Installation guide
H-4113-8504-02-A

RENISHAW
apply innovation™

RMP60 - radio machine probe

Renishaw part no: H-4113-8504-02-A

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Disclaimer

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Trademarks

Warranty

Equipment requiring attention under warranty must be returned to your equipment supplier. No claims will be considered where Renishaw equipment has been misused, or where repairs or adjustments have been attempted by unauthorised persons. Prior consent must be obtained in instances where Renishaw equipment is to be substituted or omitted. Failure to comply with this requirement will invalidate the warranty.

Changes to equipment

Renishaw reserves the right to change equipment specifications without notice.

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 RMP60 probe, and other similar Renishaw probes, are subject of one or more of the following patents and/or patent applications:

CN 1732488A	CN 1771425A
EP 0337669	EP 0390342
EP 0652413	EP 0695926
EP 1185838	EP 1373995
EP 1425550	EP 1457786
EP 1477767	EP 1477768
EP 1576560	EP 1613921
EP 1701234	EP 1734426
JP 2,945,709	JP 2,994,401
JP 2003-526,170	JP 2004-279,417
JP 2004-522,961	JP 2005-502,035
JP 2006/522931	JP 2006-511860
JP 3,126,797	US 2003-0179097
US 2004-0178771	US 2006/0215614 A1
US 5,040,931	US 5,150,529
US 5,212,872	US 5,279,042
US 5,669,151	US 6,776,344 B2
US 6,941,671B2	

CAUTION: The RMP60 has a glass window. Handle with care if broken to avoid injury.

CE

EC DECLARATION OF CONFORMITY

Renishaw plc declares that the product:

Name:	RMP60
Description:	Radio machine probe

has been manufactured in conformity with the following standard:

EN 300 328-2 V1.2.1	Electromagnetic compatibility and radio spectrum matters (ERM); wideband transmission systems; data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive
EN 301 489-17 V1.2.1	Electromagnetic compatibility and radio spectrum matters (ERM); electromagnetic compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

and that it complies with the requirements of the following directives (as amended):

1999/5/EC	R&TTE Radio and telecommunications terminal equipment

The above information is summarised from the full EC Declaration of Conformity. A copy is available from Renishaw on request.

FCC DECLARATION (USA)

FCC Section 15.19

This device complies with Part 15 of the FCC rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device may accept any interference received, including interference that may cause undesired operation.

FCC Section 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

FCC Section 15.21

The user is cautioned that any changes or modifications not expressly approved by Renishaw plc, or authorised representative could void the user's authority to operate the equipment.

Radio approval

Extract from Taiwanese radio regulations

附件一

低功率電波輻射性電機管理辦法

第十二條

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信法規定作業之無線電通信。

低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Radio approvals

Europe: CE 0536!

USA: FCC ID KQGRMP60V2
FCC ID KQGRMP60MV2

Canada: IC: 3928A-RMP60V2

Japan: RMP60: 004NYCA0406
RMP60M: 004NYCA0407

South Africa: TA-2007/518

Australia China Israel New Zealand Russia Switzerland India Thailand Korea Turkey Indonesia Malaysia Mexico

In the countries identified below an additional label is required. The label must be fitted on the side of the RMP60 battery housing, but not across the glass window:

Brazil 

Taiwan:

RMP60: CCAC07LP0100T2

RMP60M: CCAC07LP0101T1

Safety

Information to the user

Handle and dispose of batteries in accordance with the manufacturer's recommendations. Use only the recommended batteries. Do not allow the battery terminals to contact other metallic objects.

Take care not to short the battery contacts as this may be a fire hazard. Ensure that the contact strips are located securely.

The RMP60 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.

Under certain circumstances, 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 EEC 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, i.e. power transformers, servo drives etc;
- all 0V/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, i.e. motor power supply cables etc, or be near high speed data lines;
- cable lengths should always be kept to a minimum.

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RMP60 basics

Introduction

RMP60 is part of a new generation of radio transmission part probing system, ideally suited to large machining centres or where line-of-sight between probe and receiver is difficult to achieve.

RMP60 features an integrated probe module delivering exceptional robustness and generous overtravel.

RMP60 complies with FCC regulations and operates in the 2.4 GHz band. It delivers interference-free transmission through the use of FHSS (frequency hopping spread spectrum). This allows many systems to operate in the same machine shop without risk of cross-talk.

All RMP60 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:

- Radio on / Radio off
- Radio on / Timer off
- Spin on / Spin off
- Spin on / Timer off
- Shank switch-on / Shank switch-off

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

Batteries are inserted or removed as shown (see ‘RMP60 batteries’ for further information).

On insertion of batteries, the LEDs will begin to flash (see ‘Reviewing current probe settings’ for further information).

System interface

The RMI integrated interface/receiver is used to communicate between the RMP60 probe and the machine control.

Trigger Logic™

Trigger Logic™ (see Section 4, "Trigger Logic™") 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 deflection (triggering) to systematically lead the user through the available choices to allow selection of the required mode options.

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.

Modes of operation

The RMP60 probe can be in one of three modes:

Standby mode: where the probe is awaiting a switch on signal.

Operational mode: activated by one of the switch on methods described on this page. In this mode the RMP60 is ready for use.

Configuration mode: where Trigger Logic™ may be used to configure the following probe settings.

Configurable settings

Switch on/switch off methods

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

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

RMP60 switch on method Switch on options are configurable	**RMP60 switch off method** Switch off options are configurable	**Switch on time**
Radio on Radio switch on is commanded by machine input.	**Radio off** Radio 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. **Timer off (timeout)** Timeout will occur 12, 33 or 134 seconds (user configurable) after the last probe trigger or reseat.	1.0 second maximum Note: This assumes a good radio communication link. In a poor RF environment this may rise to a maximum of 3 seconds.
Spin on Spin at 500 rev/min for 1 second minimum (6 seconds maximum).	**Spin off** Spin at 500 rev/min for 1 second minimum (6 seconds maximum). A timer automatically switches the probe off 90 minutes after the last trigger if it is not spun. **Timer off (timeout)** Timeout will occur 12, 33 or 134 seconds (user configurable) after the last probe trigger or reseat.	2 seconds maximum. Note: The 2 seconds starts from the moment the spindle reaches 500 rev/min.
Shank switch on	**Shank switch off**	1 second maximum.

NOTE: After being switched on, the RMP60 must be on for 1 second minimum (7 seconds for spin start) before being switched off.

Multiple probe mode

The RMP60 can be configured, using Trigger Logic™, to allow multiple radio probes to be used with a single RMI.

NOTES:

The 'radio on' switch on method cannot be used in multiple probe mode. Multiple probe mode will not appear as an option if the 'radio on' option has been selected.

RMP60 probes which are set to 'multiple probe mode on' can coexist alongside any number of RMP60 probes set to 'mode off'.

To allow multiple radio probes to work in close proximity, and with a single RMI, 16 choices of 'mode on' colours are available, each representing a different machine tool installation. The colour choices available are as shown on page 4.2.

All probes operating with a single RMI must be set to the same 'mode on' colour choice; any multiple probes located on adjacent machines must all be set to an alternative 'mode on' colour choice. Only one probe per 'mode on' colour choice needs to be partnered with the RMI as, by configuring multiple probes to a single 'mode on' colour choice, all probes using this 'mode on' colour choice will have the same identity. The probe to be partnered is partnered after selecting the 'multiple probe mode' setting and choosing the 'mode on' option. See 'Changing the probe settings' in Section 4, "Trigger Logic™".

There is no limit to the number of probes that can be used with a single RMI so long as they all have the same 'mode on' colour choice.

All RMP60 probes are factory set to 'mode off'.

The addition of any further probe(s) into a single probe installation will require that all probes are reconfigured to the same 'mode on' colour choice and that one of the probes are then repartnered with the RMI.

The addition of any further probe(s), or replacements, into a multi-probe installation can be achieved simply through the reconfiguration of the probe to the same 'mode on' colour choice.

