Installation guide
H-4038-8505-03-B

RENISHAW
apply innovation™

OMP60 – optical machine probe

Renishaw plc. Registered in England and Wales. Company no: 1106260. Registered office: New Mills, Wotton-under-Edge, Gloucestershire, GL12 8JR, UK.

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

Renishaw part no: H-4038-8505-03-B
First issued: 01.2008
Revised: 12.2022

RENISHAW
apply innovation™

Contents

Before you begin

Disclaimer

WHILE CONSIDERABLE EFFORT WAS MADE TO VERIFY THE ACCURACY OF THIS DOCUMENT AT PUBLICATION, ALL WARRANTIES, CONDITIONS, REPRESENTATIONS AND LIABILITY, HOWSOEVER ARISING, ARE EXCLUDED TO THE EXTENT PERMITTED BY LAW.

RENISHAW RESERVES THE RIGHT TO MAKE CHANGES TO THIS DOCUMENT AND TO THE EQUIPMENT, AND/OR SOFTWARE AND THE SPECIFICATION DESCRIBED HEREIN WITHOUT OBLIGATION TO PROVIDE NOTICE OF SUCH CHANGES.

Trade marks

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 OMP60 probe, and other similar Renishaw probes, are subject of one or more of the following patents and/or patent applications:

CN 100416216	IN 234921
CN 101476859	IN 8707/DELNP/2008
EP 1425550	JP 4852411
EP 1457786	US 7285935
EP 1613921	US 7316077
EP 1804020	

OMP60 software notices

This OMP60 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 OMP60 is an optical transmission spindle probe that enables automated workpiece inspection and job set-up on machining centres and small to medium multi-tasking machines.

Safety

Information to the user

This product is supplied with non-rechargeable batteries that do not contain lithium. For specific battery operating, safety and disposal guidelines refer to the battery manufacturers' literature.

- 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, eye protection is recommended.

The OMP60 has a glass window. Handle with care if broken to avoid injury.

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.

OMP60 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.

OMP60 basics

Introduction

The OMP60 is an optical machine tool probe suitable for use on medium to large machining and multi-tasking centres. It is designed to resist optical interference, false triggering and shock.

The OMP60 can be operated in either 'Legacy' or 'Modulated' optical transmission modes – see probe settings for further details.

When operating in 'Legacy' mode, the OMP60 is compatible with an OMM receiver and an MI 12 interface, or with an OMI receiver/interface.

When operating in 'Modulated' mode, the OMP60 becomes compatible for use with an OMM-2 or OMM-2C receiver with an OSI or OSI-D interface, or with an OMI-2 / OMI-2T / OMI-2H / OMI-2C receiver / interface, to provide substantially increased resistance to light interference.

In 'Modulated' mode, it is possible to define the probe ID. This is factory set to PROBE 1, but can be changed to PROBE 2 for use with twin probes or PROBE 3 for use with multiple probe systems.

All OMP60 settings are configured using 'Trigger Logic™'. This technique enables the user to review and subsequently change probe settings by deflecting the stylus whilst observing the LED display.

Configurable settings are:

- Switch-on / switch-off method
- Enhanced trigger filter setting
- Optical transmission method
- Optical power

Getting started

Three multicolour probe LEDs provide visual indication of selected probe settings.

For example:

- Switch-on and switch-off methods
- Probe status – triggered or seated
- Battery condition

System interface

The interface conveys and processes signals between the probe and CNC machine controller.

OMM-2 or OMM-2C receiver with OSI or OSI-D interface or OMI-2 / OMI-2T / OMI-2H / OMI-2C receiver / interface (modulated transmission)

The OMI-2T receiver / interface or OMM-2 receiver with OSI or OSI-D interfaces are the recommended interfaces for use with the OMP60 as they provide substantially increased resistance to light interference whilst providing the user greater flexibility to operate a multiple probe system.

OMI or OMM with MI 12 (legacy transmission)

Alternative interfaces are the OMI or OMM with the MI 12 interface unit.

MI 7 interface unit

CAUTION: Systems using the earlier MI 7 interface in place of the MI 12 interface are not compatible with OMP60.

Trigger Logic™

Trigger Logic (for more information, see page 4.1, “Reviewing the probe settings”) is a method that allows the user to view and select all available mode settings in order to customise a probe to suit a specific application. Trigger Logic is activated by battery insertion and uses a sequence of stylus deflections (triggering) to systematically lead the user through the available choices to allow selection of the required mode options.

A Probe setup app is available that simplifies this process with clear, interactive instructions and informative videos and is available for download on the App Store and Google Play.

Download on the App Store

or

GET IT ON Google Play

Current probe settings can be reviewed by simply removing the batteries for a minimum of 5 seconds, and then replacing them to activate the Trigger Logic review sequence (for more information, see page 4.1, “Reviewing the probe settings”).

Probe modes

The OMP60 probe can be in one of three modes:

Standby mode – Probe is waiting for a switch-on signal.

Operational mode – When activated by one of the switch-on methods, the probe is switched on and ready for use.

Configuration mode – Ready to change the probe settings using Trigger Logic™.

Configurable settings

Switch-on / switch-off methods

The following switch-on / switch-off options are user-configurable.

1. Optical on / Optical off
2. Optical on / Timer off
3. Spin on / Spin off
4. Spin on / Timer off
5. Shank switch on / Shank switch off

OMP60 switch-on method Switch-on options are configurable	OMP60 switch-off method Switch-off options are configurable	Switch-on time
Optical on Optical switch-on is commanded by machine input.	**Optical off** Optical switch-off is commanded by machine input. A timer automatically switches the probe off 90 minutes after the last trigger if it is not turned off by machine input.	Legacy (start filter off): 0.5 seconds Legacy (start filter on): 1 second Modulated: 0.5 seconds
Optical on Optical switch-on is commanded by machine input or auto start.	**Timer off (timeout)** Timeout will occur 12, 33 or 134 seconds (user configurable) after the last probe trigger or reseat. Please note that the issue of a further M-code during the time out period, will also reset the timer.	
Spin on Spin at 500 rev/min for 1 second minimum.	**Spin off** Spin at 500 rev/min for 1 second minimum. A timer automatically switches the probe off 90 minutes after the last trigger if it is not spun.	1 second maximum
Spin on Spin at 500 rev/min for 1 second minimum.	**Timer off (timeout)** Timeout will occur 12, 33 or 134 seconds (user configurable) after the last probe trigger or reseat.	1 second maximum
Shank switch-on	**Shank switch-off**	Approximately 0.5 seconds.

Enhanced trigger filter

Probes subjected to high levels of vibration or shock loads may output probe trigger signals without having contacted any surface. The enhanced trigger filter improves the probe's resistance to these effects.

When the filter is enabled, a constant nominal 10, 20 or 40 ms delay is introduced to the probe output.

It may be necessary to reduce the probe approach speed to allow for the increased stylus overtravel during the extended time delay.

Factory set to OFF.

Optical transmission method

Probes subjected to particular forms of light interference may accept spurious start signals.

The OMP60 can be operated in either 'Legacy' or 'Modulated' optical transmission mode.

Legacy mode

A start filter improves the probe's resistance to these effects.

When Legacy (start filter on) is enabled, an additional one second delay is introduced to the probe activation (switch on) time.

It may be necessary to revise the probe program software to allow for the increased activation time.

Modulated mode

The OMP60 becomes compatible for use with the OMM-2 or OMM-2C receiver with OSI or OSI-D interface or with an OMI-2 / OMI-2T / OMI-2H / OMI-2C receiver / interface to provide substantially increased resistance to light interference.

Modulated transmission in the OMP60, is capable of providing three different coded start signals. This allows the use of two probes with an OMI-2T receiver / interface and up to three probes with an OMM-2 receiver with a OSI or OSI-D interface respectively.

Twin/multiple probe system

To operate in a twin or multiple probe system, one probe must be set to PROBE 1 start and the other probe must be set to PROBE 2 start (OMI-2T or OMM-2 with OSI or OSI-D) or PROBE 3 start (OMM-2 with OSI or OSI-D only). These settings are user configurable.

In a twin probe system, such as a spindle probe and an optical tool setting probe, the spindle probe needs to be set to PROBE 1 start and the tool setter to PROBE 2 start.

In a multiple probe system, with two spindle probes and one optical tool setting probe, the two spindle probes needs to be set to PROBE 1 and PROBE 2 start, respectively, and the tool setter would be set to PROBE 3 start.

Optical power

Where the separation between the OMP60 and the OMI-2 / OMI-2T / OMI-2H / OMI-2C / OMM with MI 12 or OMM-2 with OSI or OSI-D is small, low optical power may be used. In this setting, the optical transmission range will be reduced as shown on the performance envelopes so that battery life will be extended.

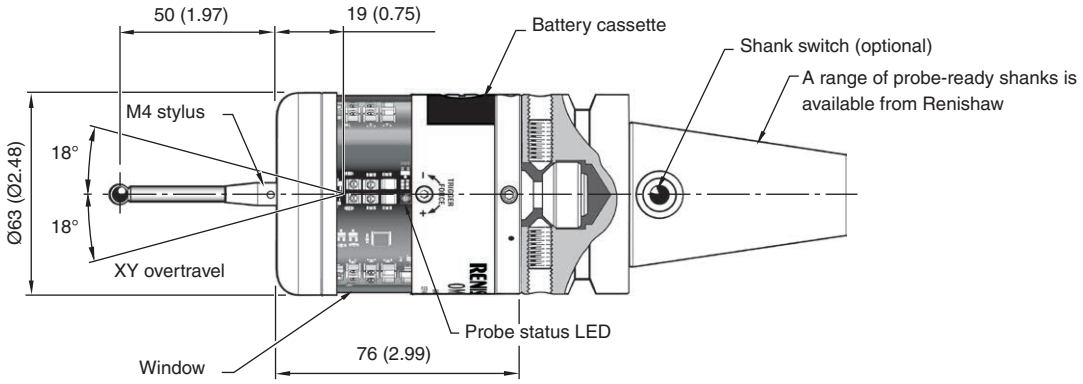
Dotted lines on the performance envelopes represent the OMP60 in low optical power.

Low optical power should be used whenever possible for increased battery life.

