
OSP60 battery cap gasket replacement information leaflet	H-5465-8532	Information leaflet: OSP60 battery cap gasket replacement.

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