Acquisition mode

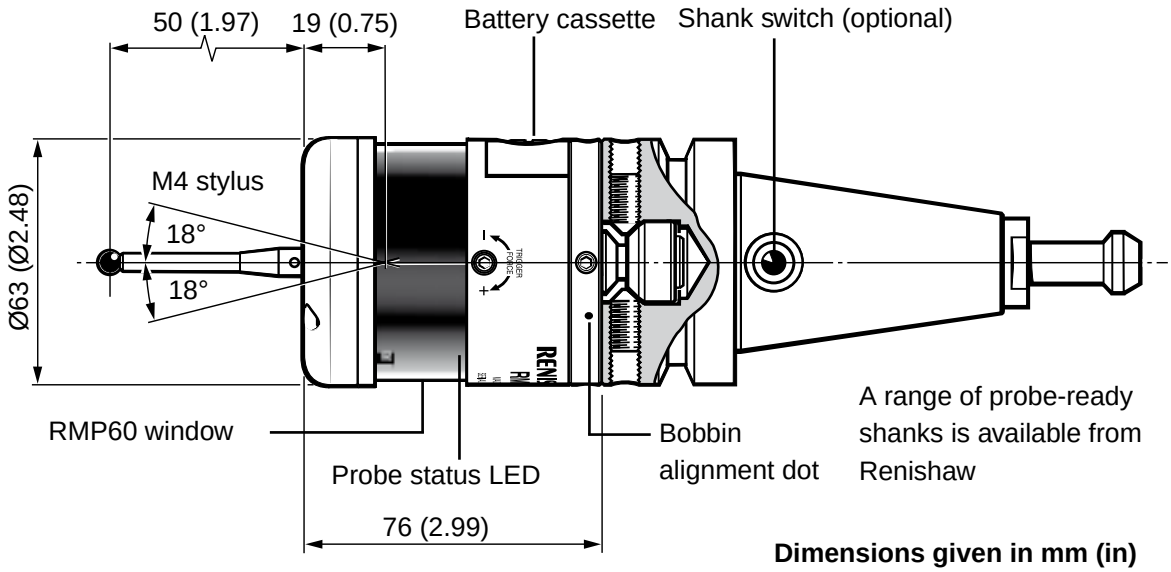
System set-up is achieved using Trigger Logic™ and powering on the RMI.

Partnering is only required during initial system set-up. Further partnering is only required if either the RMP60 or RMI is changed.

Partnering will not be lost by reconfiguration of probe settings or when changing batteries, except where multiple probe mode is selected .

Partnering can take place anywhere within the operating envelope.

RMP60 dimensions



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)

RMP60 specification

Principal application	Inspection probe for machine centres		
Dimensions	Length	76 mm (2.99 in)	
	Diameter	63 mm (2.48 in)	
Weight (without shank)	With batteries	901 g (31.79 oz)	
	Without batteries	855 g (30.16 oz)	
Transmission type	Frequency hopping spread spectrum radio (FHSS)		
Radio frequency	2400 MHz to 2483.5 MHz		
Switch on methods	Radio M code, spin on or shank switch		
Switch off methods	Radio M code, timer, spin off or shank switch		
Spindle speed (maximum)	1000 rev/min		
Operating range	Up to 15 m (49.2 ft)		
Receiver/interface	RMI combined interface and receiver unit		
Sense directions	Omni-directional ±X, ±Y, +Z		
Uni-directional repeatability maximum 2σ value in any direction	1.0 µm (0.00004 µin) is certified at 480 mm/min (1.57 ft/min) using 50 mm (1.97 in) stylus.		
Stylus trigger force	Factory setting	XY low force	0.75 N, 75 gf (2.64 ozf)
		XY high force	1.40 N, 140 gf (4.92 ozf)
		Z	5.30 N, 530 gf (18.69 ozf)
	Maximum setting	XY low force	2.0 N, 200 gf (7.0 ozf)
		XY high force	3.5 N, 350 gf (12.3 ozf)
		Z	14.0 N, 1400 gf (49.38 ozf)
	Minimum setting	XY low force	0.50 N, 50 gf (1.7 ozf)
		XY high force	0.90 N, 90 gf (3.2 ozf)
		Z	3.50 N, 350 gf (12.35 ozf)
Stylus overtravel	XY plane	±18°	
	+Z plane	11 mm (0.43 in)	

Battery types 2 x AA 1.5 V alkaline or Lithium Thionyl Chloride

Battery reserve life Approximately one week after a low battery warning is first given

Typical battery life

Battery type	Shank or spin switch on		Radio switch on		Continuous use
	Standby life	**5% usage** (72 minutes/day)	**Standby life**	**5% usage** (72 minutes/day)	
Alkaline	650 days	100 days	130 days	65 days	140 hours
Lithium Thionyl Chloride	1300 days	200 days	260 days	130 days	280 hours

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.

Environment

IP rating	IPX8
Storage temperature	-10 °C to 70 °C (14 °F to 158 °F)
Operating temperature	5 °C to 50 °C (41 °F to 122 °F)

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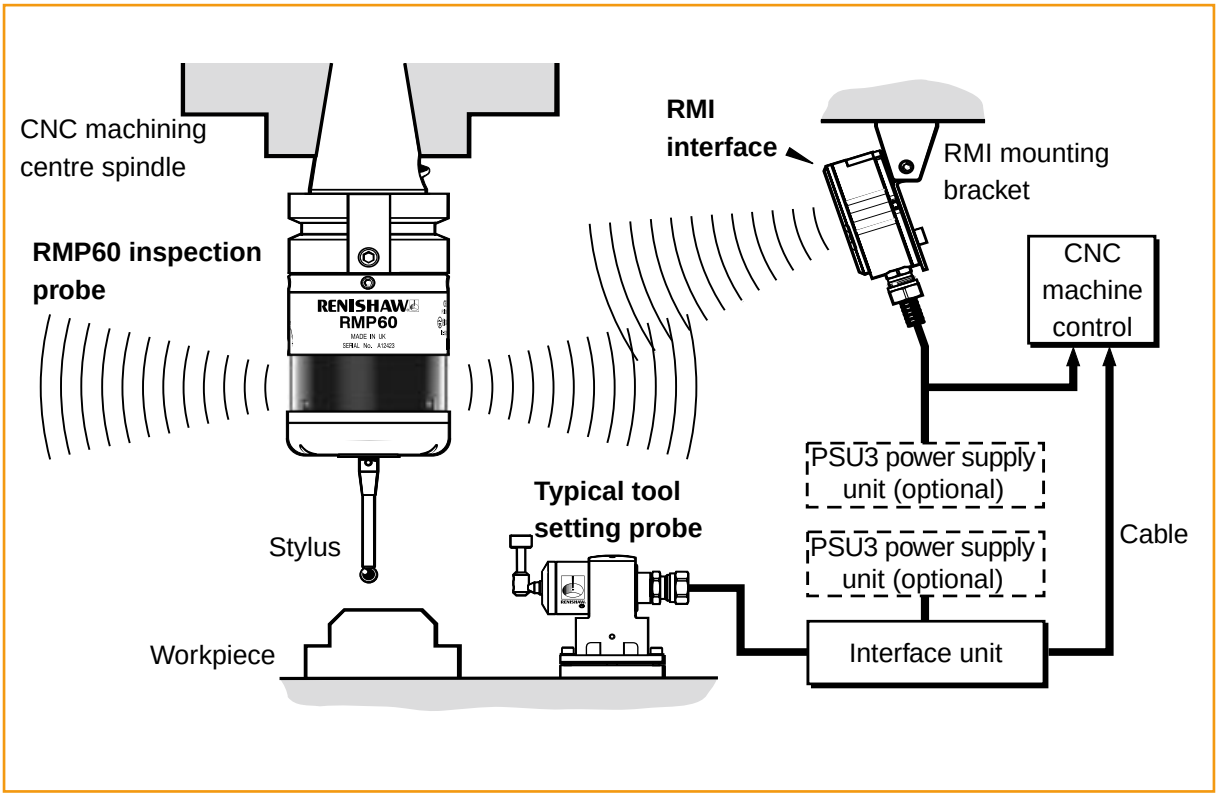
System installation

Installing the RMP60 with an RMI



Operating envelope

Radio transmission does not require line-of-sight and will pass through very small gaps and machine tool windows. This allows easy installation, either inside or outside the machine enclosure.

Coolant and swarf residue accumulating on the RMP60 and RMI may have a detrimental effect on transmission performance. Wipe clean as often as is necessary to maintain unrestricted transmission.

When operating, do not touch either the RMI cover or the probe glass window with your hand, as this will affect the performance.

Some reduction in range may result when operating in temperatures of 0 °C to 5 °C (32 °F to 41 °F) and 50 °C to 60 °C (122 °F to 140 °F)..

Performance envelope when using the RMP60 with the RMI

RMP60 / RMI positioning

The probe system should be positioned so that the optimum range can be achieved over the full travel of the machine's axes. Always face the front cover of the RMI in the general direction of the machining area and the tool magazine, ensuring both are within the performance envelope shown below. To assist in finding the optimum position of the RMI, the signal quality is displayed on an RMI signal LED.

NOTE: RMP60 / RMI installation with RMP60 in radio-on configuration.