Maximum battery life is achieved when Lithium Thionyl Chloride (LTC) batteries are used in conjunction with low power mode.

The probe is factory set to standard optical power.

OMP60 dimensions



Dimensions given in mm (in)

Stylus overtravel limits		
Stylus length	**±X/±Y**	**+Z**
50 (1.97)	21 (0.82)	11 (0.43)
100 (3.94)	37 (1.45)	11 (0.43)

OMP60 specification

Principal application	Workpiece inspection and job set-up on medium to large-sized machining centres and multi-tasking centres.	
Dimensions	Length Diameter	76 mm (2.99 in) 63 mm (2.48 in)
Weight (without shank)	With batteries Without batteries	885 g (31.22 oz) 836 g (29.49 oz)
Transmission type	360° infrared optical transmission (modulated or legacy)	
Switch-on methods	Optical M-code, spin-on or shank switch	
Switch-off methods	Optical M-code, timeout, spin-off or shank switch	
Spindle speed (maximum)	1000 rev/min	
Operating range	Up to 6 m (19.7 ft)	
Compatible receiver / interface	**Modulated** OMM-2 or OMM-2C with OSI or OSI-D or with OMI-2 / OMI-2T / OMI-2H / OMI-2C	**Legacy** OMI or OMM / MI 12
Sense directions	±X, ±Y, +Z	
Unidirectional repeatability	1.00 µm (40 µin) 2σ – 50 mm stylus length (see note 1)	
Stylus trigger force (see notes 2 and 3) Factory setting: XY low force XY high force Z	 0.75 N, 76 gf (2.70 ozf) 1.40 N, 143 gf (5.04 ozf) 5.30 N, 540 gf (19.06 ozf)	
Maximum setting: XY low force XY high force Z	 2.00 N, 204 gf (7.19 ozf) 3.50 N, 357 gf (12.59 ozf) 14.00 N, 1428 gf (50.36 ozf)	
Minimum setting: XY low force XY high force Z	 0.50 N, 51 gf (1.80 ozf) 0.90 N, 92 gf (3.24 ozf) 3.50 N, 357 gf (12.59 ozf)	
Stylus overtravel	XY plane +Z plane	±18° 11 mm (0.43 in)

Note 1 Performance specification is tested at a standard test velocity of 480 mm/min (18.9 in/min) with ceramic styli. Significantly higher velocity is possible depending on application requirements.

Note 2 Trigger force, which is critical in some applications, is the force exerted on the component by the stylus when the probe triggers.
The maximum force applied will occur after the trigger point, i.e. overtravel. The force value depends on related variables, including measuring speed and machine deceleration.

Note 3 Tests were carried out using a 50 mm (1.97 in) straight stylus.

Environment	IP rating	IPX8 (BS EN 60529:1992+A2:2013)
	Storage temperature	–25 °C to +70 °C (–13 °F to +158 °F)
	Operating temperature	+5 °C to +55 °C (+41 °F to +131 °F)
Battery types	2 x AA 1.5 V alkaline or 2 x AA 3.6 V Lithium Thionyl Chloride (LTC)	
Battery reserve life	Approximately one week after a low battery warning is first given.	
Typical battery life	See page 2.8	
Rechargeable batteries	Either Nickel Cadmium (NiCd) or Nickel Metal Hydride (NiMh) can be used. However, when these battery types are fitted, expect a battery life of approximately 50% less than that quoted for alkaline batteries together with a reduced low battery warning period.	

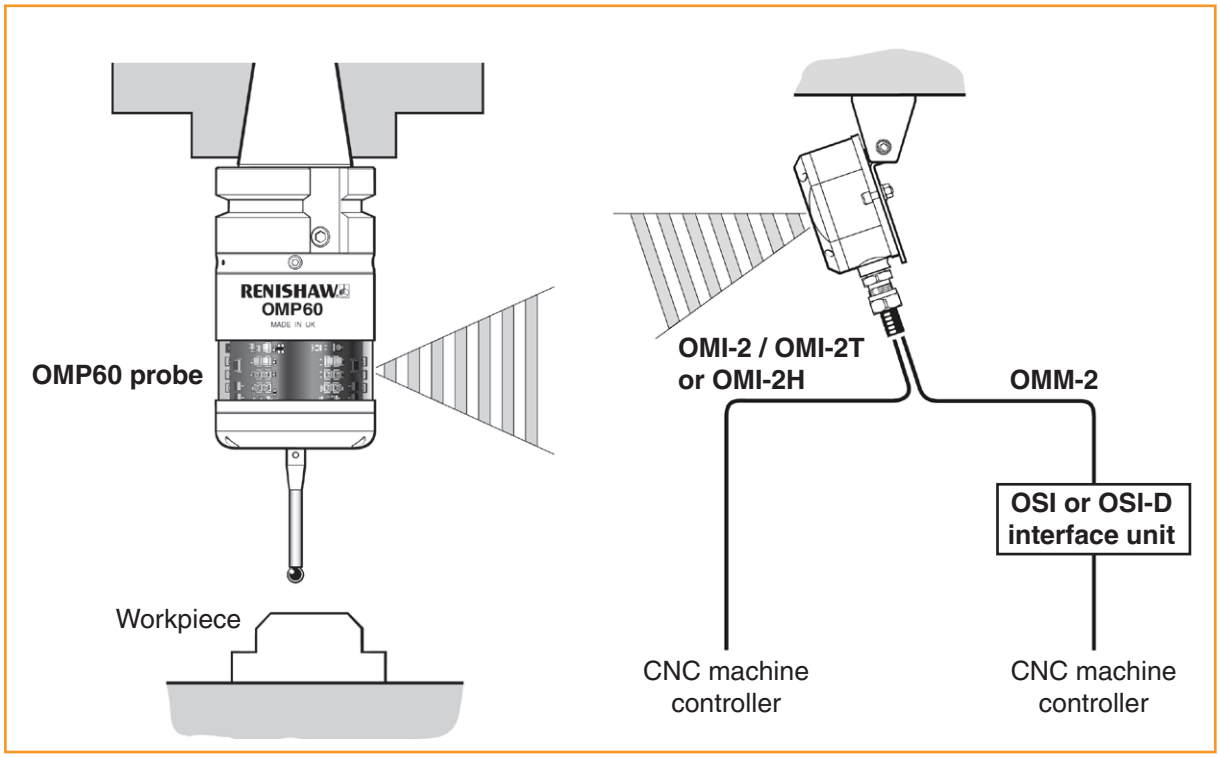
Typical battery life

Modulated transmission						
2 x AA 1.5V alkaline batteries (typical)	**Optical on/off**		**Shank on/off**		**Spin on/off**	
	Standard power	**Low power**	**Standard power**	**Low power**	**Standard power**	**Low power**
Standby	818 days		940 days		304 days	
5% usage	134 days	162 days	136 days	165 days	105 days	121 days
Continuous use	190 hours	240 hours	190 hours	240 hours	190 hours	240 hours
2 x AA 3.6V LTC batteries (typical)	**Optical on/off**		**Shank on/off**		**Spin on/off**	
	Standard power	**Low power**	**Standard power**	**Low power**	**Standard power**	**Low power**
Standby	1597 days		1767 days		722 days	
5% usage	359 days	430 days	364 days	438 days	283 days	325 days
Continuous use	550 hours	690 hours	540 hours	690 hours	540 hours	680 hours

Legacy transmission						
2 x AA 1.5V alkaline batteries (typical)	**Optical on/off**		**Shank on/off**		**Spin on/off**	
	Standard power	**Low power**	**Standard power**	**Low power**	**Standard power**	**Low power**
Standby	818 days		940 days		304 days	
5% usage	133 days	195 days	135 days	199 days	104 days	139 days
Continuous use	190 hours	300 hours	190 hours	300 hours	190 hours	300 hours
2 x AA 3.6V LTC batteries (typical)	**Optical on/off**		**Shank on/off**		**Spin on/off**	
	Standard power	**Low power**	**Standard power**	**Low power**	**Standard power**	**Low power**
Standby	1597 days		1767 days		722 days	
5% usage	355 days	511 days	360 days	523 days	280 days	369 days
Continuous use	540 hours	880 hours	540 hours	880 hours	530 hours	860 hours

System installation

Installing the OMP60



Operating envelope

The OMP60 / OMI or OMM with MI 12 system uses legacy transmission. When used with the OMM-2 receiver with OSI or OSI-D interface or the OMI-2 / OMI-2T / OMI-2H interface / receiver, the OMP60 uses modulated transmission.

Natural reflective surfaces within the machine may increase the signal transmission range.

Coolant and swarf residue accumulating on the probe or receiver / interface windows will have a detrimental effect on transmission performance. Wipe clean as often as necessary to maintain unrestricted transmission.

CAUTION: If two or more systems are operating in close proximity to each other, take care to ensure that signals transmitted from the OMP60 on one machine are not received by the receiver on the other machine, and vice versa. When this is the case it is recommended that the OMP60 low optical power is used and that the low range setting is used on the receiver.

OMM-2 / OMI-2T / OMI-2H / OMI-2 / OMI or OMM positioning

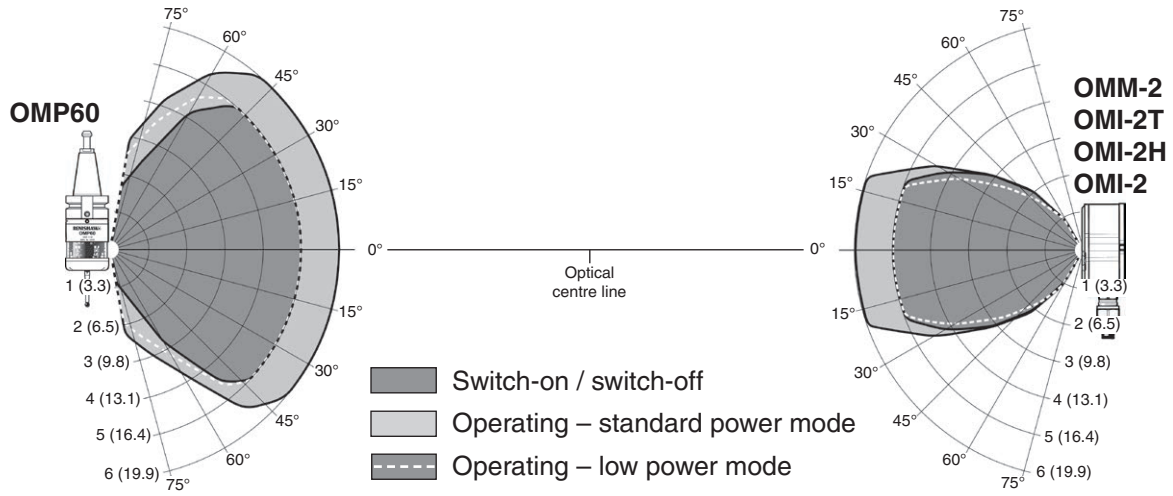
To assist finding the optimum position for the OMM-2 / OMI-2T / OMI-2H / OMI-2, the signal condition is displayed on a multi-coloured LED.

