RENISHAW
apply innovation™

RMP60 - radio machine probe

Disclaimer

Considerable effort has been made to ensure
that the contents of this document are free
from inaccuracies and omissions. However,
Renishaw makes no warranties with respect
to the contents of this document and specifically
disclaims any implied warranties. Renishaw
reserves the right to make changes to this
document and to the product described herein
without obligation to notify any person of such
changes.

Trademarks

RENISHAW® and the probe emblem used in
the RENISHAW logo are registered trademarks
of Renishaw plc in the UK and other countries.

apply innovation is a trademark of Renishaw
plc.

RENISHAW® is a registered trademark of
Renishaw plc in the UK and other countries.

All brand names and product names used in this
document are trade names, service marks,
trademarks, or registered trademarks of their
respective owners.

Contents

$C\epsilon$
EC DECLARATION OF CONFORMITY

Renishaw plc declares that the product:

Name: RMP60/RMP60M

Description: Radio machine probe

has been manufactured in conformity with the following standard:
BS EN 61326:1998/   Electrical equipment for measurement,
                      control and laboratory use - EMC requirements.
                      Immunity to annex A - industrial locations.
                      Emissions to class A - (non-domestic) limits.

and that it complies with the requirements of directive (as amended):
89/336/EEC   Electromagnetic compatibility

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

Radio approvals

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.

SAFETY

Information for the user

Beware of unexpected movement. The user should remain outside of the full working envelope of probe head/extension/probe combinations.

Handle and dispose of batteries in according to the manufacturers recommendations. Use only the recommended batteries. Do not allow the battery terminals to contact other metallic objects.

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

Refer to the machine supplier's operating instructions.

Information for the machine supplier

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 documentation, 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 stop the machine's movement.

Installation and user's guide

Warranty

Equipment requiring attention under warranty must be returned to your supplier. No claims will be considered where Renishaw equipment has been misused, or repairs or adjustments have been attempted by unauthorised persons.

Changes to equipment

Renishaw reserve the right to change specifications without obligation to change equipment previously sold.

CNC machine

CNC machine tools must always be operated by competent persons in accordance with manufacturers instructions.
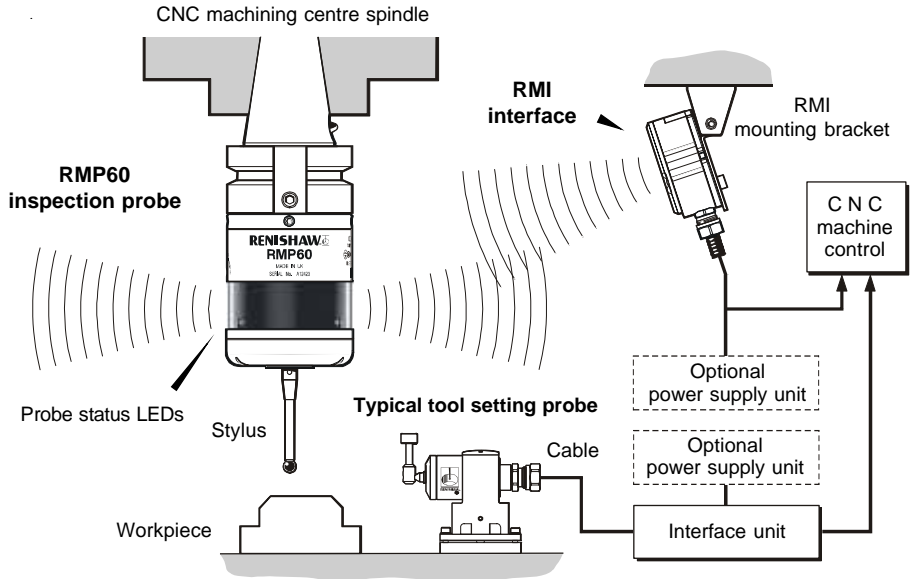
Care of the probe

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

Patent notice

Features of products shown in this guide, and of related products, are the subject of the following patents and/or patent applications:

EP 0390342	US 5,040,931
EP 0652413	US 5,212,872
EP 0695926	US 5,279,042
EP 1373995	US 5,669,151
EP 142550	US 6,941,671 B2
EP 1457786	US 2003-01799097
EP 2,945,709	WO 2004-057552
JP 3,126,797	WO 2004-090467
JP 2004-522,961	
JP 2004-279,417	
JP 2005-502,035	

Typical probe system with radio transmission

CNC machining centre spindle

RMI interface

RMI mounting bracket

RMP60 inspection probe

RENISHAW
RMP60
MADE IN UK
SERIAL No. A1203

C N C machine control

Probe status LEDs

Stylus

Typical tool setting probe

Cable

Optional power supply unit

Optional power supply unit

Workpiece

Interface unit

A workpiece set-up and inspection probe is in effect another tool in the system. A probing cycle may be included at any stage of the machining process.