RMP60 has a built-in hibernate mode (battery saving mode) that saves battery life when the RMI is unpowered in radio-on (radio-off or time-off) configurations. The RMP60 goes into hibernate mode 30 seconds after the RMI is unpowered (or the RMP60 is out of range). When in hibernate mode, the RMP60 checks for a powered RMI every 30 seconds. If found, the RMP60 goes from hibernate mode to stand-by mode, ready for radio-on.

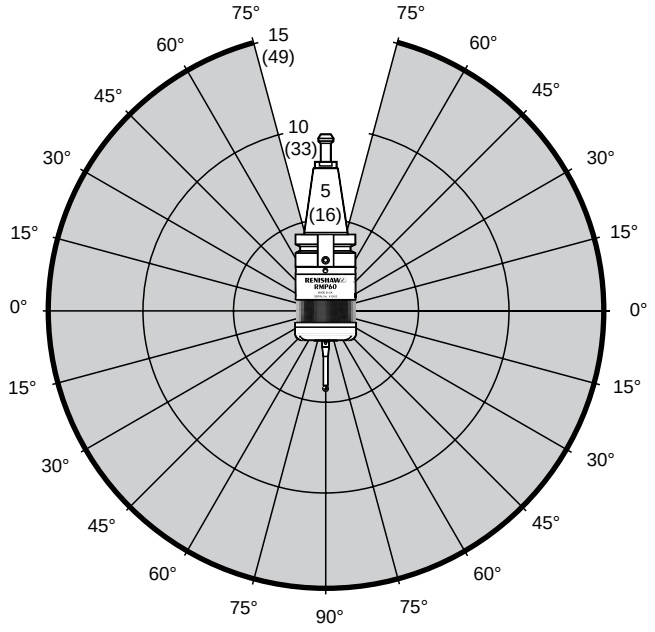
Performance envelope

The RMP60 and RMI must be within each other's performance envelope as shown below. The performance envelope shows line-of-sight performance, however radio transmission does not require this as any reflected radio paths will be less than the 15 m (49.2 ft) operating range.

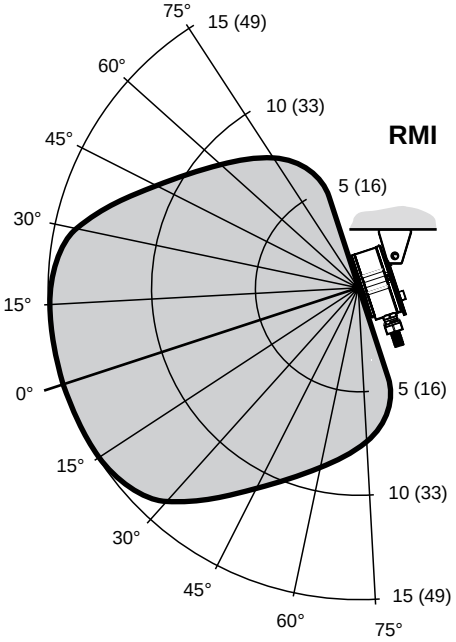
Range metres (feet)

OPERATING AND SWITCH ON/OFF

RMP60 probe



RMI



Preparing the RMP60 for use

Fitting the stylus

1

2

M-5000-3707

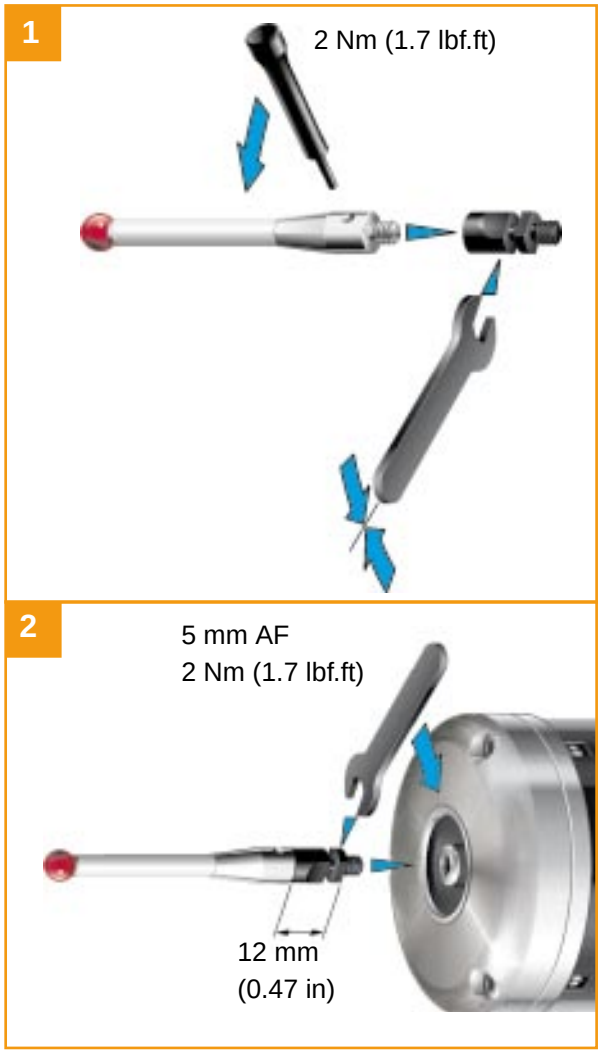
Stylus weak link

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

Fitting stylus with weak link onto RMP60

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.



Removing a broken weak link

Installing the batteries

1

NOTES:

See Section 5, "Maintenance" for a list of suitable battery types.

If dead batteries are inadvertently inserted into the probe, the LEDs will remain a constant red.

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

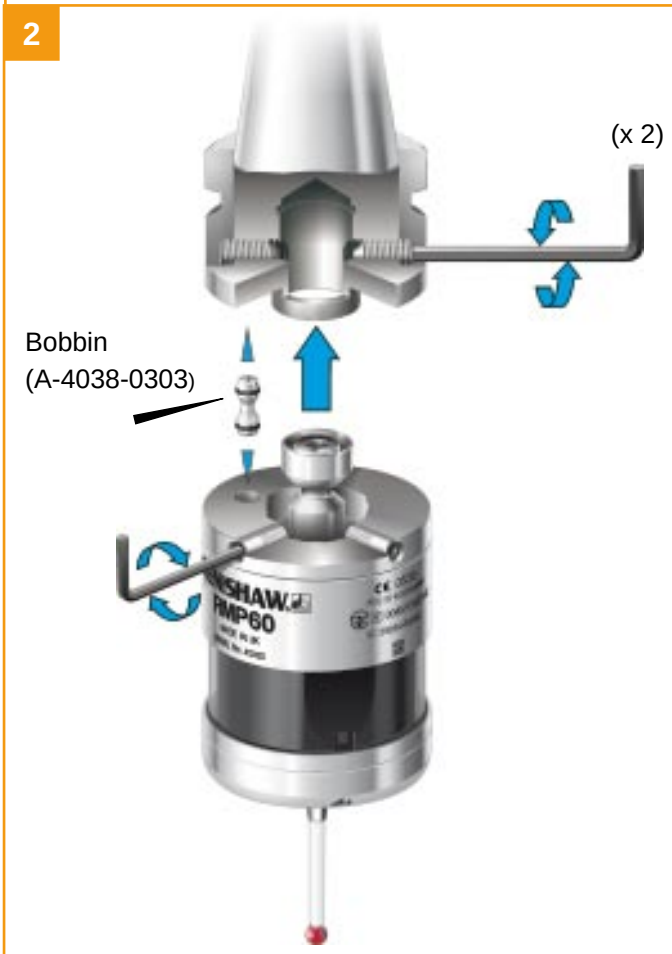
4

Mounting the probe on a shank (or machine table)

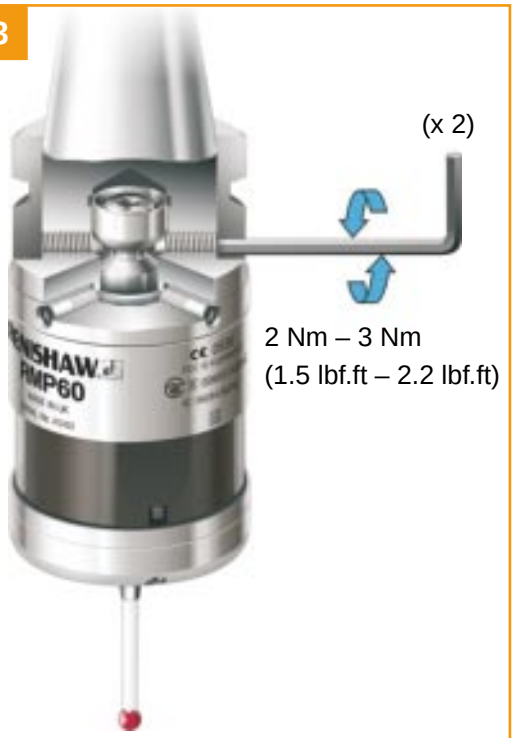
1

NOTE: In instances where the RMP60 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).