To assist finding the optimum position for the OMI, the signal strength is displayed on an OMI multi-coloured LED.

To assist finding the optimum position of the OMM during system installation, signal strength outputs are available on the MI 12 interface.

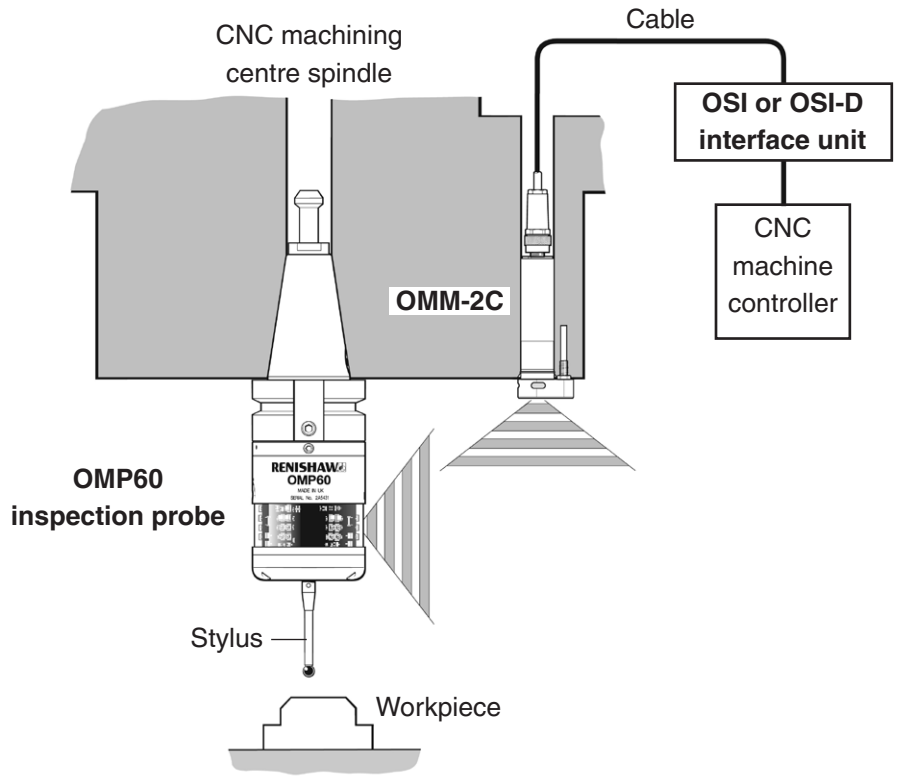
Performance envelope when using the OMP60 with an OMM-2 / OMI-2T / OMI-2H / OMI-2 (modulated transmission)

The probe and OMM-2 / OMI-2T / OMI-2H / OMI-2 diodes must be in each other's field of view and within the performance envelope shown. The OMP60 performance envelope is based on the OMM-2 / OMI-2T / OMI-2H / OMI-2 being at 0° and vice versa.



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

Installing the OMP60 with an OMM-2C receiver with OSI or OSI-D interface



Operating envelopes

When used with an OMM-2C receiver with OSI or OSI-D interface, the OMP60 uses modulated transmission.

Natural reflective surfaces within the machine may increase the signal transmission range.

For best system performance, ensure that the OMM-2C receiver with OSI or OSI-D interface is mounted in a position which is not directly in front of a light source.

Coolant and swarf residue accumulating on the probe, interface or receiver windows will have a detrimental effect on transmission performance. Wipe clean as often as is necessary to maintain unrestricted transmission.

WARNING: Ensure the machine tool is in a safe condition and power is removed before removing covers. Only qualified persons should adjust switches.

CAUTION: If two systems are operating in close proximity to each other, take care to ensure that the signals transmitted from the OMP60 on one machine are not received by the receiver on the other machine, and vice versa. When this is the case, it is recommended that the OMP60 low optical power is used.

Performance envelope of OMM-2C with OMP60

Reflective surfaces within the machine cabinet may increase the signal transmission range.

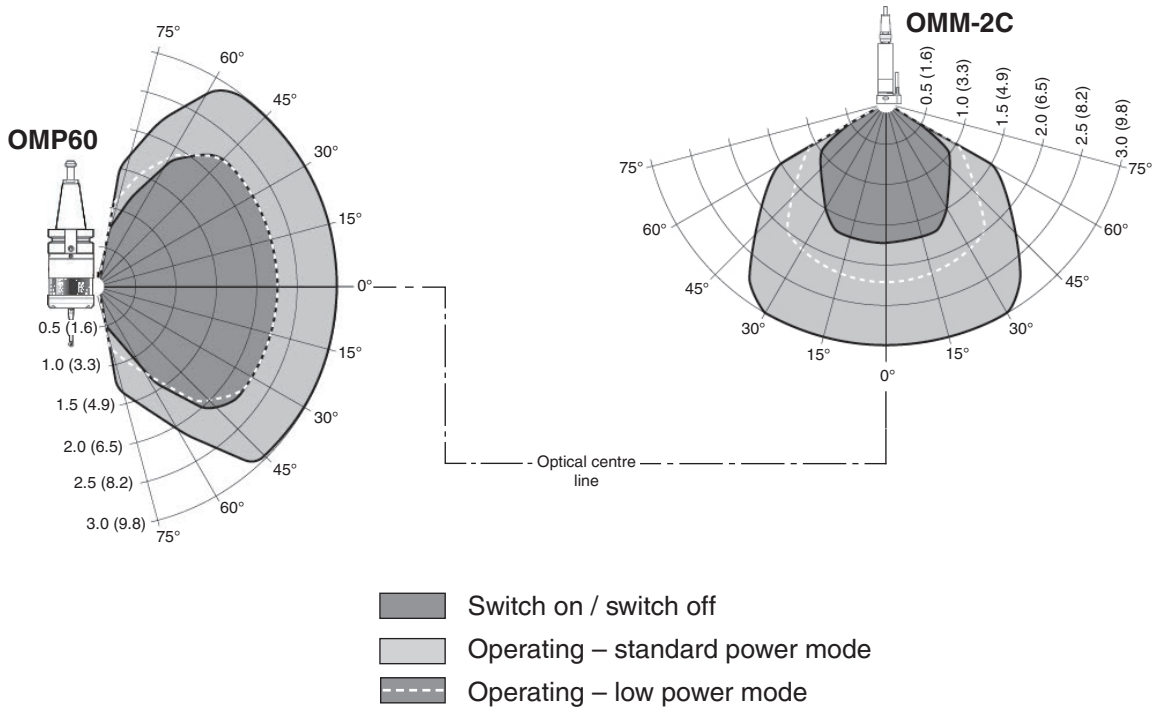
Coolant residue accumulating on the windows of the OMM-2C and OMP60 will have a detrimental effect on transmission performance. Wipe the windows clean as often as necessary to maintain unrestricted transmission.

For best system performance, ensure the OMM-2C is mounted in a position which is not directly in front of a light source.

The probe and OMM-2C may deviate from the optical centre line, provided opposing light cones always overlap, with transmitters and receivers in the other's field of view (eye-to-eye).

In multiple probe mode applications, OMP60 may be configured as Probe 1, Probe 2 or Probe 3.

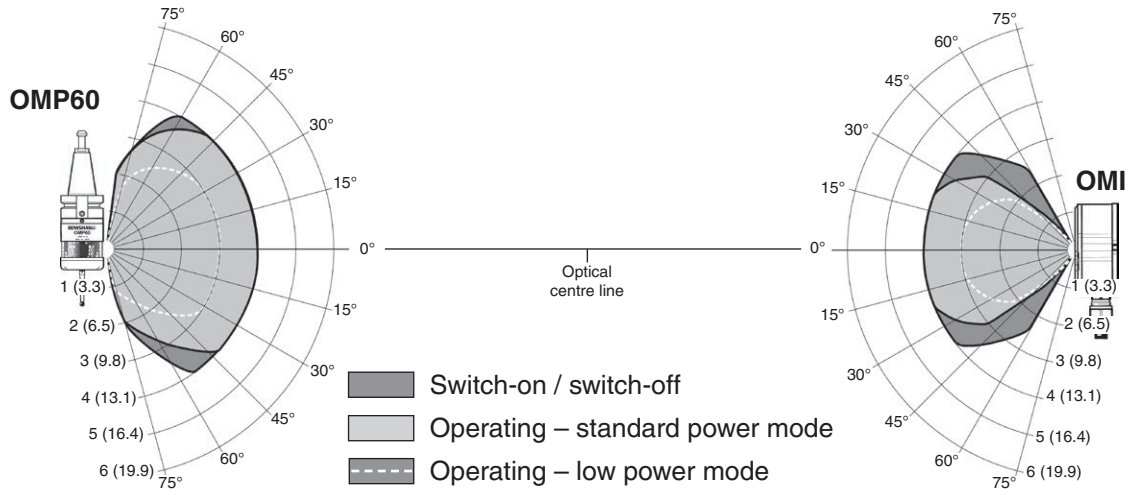
CAUTION: If two systems are operating in close proximity, take care to ensure that the signals transmitted from the OMP60 on one machine are not received by the OMM-2C on another machine and vice versa.