Probe data is transmitted from the RMP60 (or RMP60M) to the RMI via the radio link. The RMI converts probe signals into a form compatible with the machine CNC control.

System performance

RMP60 and RMP60M have identical user options and radio performance

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/M 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.

Operation in extremes of temperature will result in some reduction in range.

RMI position

The probe system should be positioned so that the optimum range can be achieved over the full travel of the machine 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 operating envelope.

To assist in finding the optimum position of the RMI, the signal quality is displayed on an RMI signal LED.

Note: RMP60/M in radio-on configuration

The RMP60/M 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/M goes into hibernate 30 seconds after the RMI is unpowered (or the RMP60 is out of range).

When in hibernate, the RMP60/M checks for a powered RMI every 30 seconds. If found, the RMP60/M goes from hibernate to standby, ready for radio-on.

Probe repeatability

Maximum 2 Sigma (2σ) value.

Repeatability of 1.0 µm (40 µ in) is valid for a test velocity of 480 mm/min (1.57 ft/min) at the stylus tip, using a stylus 50 mm (1.97 in) long.

RMP60 IP rating   IPX8

RMP60 weight   (without shank)

Without batteries   855 g (30.16 oz)
With batteries   901 g (31.79 oz)

RMP60M weight   (without shank)

Without batteries   690 g (24.34 oz)
With batteries   736 g (25.95 oz)

Max spin speed

RMP60   1000 rev/min

RMP60M   Dependent on configuration

Environment

RMP60 RMP60M RMI	Temperature
Storage	-10 °C to 70 °C (14 °F to 158 °F)
Normal operating	5 °C to 50 °C (41 F° to 122 °F)

# Operating envelope

RMP60 probe + RMI

RMP60 and RMI must be within each other's operating envelope. The operating envelope shows line-of-sight performance, however radio transmission does not require line-of-sight as long as any reflected radio path is less than the 15 m (49.2 ft) system operating range
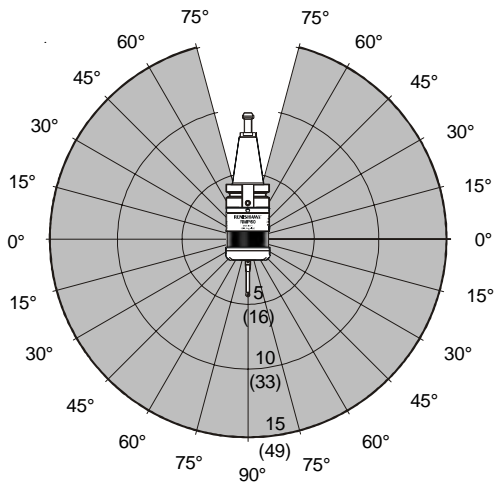
Always face the front cover of the RMI in the general direction of the machining area and the tool magazine, ensuring both are within the operating envelope.
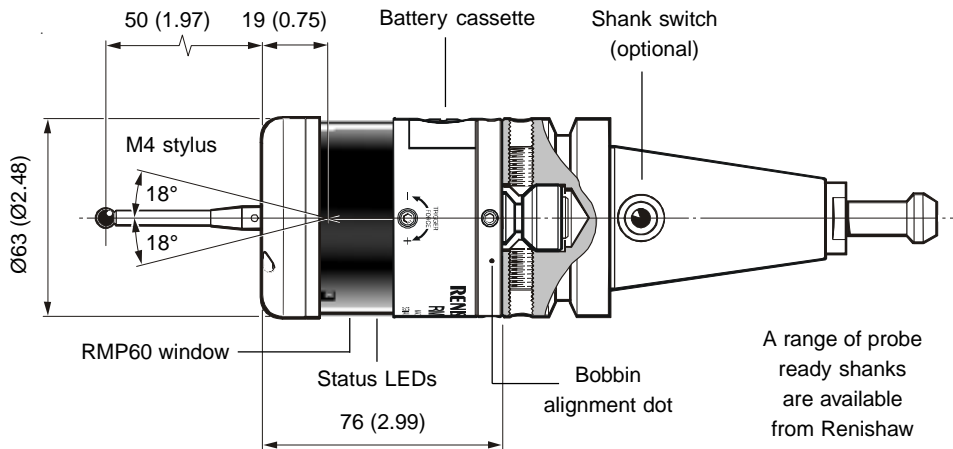
Range metres (feet)