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

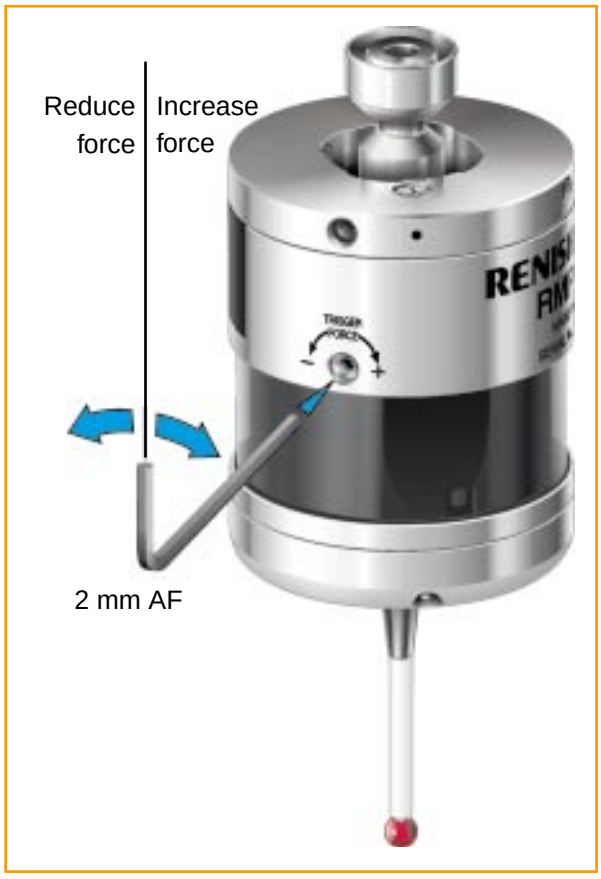
Stylus trigger force and adjustment

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 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	0.7 N/75 gf (2.6 ozf)
XY high force	1.4 N/140 gf (4.9 ozf)
Z	5.30 N/530 gf (18.69 ozf)

Maximum setting

XY low force	2 N/200 gf (7.0 ozf)
XY high force	3.5 N/350 gf (12.3 ozf)
Z	14 N/1400 gf (49.38 ozf)

Minimum setting

XY low force	0.5 N/50 gf (1.7 ozf)
XY high force	0.9 N/90 gf (3.2 ozf)
Z	3.5 N/350 gf (12.35 ozf)

Calibrating the RMP60

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 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 page 3.7). 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 value 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.

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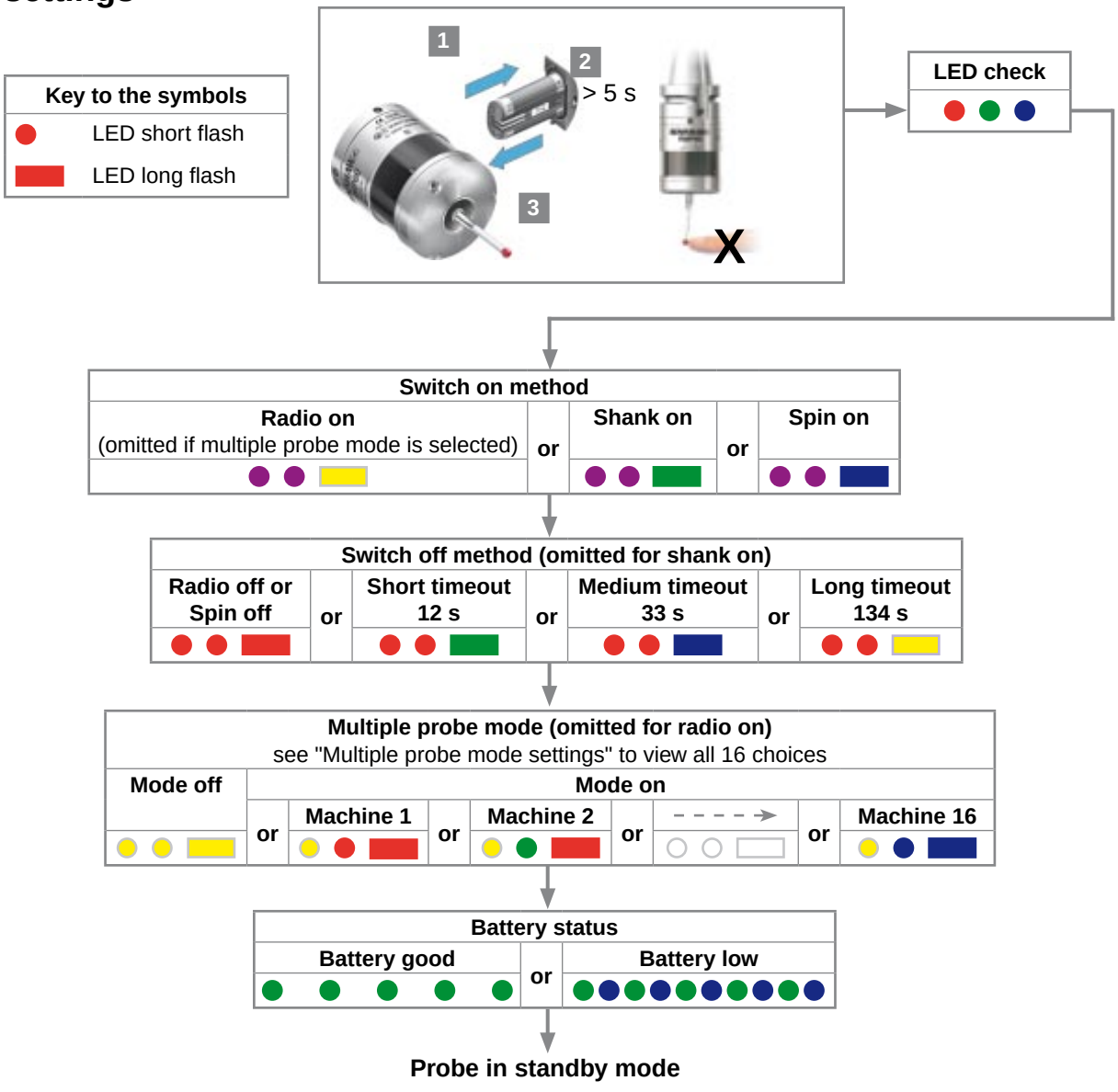
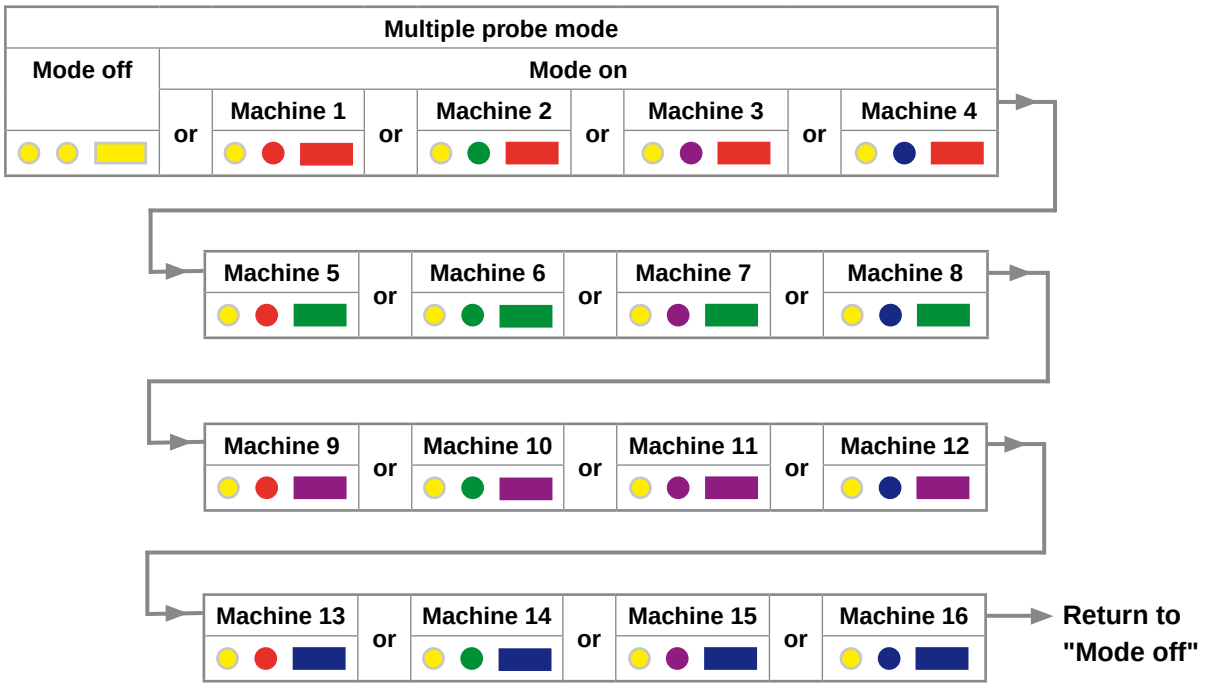
Trigger Logic™

Reviewing the current probe settings



Multiple probe settings

Deflect the stylus for less than 4 seconds to cycle to the next setting.