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

Performance envelope when using the OMP60 with an OMI (legacy transmission)

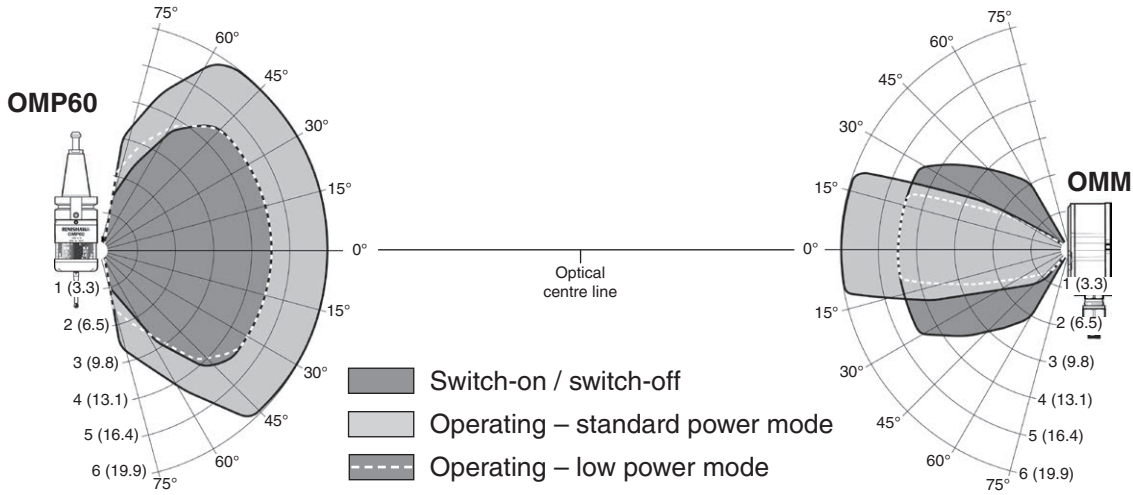
The probe and OMI diodes must be in each other's field of view, and within the performance envelope shown. The OMP60 performance envelope is based on the OMI being at 0° and vice versa.



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

Performance envelope when using the OMP60 with an OMM (legacy transmission)

The probe and OMM diodes must be in each other's field of view, and within the performance envelope shown. The OMP60 performance envelope is based on the OMM being at 0° and vice versa.



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

Preparing the OMP60 for use

Fitting the stylus

1

2

1.8 Nm – 2.2 Nm
(1.3 lbf.ft – 1.6 lbf.ft)

M-5000-3707

Stylus weak link

NOTE: Must be used with steel styli. For optimum metrology performance do not use a weak link with ceramic or carbon fibre styli.

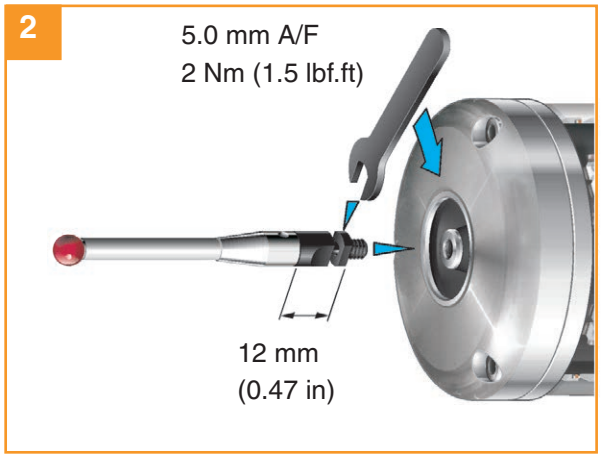
Fitting a stylus with a weak link onto the OMP60

In the event of excessive stylus overtravel, the weak link is designed to break, thereby protecting the probe from damage.

Take care to avoid stressing the weak link during assembly.

1

2



Removing a broken weak link

Installing the batteries

1

NOTES:

See Section 5 – “Maintenance” for a list of suitable battery types.

Ensure the product is clean and dry before inserting batteries.

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

When inserting batteries, check that the battery polarity is correct.

After inserting the batteries, the LEDs will display the current probe settings (for details, see Section 4 – “Trigger Logic™”).

2

3

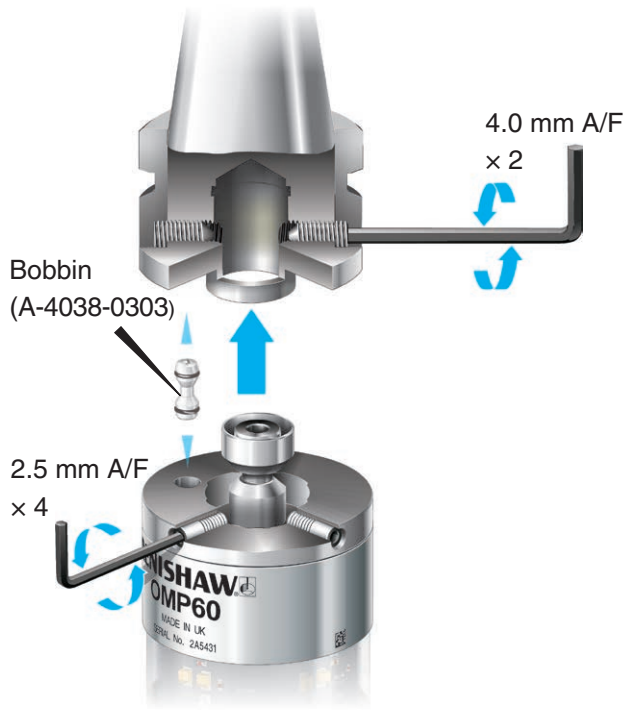
4

Mounting the probe on a shank (or machine table)

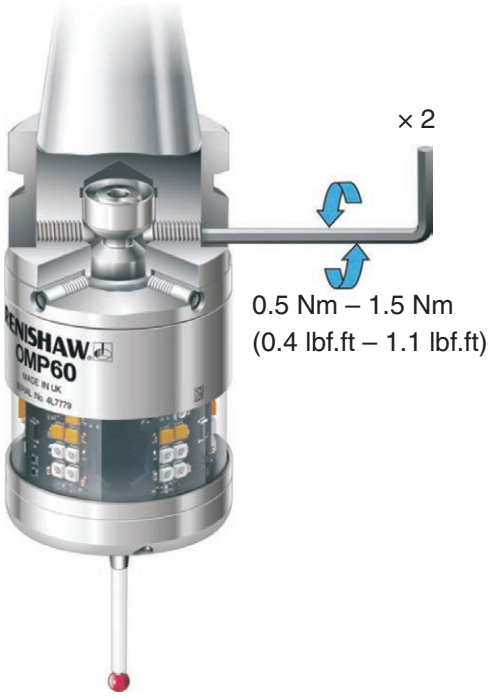
NOTE: In instances where the OMP60 is to be used with a shank switch, it will be necessary to remove the plug from the rear of the probe using pliers. This should then be substituted with the bobbin (A-4038-0303).

1

2



3



Stylus on-centre adjustment

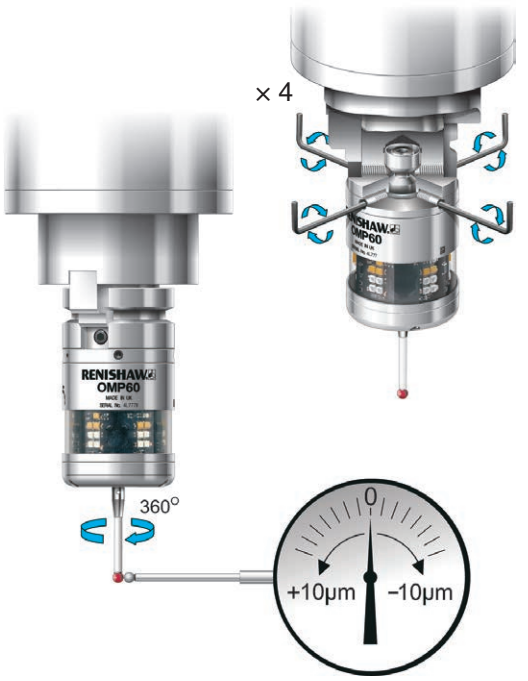
NOTES:

During adjustment, care must be taken not to rotate the probe relative to the shank, as damage to the bobbin (A-4038-0303) can occur where fitted.

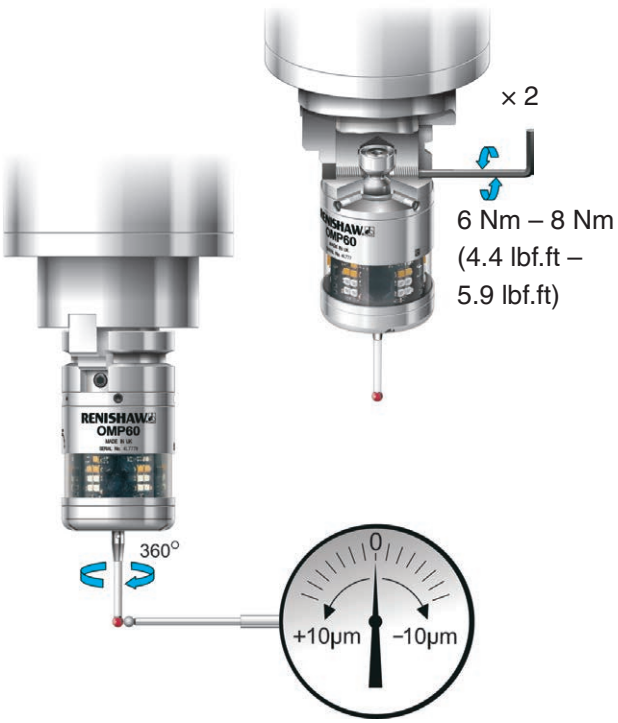
If a probe and shank assembly is dropped, it must be rechecked for correct on-centre adjustment.

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

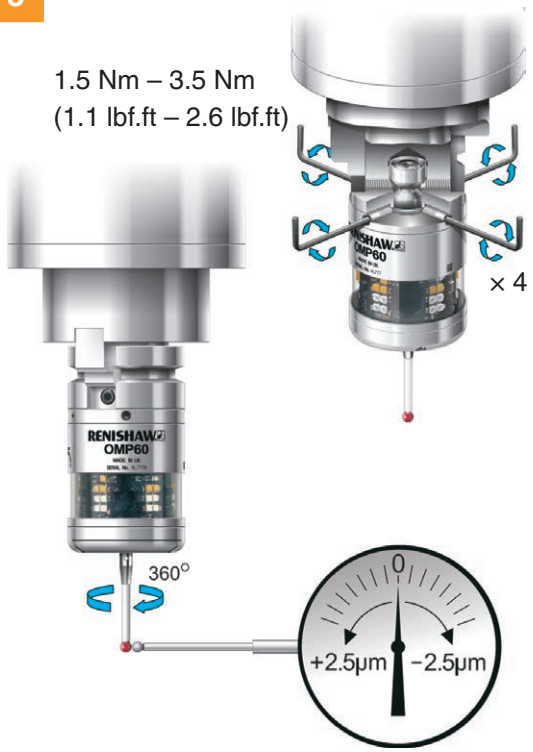
1



2



3



Stylus trigger force and adjustment

Spring force within the probe causes the stylus to sit in a unique position and return to this position following each stylus deflection.

Stylus trigger force is set by Renishaw. The user should only adjust the trigger force in special circumstances, e.g. where there is excessive machine vibration or insufficient force to support the stylus weight.

To adjust the trigger force, turn the adjusting screw anticlockwise to reduce the force (more sensitive) or clockwise to increase the force (less sensitive). A stop helps to prevent damage which could be caused by overtightening the adjusting screw.

XY trigger forces vary around the stylus seating.

Factory setting

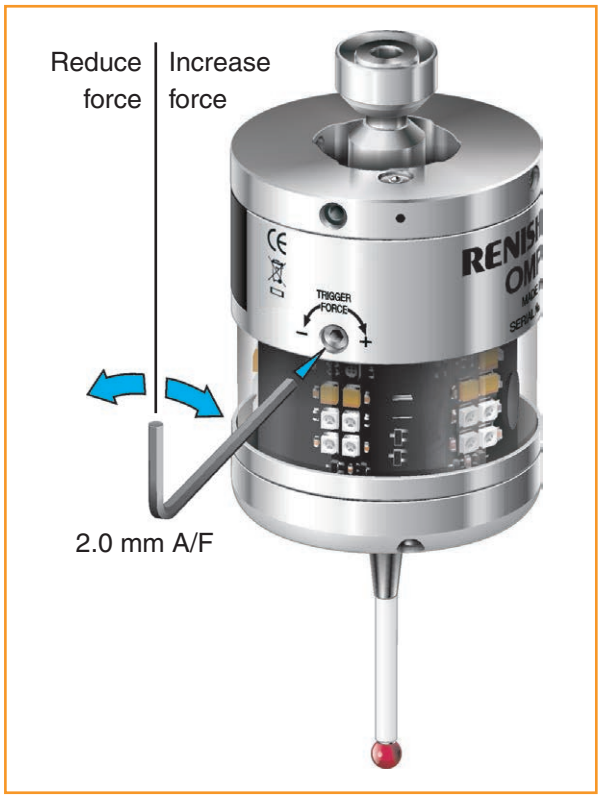
XY low force	0.75 N, 76 gf (2.70 ozf)
XY high force	1.40 N, 143 gf (5.04 ozf)
Z	5.30 N, 540 gf (19.06 ozf)

Maximum setting

XY low force	2.00 N, 204 gf (7.19 ozf)
XY high force	3.50 N, 357 gf (12.59 ozf)
Z	14.00 N, 1428 gf (50.36 ozf)

Minimum setting

XY low force	0.50 N, 51 gf (1.80 ozf)
XY high force	0.90 N, 92 gf (3.24 ozf)
Z	3.50 N, 357 gf (12.59 ozf)



Calibrating the OMP60

Why calibrate a probe?

A spindle probe 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 probe allows the probing software to compensate for this difference.

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 the enhanced trigger filter delay is changed;
- when a new stylus is fitted to the probe;
- when it is suspected that the stylus has become distorted or that the probe has crashed;
- at regular intervals to compensate for mechanical changes of your machine tool;
- 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.

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’ in Section 3 – “System Installation”). A small amount of run-out is acceptable, and can be compensated for as part of the normal calibration process.

Three different operations are to be used when calibrating a probe. They are:

- calibrating either in a bored hole or on a turned diameter of known position;
- calibrating either in a ring gauge or on a datum sphere;
- calibrating the probe length.

Calibrating in a bored hole or on a turned diameter

Calibrating a probe, either in a bored hole or on a turned diameter of known size, automatically stores values for the offset of the stylus ball to the spindle centre-line. The stored values are then used automatically in the measuring cycles. Measured values are compensated by these values so that they are relative to the true spindle centre-line.

Calibrating in a ring gauge or on a datum sphere

Calibrating a probe either in a ring gauge or on a datum sphere with a known diameter automatically stores one or more values for the radius of the stylus ball. The stored values are then used automatically by the measuring cycles to give the true size of the feature. The values are also used to give true positions of single surface features.

NOTE: The stored radius values are based on the true electronic trigger points. These values are different from the physical sizes.

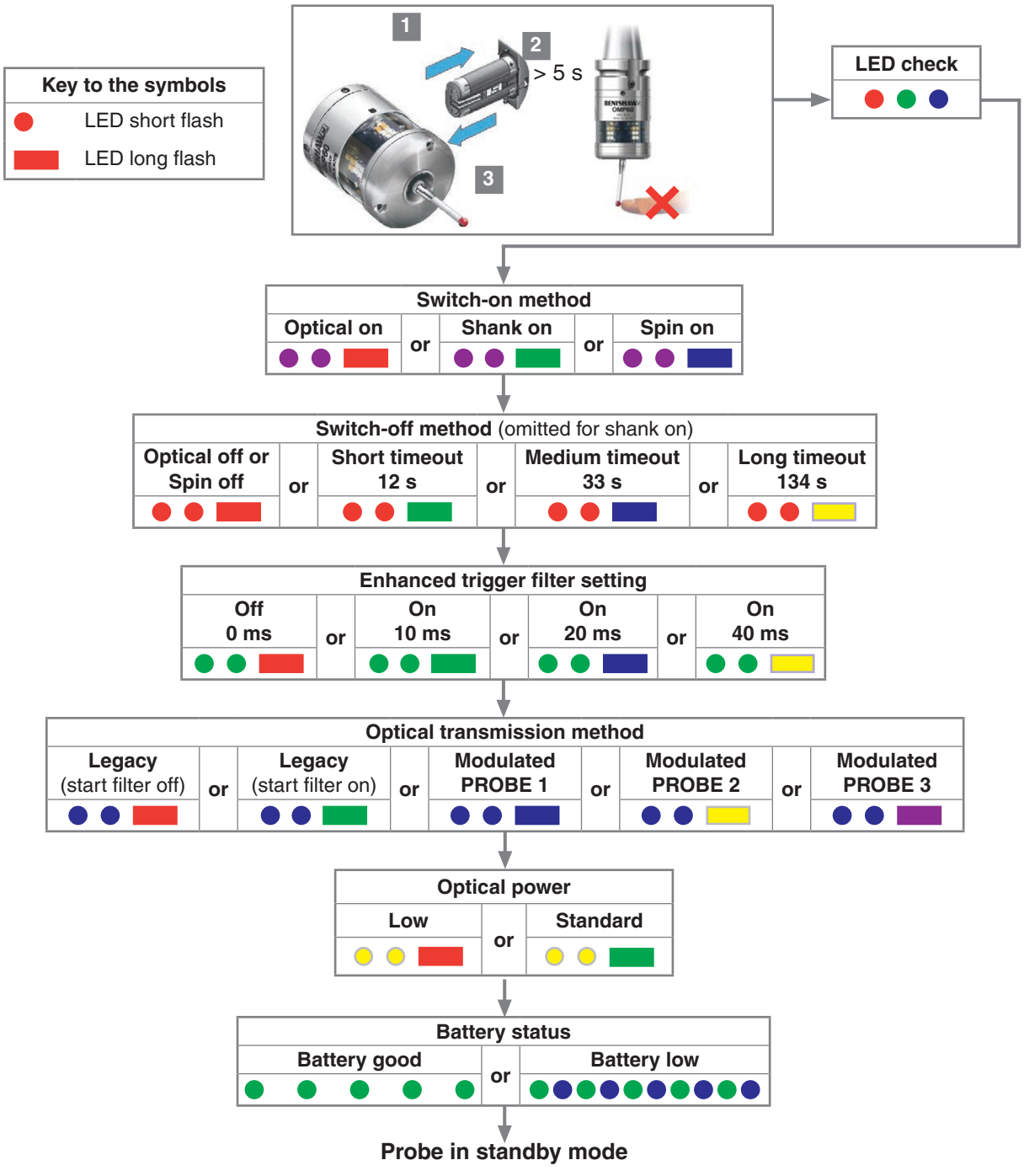
Calibrating the probe length

Calibrating a probe on a known reference surface determines the length of the probe, based on the electronic trigger point. The stored value for length is different from the physical length of the probe assembly. Additionally, the operation can automatically compensate for machine and fixture height errors by adjusting the probe length value that is stored.

This page is intentionally left blank.

Trigger Logic™

Reviewing the probe settings



Probe settings record

This page is provided to note your probe's settings.

			✓ tick Factory settings	✓ tick New settings
Switch-on method	Optical on	● ● ▬	✓	
	Shank on	● ● ▬		
	Spin on	● ● ▬		
Switch-off method	Optical off or spin off	● ● ▬	✓	
	Short timeout (12 s)	● ● ▬		
	Medium timeout (33 s)	● ● ▬		
	Long timeout (134 s)	● ● ▬		
Enhanced trigger filter setting	Off (0 ms)	● ● ▬	✓	
	On (10 ms)	● ● ▬		
	On (20 ms)	● ● ▬		
	On (40 ms)	● ● ▬		
Optical transmission method	Legacy (start filter off)	● ● ▬		
	Legacy (start filter on)	● ● ▬		
	Modulated PROBE 1	● ● ▬	✓	
	Modulated PROBE 2	● ● ▬		
	Modulated PROBE 3	● ● ▬		
Optical power	Low	● ● ▬		
	Standard	● ● ▬	✓	

Factory settings are for kit (A-4038-2001) only.