Probe settings record

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

			✔ tick Factory settings	✔ tick New settings
Switch on method	Radio on	● ● ▭	✔	
	Shank on	● ● ▭		
	Spin on	● ● ▭		
Switch off method	Radio or spin	● ● ▭	✔	
	Short timeout (12 s)	● ● ▭		
	Medium timeout (33 s)	● ● ▭		
	Long timeout (134 s)	● ● ▭		
Multiple probe mode	Off (factory set)	● ● ▭	✔	
	On (machine number)	See "Multiple probe settings"		

RMP60 serial no .....

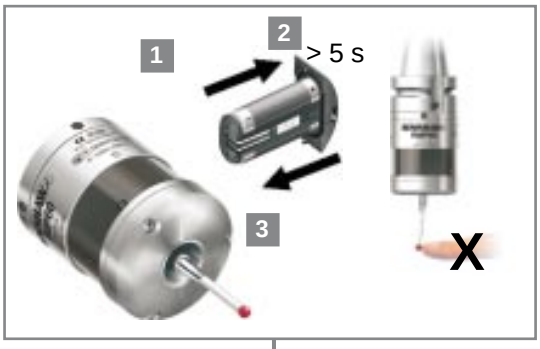
Changing the probe settings

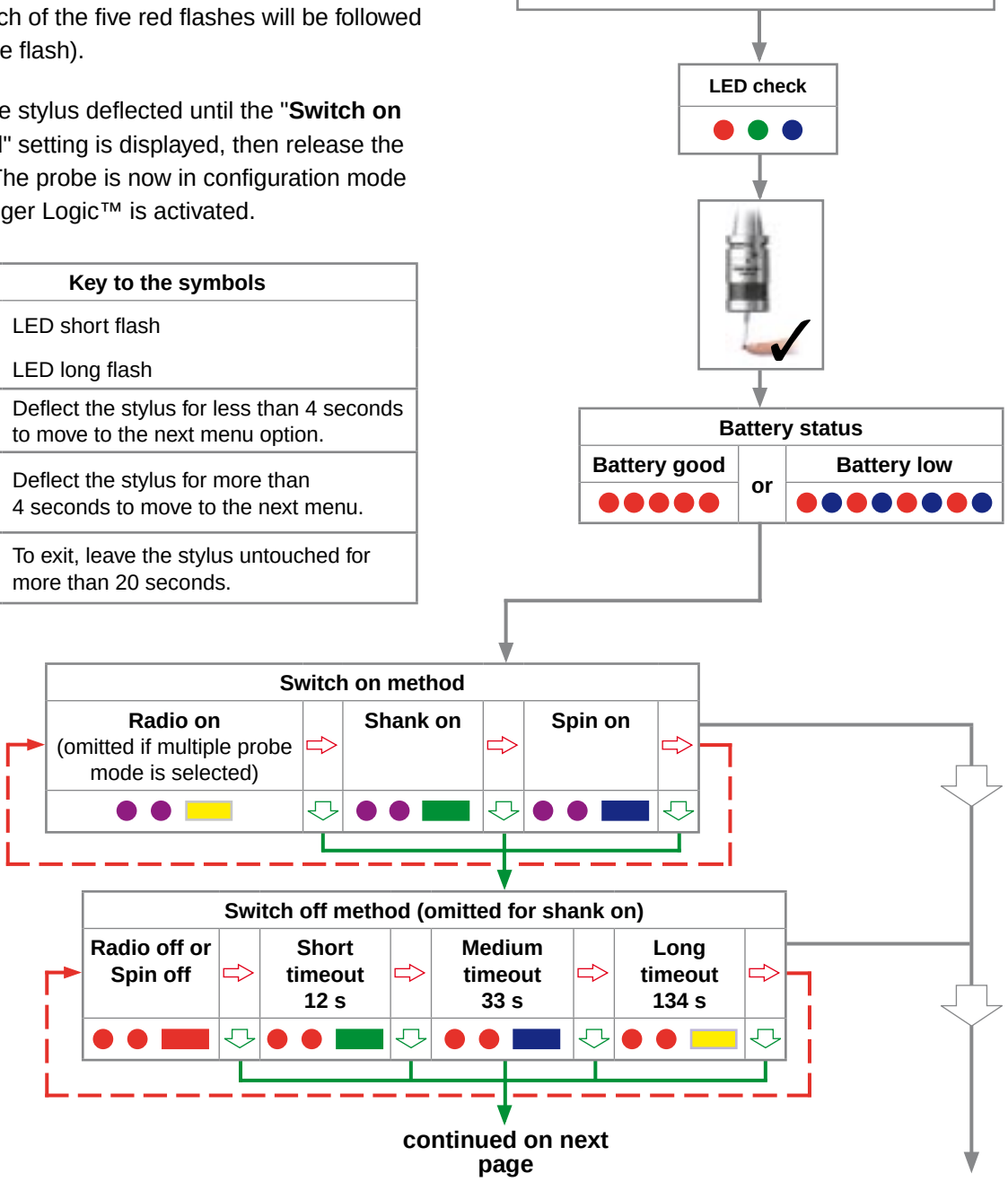
Insert the batteries or, if they have already been installed, remove them for five seconds and then refit them.

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).

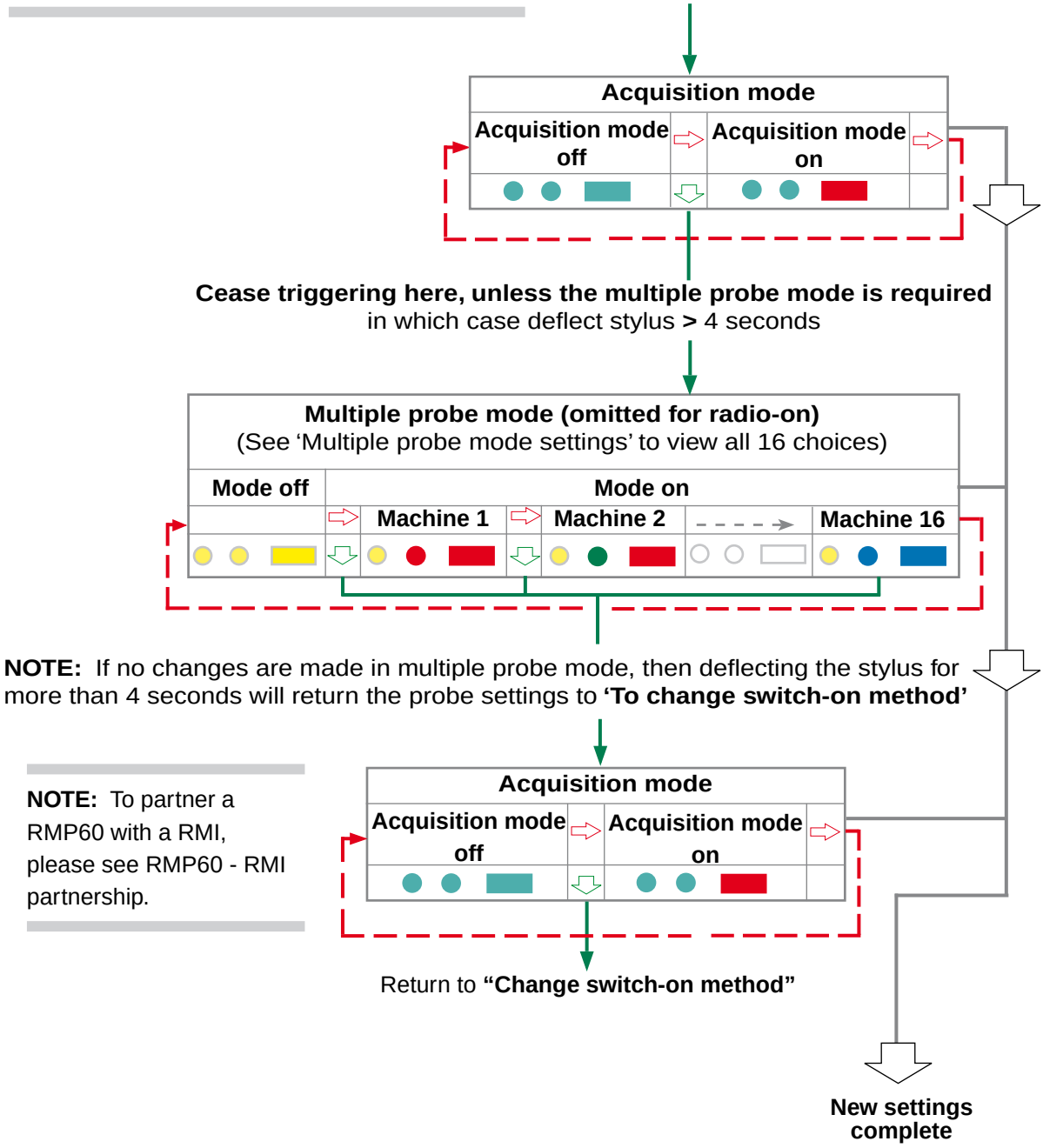
Keep the stylus deflected until the "**Switch on method**" setting is displayed, then release the stylus. The probe is now in configuration mode and Trigger Logic™ is activated.