OMP60 serial no .....

This page is intentionally left blank.

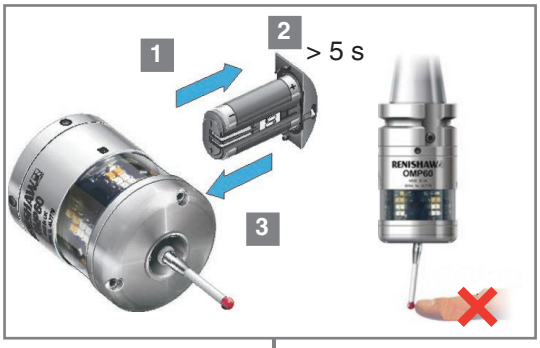
Changing the probe settings

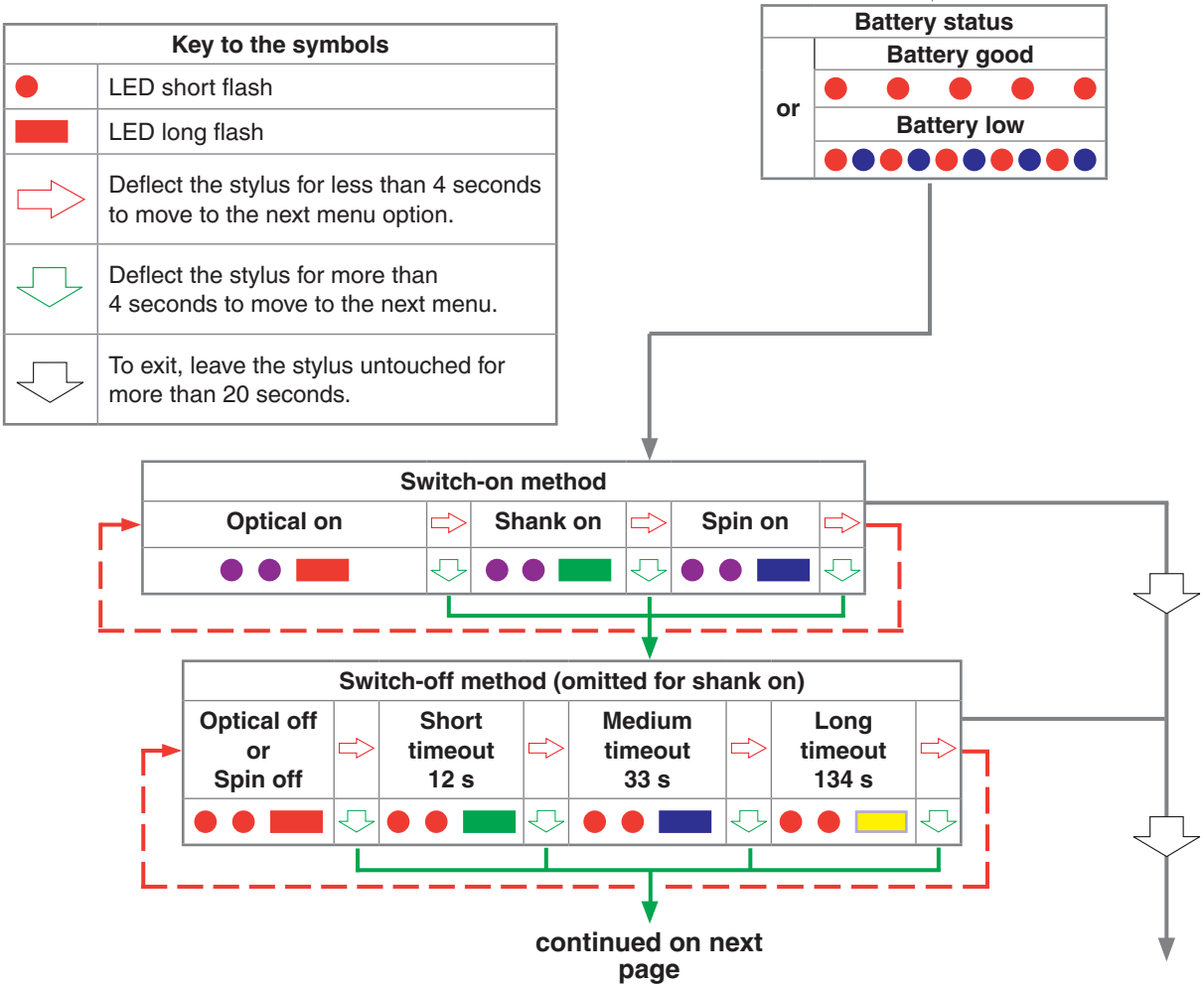
Insert the batteries or, if they have already been installed, remove them for five seconds and then refit them.

Following the LED check, immediately deflect the stylus and hold it deflected until five red flashes have been observed (if the battery power is low then each of the five red flashes will be followed by a blue flash).

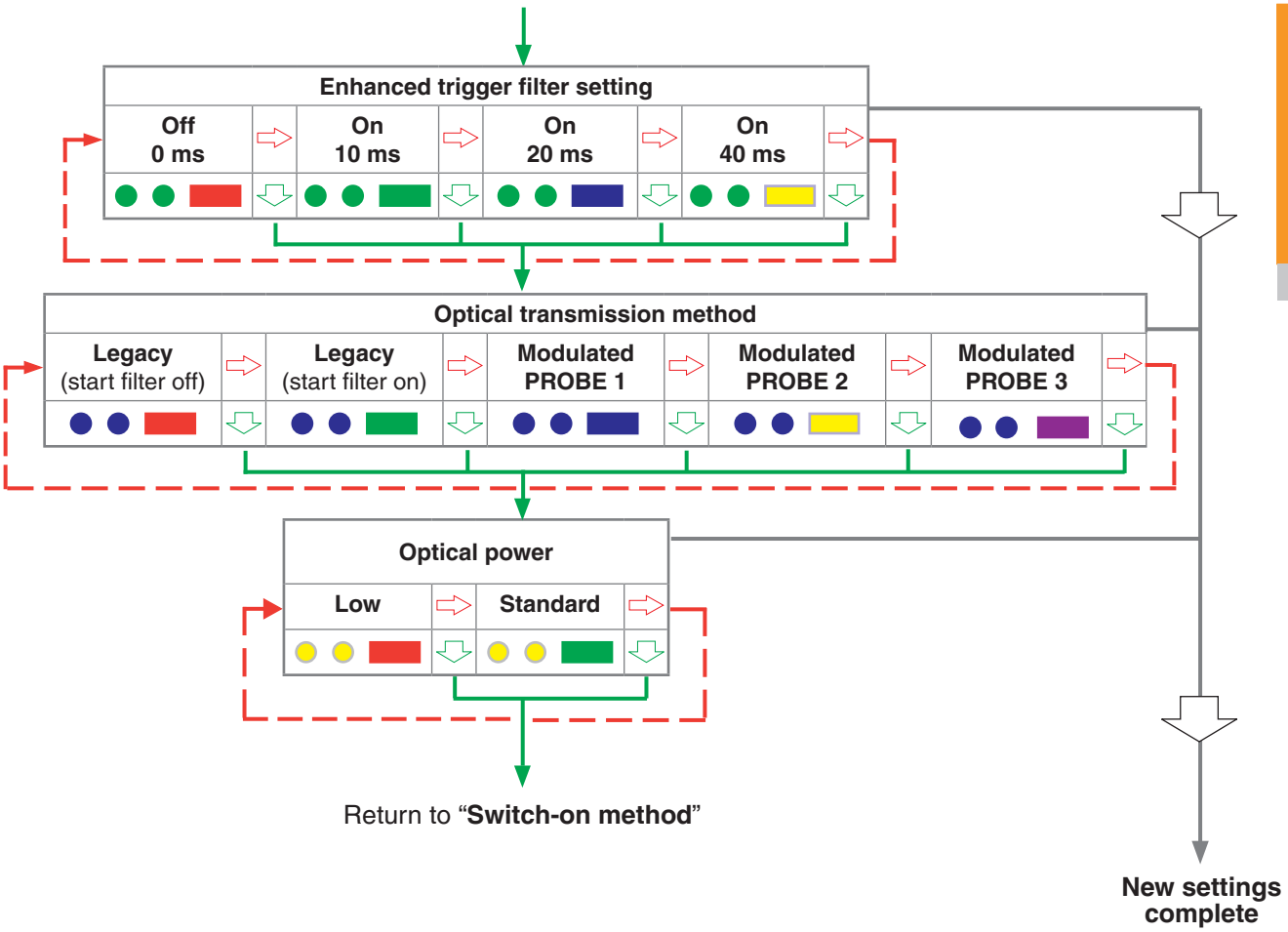
Keep the stylus deflected until the "**Switch-on method**" setting is displayed, then release the stylus. The probe is now in configuration mode and Trigger Logic™ is activated.

CAUTION: Do not remove the batteries whilst in the configuration mode. To exit, leave the stylus untouched for > 20 seconds.





continued on next page


Enhanced trigger filter setting
Off
0 ms
On
10 ms
On
20 ms
On
40 ms
Optical transmission method
Legacy
(start filter off)
Legacy
(start filter on)
Modulated
PROBE 1
Modulated
PROBE 2
Modulated
PROBE 3
Optical power
Low
Standard
Return to "Switch-on method"
New settings
complete

Operating mode

Probe status LEDs

LED colour	Probe status	Graphic hint
Flashing green	Probe seated in operating mode	
Flashing red	Probe triggered in operating mode	
Flashing green and blue	Probe seated in operating mode – low battery	
Flashing red and blue	Probe triggered in operating mode – low battery	
Constant red	Battery dead	
Flashing red or Flashing red and green or Sequence when batteries are inserted	Dead battery or unsuitable battery	

NOTE: Due to the nature of Lithium Thionyl Chloride batteries, if a 'low battery' LED sequence is ignored or overlooked, then it is possible for the following sequence of events to occur:

1. When the probe is active, the batteries discharge until battery power becomes too low for the probe to operate correctly.
2. The probe stops functioning, but then reactivates as the batteries recover sufficiently to provide the probe with power.
3. The probe begins to run through the LED review sequence (see 'Reviewing the current probe settings' in Section 4 – "Trigger Logic™").
4. Again, the batteries discharge and the probe ceases to function.
5. Again, the batteries recover sufficiently to provide the probe with power, and the sequence is repeated.