Key to the symbols	
●	LED short flash
▬	LED long flash
⇨	Deflect the stylus for less than 4 seconds to move to the next menu option.
⇩	Deflect the stylus for more than 4 seconds to move to the next menu.
⇩	To exit, leave the stylus untouched for more than 20 seconds.





NOTE: To partner an RMP60 with an RMI please see "RMP60 – RMI partnership". Once acquisition has been successful, the RMP60 will revert to 'Acquisition mode off'.



NOTE: To partner a RMP60 with a RMI, please see RMP60 - RMI partnership.

NOTE: Further probes used require the same multiple probe mode setting, but do not need to be partnered with the RMI.

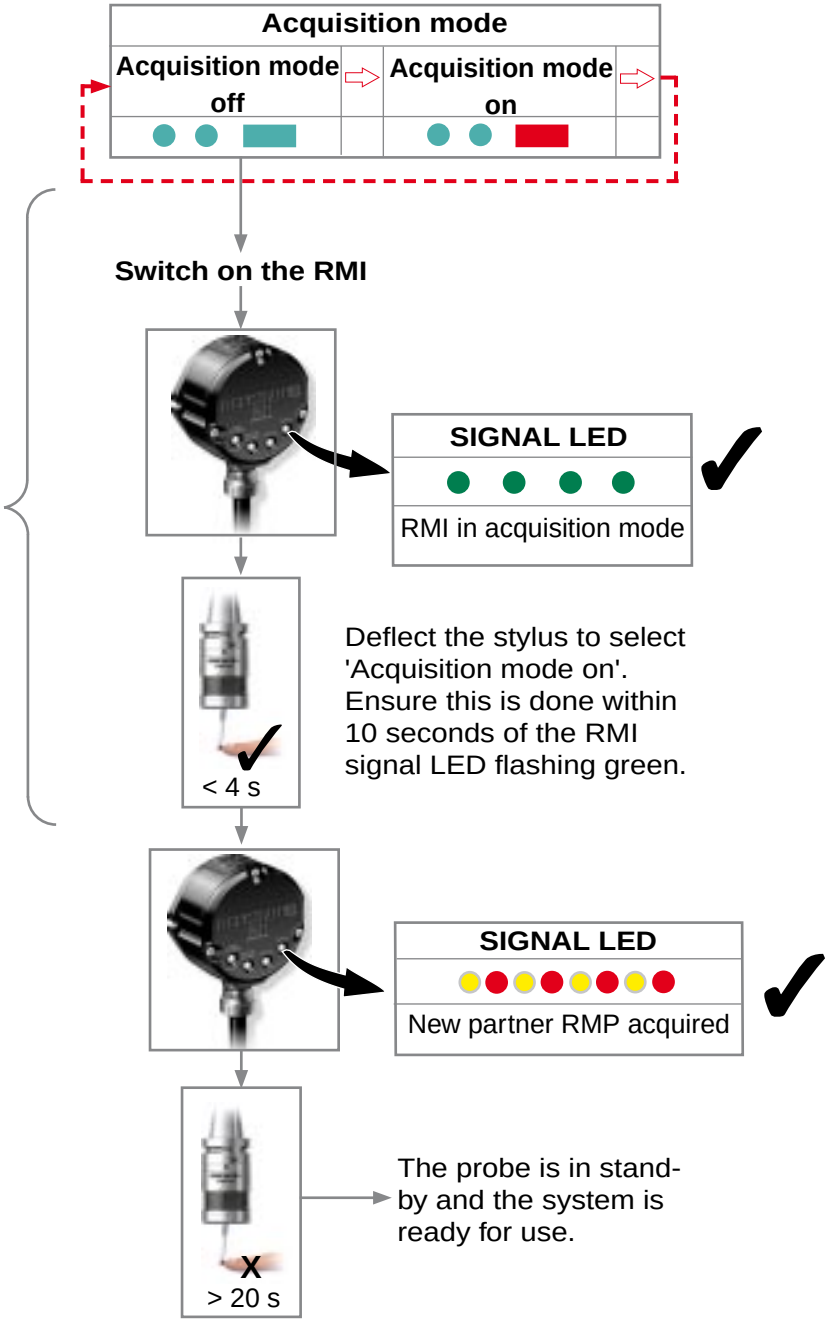
RMP60 – RMI partnership

System set-up is achieved using Trigger Logic™ and powering the RMI. Partnering is only required during initial system set-up. Further partnering is only required if either the RMP60 or RMI is changed, or a system is reconfigured for multiple probes (multiple probe mode).

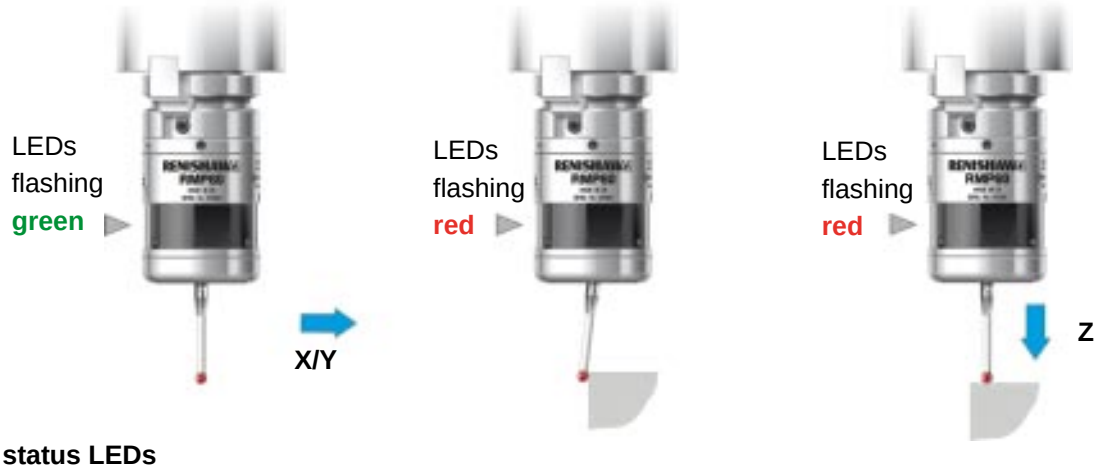
Partnering will not be lost by reconfiguring the probe settings or when changing batteries, except where multiple probe mode is selected. Partnering can take place anywhere within the operating envelope.

In configuration mode, configure the probe settings as required until you reach the "Acquisition mode" menu. Select "Acquisition mode off".

NOTE: Once in 'Acquisition mode off', ensure the next two steps are completed within 20 seconds.



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	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 recharge sufficiently to provide the probe with power.
3. The probe begins to run through the LED review sequence (see page 4.1).
4. Again, the batteries discharge and the probe ceases to function.
5. Again, the batteries recharge sufficiently to provide the probe with power, and the sequence is repeated.

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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.

Changing the batteries

1

CAUTIONS:

Do not leave exhausted 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.

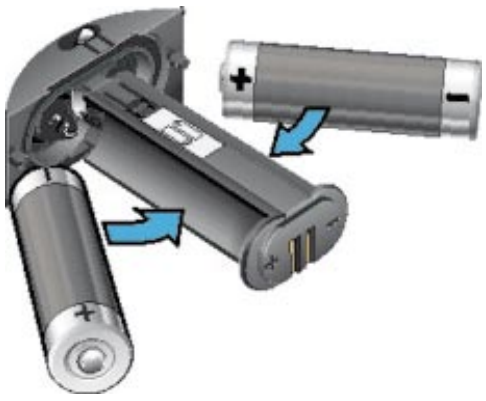
Take care to avoid damaging the battery cassette gasket.