Maintenance

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 authorised Renishaw Service Centres.

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

Cleaning the probe

Wipe the window of the probe with a clean cloth to remove machining residue. This should be done on a regular basis to maintain optimum transmission.

CAUTION: The OMP60 has a glass window, handle with care if broken to avoid injury.

Changing the batteries

CAUTIONS:

Do not leave dead batteries in the probe.

When changing batteries, do not allow coolant or debris to enter the battery compartment.

When changing batteries, check that the battery polarity is correct.

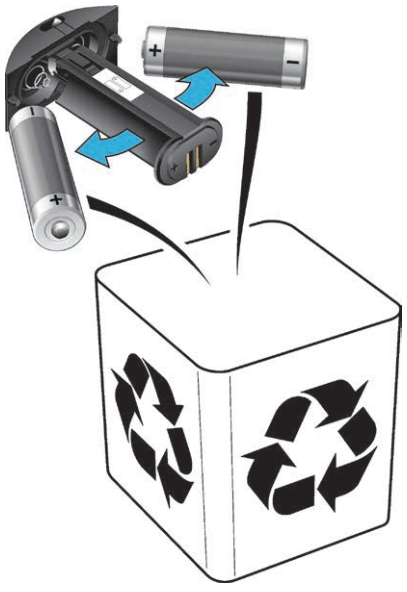
Take care to avoid damaging the battery cassette gasket.

Only use specified batteries.

1

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

2



3

NOTES:

After removing the old batteries, wait more than 5 seconds before inserting the new batteries.

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 into the probe, the LEDs will remain a constant red.

Battery types			
Alkaline x 2	**Lithium Thionyl Chloride x 2**		**Nickel Cadmium/Nickel Metal Hydride x 2**
AA 1.5 V ✓	**Saft:**	LS 14500	**AA 1.2 V** ✓
	Tadrian:	TL-5903/S, TL-2100/S, SL-760/S	
	Xeno:	XL-060F ✓	

4

5

Diaphragm replacement

OMP60 diaphragms

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

You should periodically check the outer diaphragm for signs of damage. If this is evident, replace the outer diaphragm.

Do not remove the inner diaphragm. If it is damaged, return the probe to your supplier for repair.

Outer diaphragm inspection

1. Remove the stylus.
2. Undo the three M3 front cover screws and remove the front cover.
3. Inspect the outer diaphragm for damage.
4. To remove the outer diaphragm, grip by the outer edge and pull off.

Inner diaphragm inspection

Inspect the inner diaphragm for damage. If it is damaged, return the probe to your supplier. DO NOT REMOVE THE INNER DIAPHRAGM AS YOUR WARRANTY WILL BE INVALIDATED.

Outer diaphragm replacement

1 Fit the new diaphragm over the centre.

2. Locate the outer edge of the diaphragm to rest on the outer edge of the inner diaphragm.
3. Refit the front cover and M3 screws.
4. Refit the stylus and recalibrate the probe.

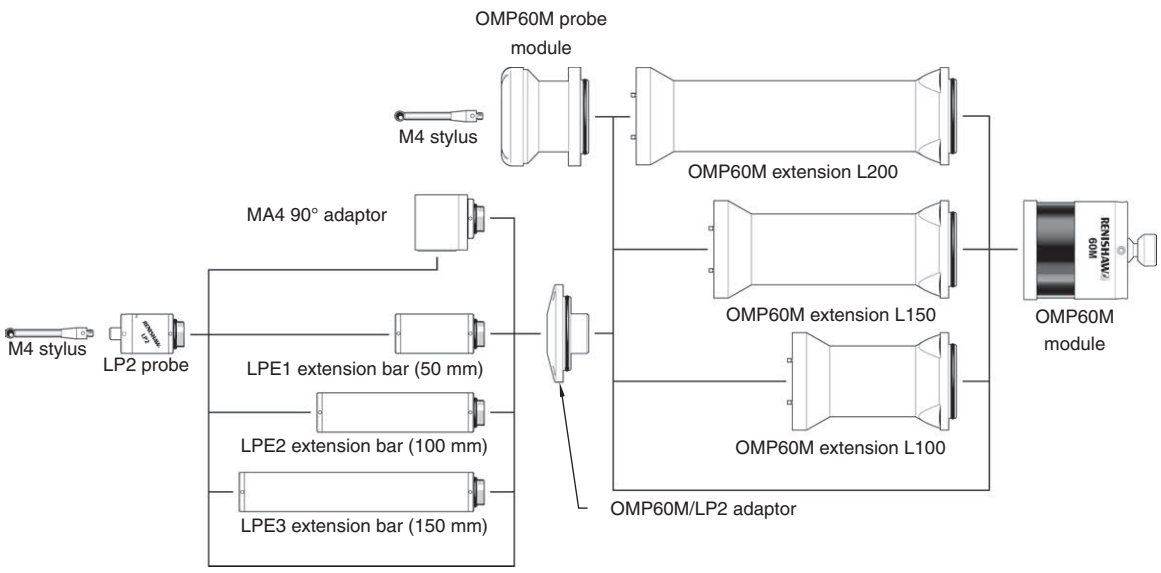
OMP60M system

OMP60M system

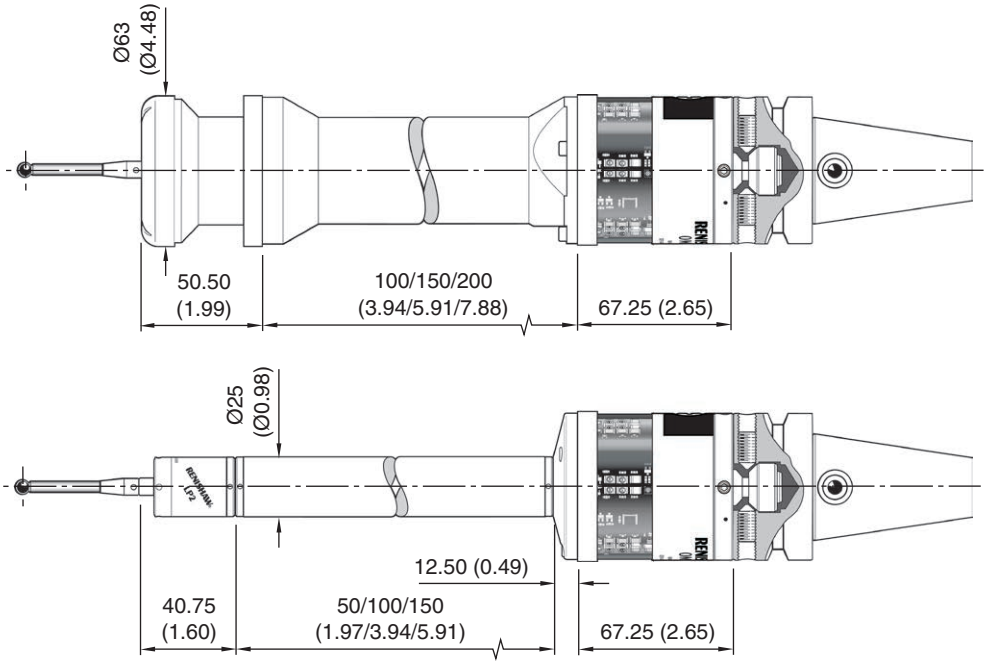
OMP60M is a special modular version of OMP60. It enables probe inspection of part features inaccessible to OMP60, by fitting selected adaptors and extensions as shown below.

See Chapter 8 – “Parts list”.

NOTE: Maximum spindle speed 750 rev/min.

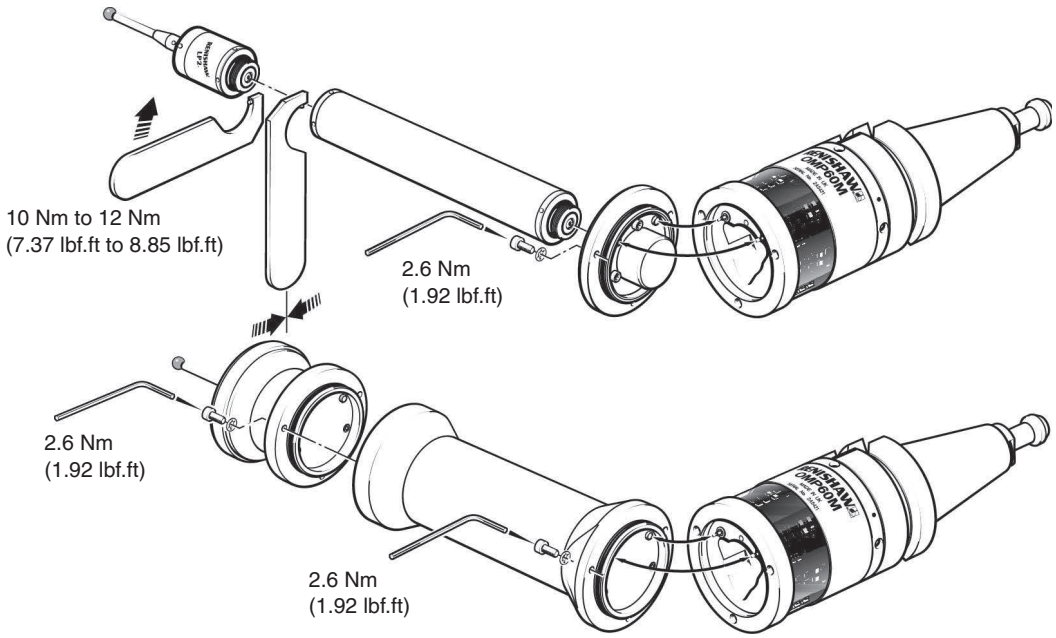


OMP60M dimensions



Dimensions given in mm (in)

OMP60M screw torque values



Fault-finding

Symptom	Cause	Action
Probe fails to power up (no LEDs illuminated or fails to indicate current probe settings).	Dead batteries.	Change batteries.
	Unsuitable batteries.	Change batteries.
	Batteries inserted incorrectly.	Check battery insertion / polarity.
	Batteries removed for too short a time and probe has not reset.	Remove batteries for a minimum of 5 seconds.
Probe fails to switch on (optical-on is required).	Wrong transmit mode selected.	Reconfigure transmit mode.
	Wrong switch-on mode selected.	Reconfigure to optical-on mode.
	Dead batteries.	Change batteries.
	Unsuitable batteries.	Change batteries.
	Batteries inserted incorrectly.	Check battery insertion / polarity.
	Optical/magnetic interference.	Check for interfering lights or motors. Consider removing source of interference.
	Probe out of range / not aligned with receiver.	Check configuration and alter as required.
	Transmission beam obstructed.	Check OMP60 and receiver windows are clean and remove any obstruction.
	No receiver start signal.	Check start signal by reviewing receiver LED. Refer to relevant user's guide.
	No power to interface or receiver.	Check if stable 24 V supply is available. Check connections and fuses.