Only use specified batteries.

2

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

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 x2**
AA 1.5 V ✓	**RS:**	596-602, 201-9438	**AA 1.2 V** ✓
	Radio shack:	23-037	
	Saft:	LS 14500 ✓	
	Sonnenschein:	SL-760/S	
	Tadrian:	TL-5903/S, TL-2100/S	
	Xeno:	XL-060F	

4

5

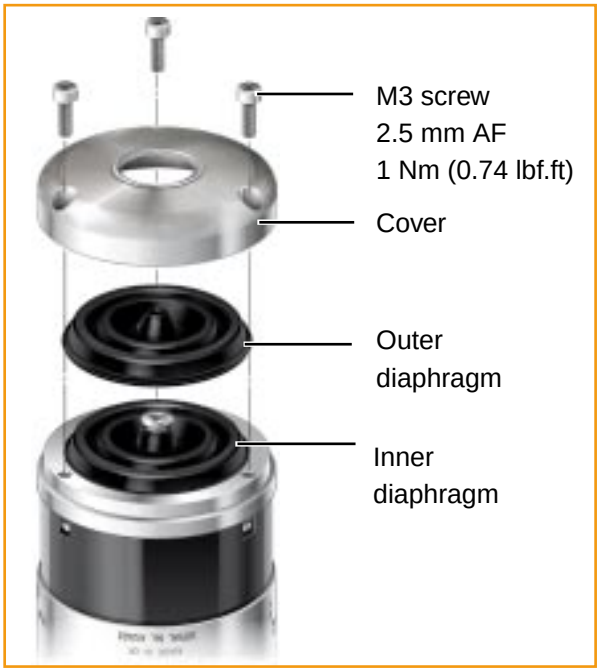
Diaphragm replacement

RMP60 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.

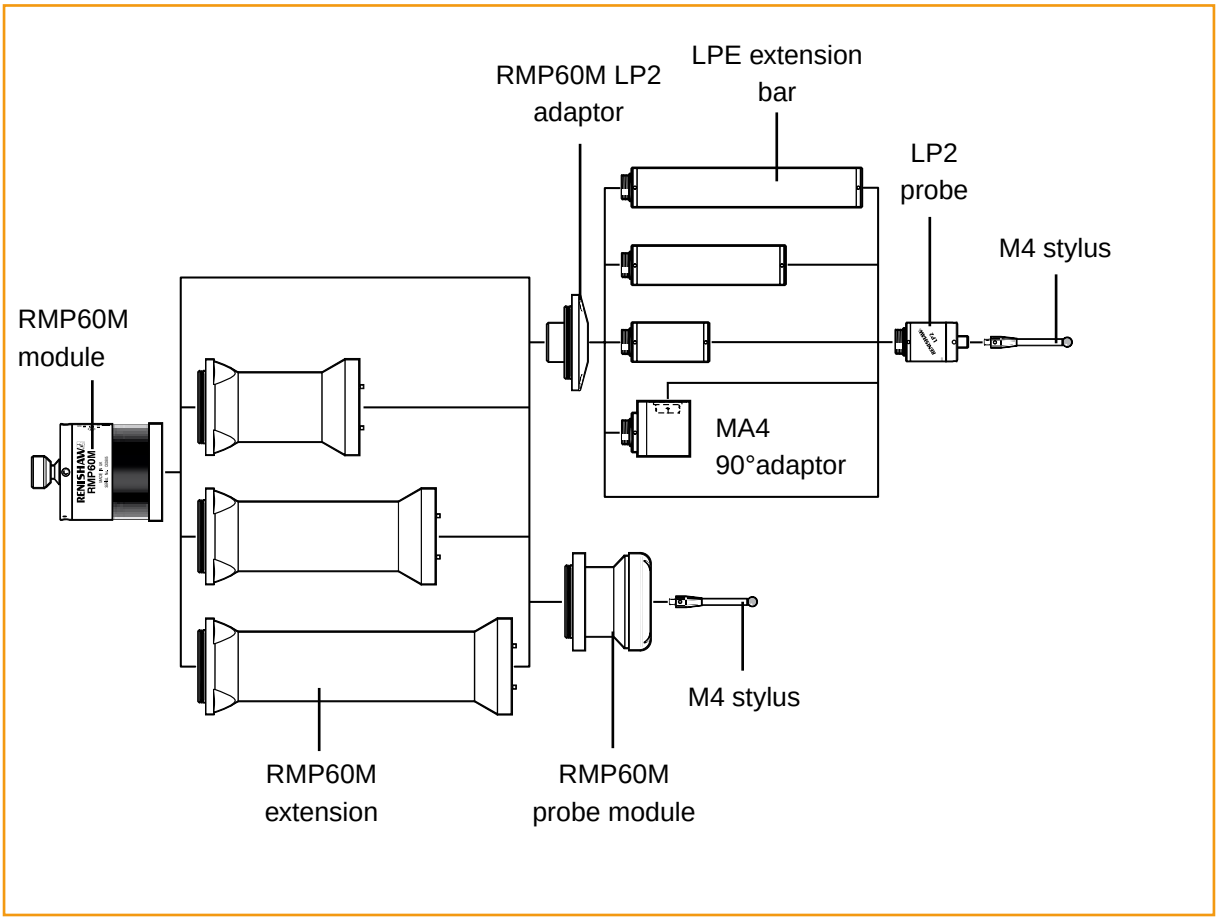
2. Locate the outer edge of the diaphragm to rest on the outer edge of the inner diaphragm.
3. Refit the front cover and M3 screws.
4. Refit the stylus and recalibrate the probe.

RMP60M system

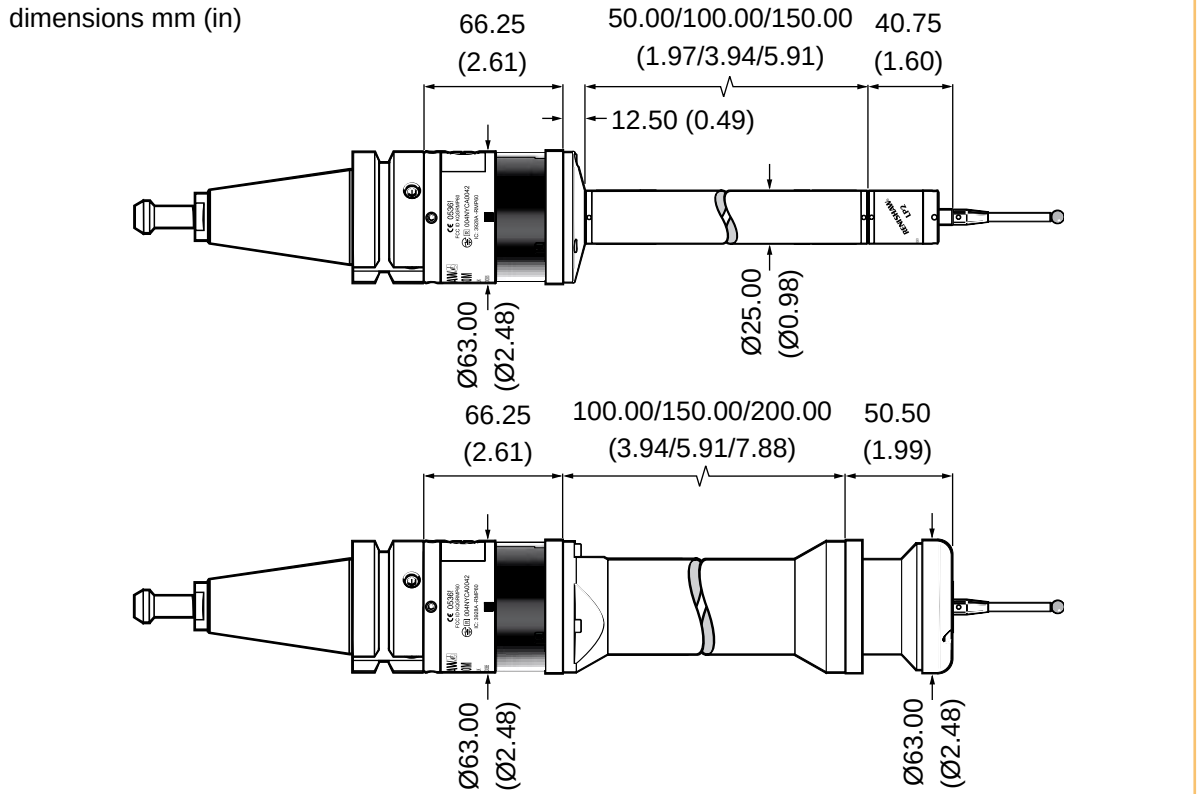
RMP60M system

RMP60M is a special modular version of RMP60. It enables probe inspection of part features inaccessible to RMP60, by fitting selected adaptors and extensions as shown below.