Symptom	Cause	Action
Probe fails to switch on (shank-on is required).	Wrong switch-on mode is selected.	Reconfigure to shank-on mode.
	Dead batteries.	Change batteries.
	Unsuitable batteries.	Change batteries.
	Batteries inserted incorrectly.	Check battery insertion.
	Malfunctioning shank switch.	Check switch operation.
	No bobbin installed.	Install bobbin.
Probe fails to switch on (spin-on is required).	Wrong switch-on mode is selected.	Reconfigure to spin-on mode.
	Dead batteries.	Change batteries.
	Unsuitable batteries.	Change batteries.
	Batteries inserted incorrectly.	Check battery insertion.
	Incorrect spindle speed selected.	Program correct spindle speed / duration.
	Excessive spindle vibration.	Review probing software.
Machine stops unexpectedly during a probing cycle.	Optical communication obstructed.	Check interface / receiver and remove obstruction.
	Interface / receiver / machine fault.	Refer to interface / receiver / machine user's guide.
	Dead batteries.	Change batteries.
	Probe unable to find target surface.	Check that part is correctly positioned and that stylus has not broken.
	False probe trigger.	Adjust stylus trigger force and / or enable enhanced trigger filter.
	Adjacent probe.	Reconfigure to low power mode and reduce range of receiver.

Symptom	Cause	Action
Probe crashes.	Inspection probe using tool setting probe signals.	When two systems are active, isolate tool setting probe.
	Workpiece obstructing probe path.	Review probing software.
	Adjacent probe.	Reconfigure to low power mode and reduce range of receiver.
	Probe length offset missing.	Review probing software.
Poor probe repeatability and/or accuracy.	Debris on part or stylus.	Clean part and stylus.
	Poor tool change repeatability.	Redatum probe after each tool change.
	Loose probe mounting on shank or loose stylus.	Check and tighten as appropriate.
	Calibration out of date and/or incorrect offsets.	Review probing software.
	Calibration and probing speeds not the same.	Review probing software.
	Calibration feature has moved.	Correct position.
	Measurement occurs as stylus leaves surface.	Review probing software.
	Measurement occurs within the machine's acceleration and deceleration zone.	Review probing software and probe filter settings.
	Probing speed too high or too slow.	Perform simple repeatability trials at various speeds.
	Temperature variation causes machine and workpiece movement.	Minimise temperature changes.

Symptom	Cause	Action
Probe fails to switch off (optical-off is required).	Wrong switch-off mode selected.	Reconfigure to optical-off mode.
	Optical / magnetic interference.	Check for interfering lights or motor.
	Probe is inadvertently switched on by the receiver when using autostart.	Check position of receiver. Reduce receiver signal strength.
	Probe out of range.	Review performance envelopes.
	Probe is regularly falsely switched on by light interference.	Enable optical transmission legacy mode (start filter on), or consider upgrading to a modulated receiver.
Probe fails to switch off (shank-off is required).	Malfunctioning switch.	Check switch operation.
Probe fails to switch off (spin-off is required).	Wrong switch-off mode selected.	Reconfigure to spin-off mode.
	Incorrect spindle speed is selected.	Program correct spindle speed / duration.
	Excessive spindle vibration.	Consider use of optical or shank switch-on.
Probe fails to switch off (timeout is required).	Incorrect switch-off method configured.	Reconfigure to timeout mode.
	Probe placed in carousel; when in timeout mode timer can be reset by carousel activity.	Use lighter styli.
Probe fails to communicate with interface after spin or shank on.	Wrong transmit mode selected; optical / magnetic interference.	Reconfigure transmit mode. Check for interfering lights or motors. Consider removing source of interference.

Parts list

Type	Part number	Description
OMP60	A-4038-0001	OMP60 probe with batteries, tools and support card (set to optical on / optical off) – legacy transmission.
OMP60	A-4038-0002	OMP60 probe with batteries, tools and support card (set to optical on / time off 134 sec) – legacy transmission.
OMP60	A-4038-2001	OMP60 probe with batteries, tools and support card (set to optical on / optical off) – modulated transmission, PROBE 1 start.
OMP60	A-4038-2002	OMP60 probe with batteries, tools and support card (set to optical on / time off 134 sec) – modulated transmission, PROBE 1 start.
Battery	P-BT03-0005	AA battery – alkaline type – supplied as standard with probe (two required).
Battery	P-BT03-0008	AA battery – Lithium Thionyl Chloride (two required).
Stylus	A-5000-3709	PS3-1C ceramic stylus 50 mm long with Ø6 mm ball.
Weak link kit	A-2085-0068	Weak link (Part no. M-2085-0069 × 2) and 5 mm A/F spanner.
Tool kit	A-4038-0304	Probe tool kit comprising Ø1.98 mm stylus tool, 2.0 mm A/F hexagon key, 2.5 mm A/F hexagon key (× 2), 4.0 mm A/F hexagon key (× 2) and shank grub screw (× 2).
Battery cassette	A-4038-0300	OMP60 battery cassette assembly.
Cassette seal	A-4038-0301	Battery cassette housing seal.
Diaphragm kit	A-4038-0302	OMP60 diaphragm kit.
External eyelid kit	A-4038-0305	External eyelid kit for OMP60.
Bobbin kit	A-4038-0303	Bobbin for shank switch (supplied with shank).
OMI-2	A-5191-0049	OMI-2 complete with cable 8 m (26.25 ft) long.
OMI-2	A-5191-0050	OMI-2 complete with cable 15 m (49 ft) long.
OMI-2T	A-5439-0049	OMI-2T complete with cable 8 m (26.25 ft) long.
OMI-2T	A-5439-0050	OMI-2T complete with cable 15 m (49 ft) long.
OMM-2	A-5492-0049	OMM-2 with cable 8 m (26.25 ft), tools and support card.
OMM-2	A-5492-0050	OMM-2 with cable 15 m (49 ft), tools and support card.

Type	Part number	Description
OSI interface	A-5492-2000	OSI (multiple probe mode) with DIN rail mounting, terminal block and support card.
OSI interface	A-5492-2010	OSI (single probe mode) with DIN rail mounting, terminal block and support card.
OSI-D interface	A-5492-3000	OSI-D (multiple probe mode) with DIN rail mounting, terminal block and support card.
OSI-D interface	A-5492-3010	OSI-D (single probe mode) with DIN rail mounting, terminal block and support card.
Mounting bracket	A-2033-0830	Mounting bracket with fixing screws, washers and nuts.
Styli tool	M-5000-3707	Tool for tightening / releasing styli.
OMP60M module	A-4038-1003	OMP60M module with batteries, tools and support card (set to optical on / optical off) – legacy transmission.
OMP60M module	A-4038-0368	OMP60M module with batteries, tools and support card (set to optical on / time off 134 sec) – legacy transmission.
OMP60M module	A-4038-0369	OMP60M module with batteries, tools and support card (set to optical on / optical off) – modulated transmission, PROBE 1 start.
OMP60M module	A-4038-0370	OMP60M module with batteries, tools and support card (set to optical on/time off 134 sec) – modulated transmission, PROBE 1 start.
LP2	A-2063-6098	LP2 probe complete with two C spanners and TK1 tool kit.
Extension L100	A-4038-1010	OMP60M extension – 100 mm long.
Extension L150	A-4038-1027	OMP60M extension – 150 mm long.
Extension L200	A-4038-1028	OMP60M extension – 200 mm long.
OMP60/OMP60M probe module assembly	A-4038-1002	OMP60M probe module assembly.
OMP60M/LP2 adaptor	A-4038-0212	OMP60M LP2 adaptor assembly.
LPE1	A-2063-7001	LPE1 extension bar – 50 mm long.
LPE2	A-2063-7002	LPE2 extension bar – 100 mm long.
LPE3	A-2063-7003	LPE3 extension bar – 150 mm long.
MA4	A-2063-7600	MA4 90° adaptor assembly.

Type	Part number	Description
Publications. These can be downloaded from our website at **www.renishaw.com**		
OMP60	H-4038-8505	Installation guide: for set-up of the OMP60.
OMI-2	H-5191-8504	Installation guide: for set-up of the OMI-2.
OMI-2T	H-5439-8510	Installation guide: for set-up of the OMI-2T.
OSI/OSI-D with OMM-2	H-5492-8504	Installation guide: for set-up of the OSI/OSI-D interface with OMM-2.
OSI/OSI-D with OMM-2C	H-5991-8504	Installation guide: for set-up of the OSI/OSI-D interface with OMM-2C.
Probe software	H-2000-2298	Data sheet: Probe software for machine tools – programs and features.
Taper shanks	H-2000-2011	Data sheet: Taper shanks for machine tool probes.
Styli	H-1000-3200	Technical specifications guide: Styli and accessories – or visit our Online store at **www.renishaw.com/shop**.

Renishaw plc
New Mills, Wotton-under-Edge
Gloucestershire, GL12 8JR
United Kingdom

T +44 (0)1453 524524
F +44 (0)1453 524901
E uk@renishaw.com

www.renishaw.com

RENISHAW
apply innovation™

For worldwide contact details, visit
www.renishaw.com/contact

Issued 12.2022

Part no. H-4038-8505-03-B