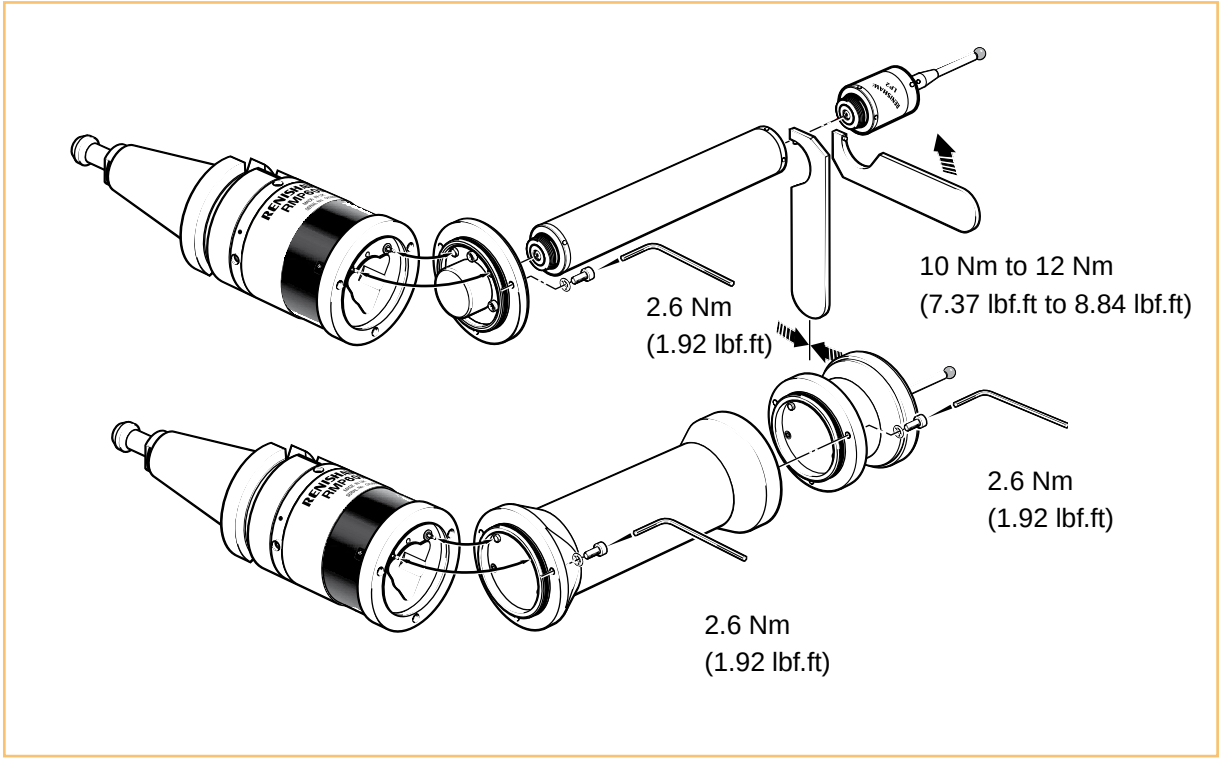
See Chapter 8, "Parts list".



RMP60M dimensions



RMP60M 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.
	Wrong batteries.	Change batteries.
	Batteries inserted incorrectly.	Check battery insertion.
	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.	Dead batteries.	Change batteries.
	Batteries inserted incorrectly.	Check battery insertion.
	Probe out of range.	Check position of RMI, see operating envelope.
	No RMI 'start/stop' signal (radio on mode only).	Check RMI for green start LED.
	Incorrect spin speed (spin switch on only).	Check spin speed and duration.
	Malfunctioning shank switch (shank switch mode only).	Check switch operation.
	Incorrect switch on method configured.	Check configuration and alter as required.
	Incorrect multiple probe mode setting configured.	Check configuration and alter as required.
	RMP60 in hibernation mode (radio on mode only).	Ensure probe is in range and wait up to 30 seconds, then resend switch on signal. Check position of RMI, see operating envelope.

Symptom	Cause	Action
Machine stops unexpectedly during a probing cycle.	Radio link failure/RMP60 out of range.	Check interface/receiver and remove obstruction.
	RMI receiver/machine fault.	Refer to 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.
	Stylus not given sufficient time to settle from a rapid deceleration.	Add a short dwell before the probing move (length of dwell will depend on stylus length and rate of deceleration). Maximum dwell is one second.
Probe crashes.	Workpiece obstructing probe path.	Review probing software.
	Probe length offset missing	Review probing software.

Symptom	Cause	Action
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.
	Machine tool faulty.	Perform health checks on machine tool.
RMP60 status LEDs do not correspond to RMI status LEDs.	Radio link failure – RMP60 out of RMI range.	Check position of RMI, see operating envelope.
	RMP60 has been enclosed/ shielded by metal.	Change batteries.
	RMP60 and RMI are not partnered.	Partner RMP60 and RMI.

Symptom	Cause	Action
RMI error LED lit during probing cycle.	Probe not switched on or probe timed out.	Change setting. Review turn off method.
	Probe out of range.	Check position of RMI, see operating envelope.
RMI low battery LED lit.	Low batteries.	Change batteries soon.
Reduced range.	Local radio interference.	Identify and remove.
Probe fails to switch off.	Incorrect switch off method configured.	Check configuration and alter as required.
	No RMI 'start/stop' signal (radio on mode only).	Check RMI for green start LED.
	Probe in timeout mode and placed in tool magazine and is being triggered by movement.	Use shorter timeout setting or use different switch off mode.
	Malfunctioning shank switch (shank switch mode only).	Check switch operation.
	Incorrect spin speed (spin switch on only).	Check spin speed.
Probe goes into Trigger Logic™ configuration mode and cannot be reset.	Probe was triggered when batteries were inserted.	Do not touch the stylus or stylus mounting face during battery insertion.

Parts list

Type	Part number	Description
RMP60	A-4113-0001	RMP60 probe with batteries, tool kit and quick-start guide (factory set to radio on/radio off).
RMP60M module	A-4113-1003	RMP60M module with batteries, tool kit and quick-start guide (factory set to radio on/radio off).
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 x 2) and 5 mm AF spanner.
Tool kit	A-4038-0304	Probe tool kit comprising Ø1.98 mm stylus tool, 2.0 mm AF hexagon key, 2.5 mm AF hexagon key (x 2), 4.0 mm AF hexagon key (x 2) and shank grub screw (x 2).
Battery cassette	A-4038-0300	RMP60 battery cassette assembly.
Cassette seal	A-4038-0301	Battery cassette housing seal.
Diaphragm kit	A-5312-0302	RMP60 diaphragm kit.
Bobbin kit	A-4038-0303	Bobbin for shank switch (supplied with shank).
RMI	A-4113-0050	RMI – side exit – with 15 m (49.2 ft) cable, tool kit and user's guide.
Mounting bracket	A-2033-0830	Mounting bracket with fixing screws, washers and nuts.
Styli tool	M-5000-3707	Tool for tightening/releasing styli.
Extension L100	A-4038-1010	RMP60M extension - 100 mm long.
Extension L150	A-4038-1027	RMP60M extension - 150 mm long.
Extension L200	A-4038-1028	RMP60M extension - 200 mm long.
RMP60/OMP60M probe module assembly	A-4038-1002	RMP60M probe module assembly.
RMP60M/LP2 adaptor	A-4038-0212	RMP60M LP2 adaptor assembly.

Type	Part number	Description
LPE1	A-2063-7001	LPE1 extension bar - 50 mm long.
LPE2	A-2063-7002	LPE1 extension bar - 100 mm long.
LPE3	A-2063-7003	LPE1 extension bar - 150 mm long.
MA4	A-2063-7600	MA4 90° adaptor assembly.
Publications. These can be downloaded from our web site at www.renishaw.com		
RMP60	A-4113-8501	Quick-start guide: for rapid set-up of the RMP60 probe, includes CD with installation guides.
Styli	H-1000-3200	Technical specification: Styli and accessories.
Software features	H-2000-2289	Data sheet: Probe software for machine tools – illustrated features.
Software list	H-2000-2298	Data sheet: Probe software for machine tools – list of programs.
Taper shanks	H-2000-2011	Data sheet: Taper shanks for machine tool probes.
RMI	H-2000-5220	Installation and user's guide: RMI – radio machine interface.

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