OPERATING AND SWITCH ON/OFF
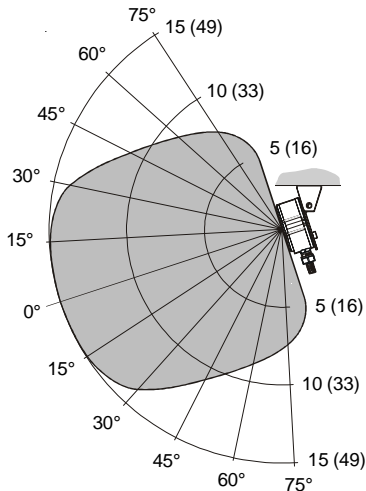
RMP60 dimensions   **dimensions mm (in)**

STYLUS OVERTRAVEL LIMITS		
Stylus length	**±X / ±Y**	**Z**
50 (1.96)	21 (0.82)	11 (0.43)
100 (3.93)	37 (1.45)	11 (0.43)

Stylus weak link

Must be used with steel styli.

For optimum metrology performance, do not use the weak link with ceramic or carbon fibre styli.
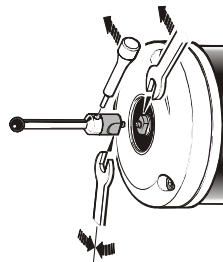
Fitting stylus with weak link onto RMP60

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

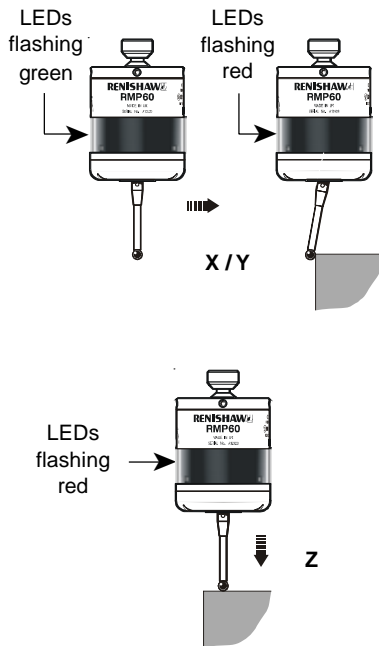Take care to avoid stressing the weak link during assembly.

Fitting a weak link

2 Nm (1.7 lbf.ft)

5 mm AF
2 Nm (1.7 lbf.ft)

12 mm
(0.47 in)
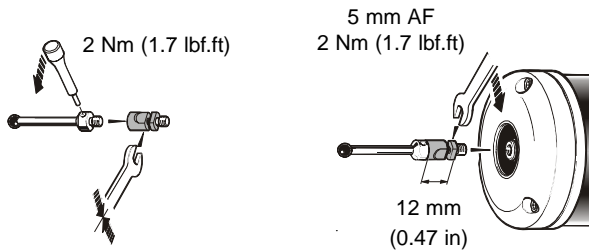
Removing a broken weak link

Operating mode

LEDs flashing green

LEDs flashing red

X / Y

LEDs flashing red

Z

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	▬▬▬▬▬
Rapid flashing red	Extremely dead alkaline batteries or unsuitable lithium thionyl chloride batteries	🔴🔴🔴🔴🔴🔴

Probe settings

The RMP60 probe can be in one of three modes:

Stand-by mode - The RMP60 is waiting for a switch on signal.

Operating mode - Activated by one of the switch on methods described on this page. In this mode the RMP60 is now ready for use.

Configuration mode - The trigger logic configuration method allows the following settings to be configured.

Switch-on / switch-off methods

The following switch on / switch off options can be configured:

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

Note:

The RMP60 will be switched on after 1 second in all modes.

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

Switch-on method	Switch-off methods available
Radio on Radio switch on when commanded by an M code.	**Radio off** Radio switch off when commanded by an M code. A timer automatically switches the probe off after 90 minutes from the last trigger if not turned off by an M code. **Timer off** (time out) Time out will occur (12, 33 or 134 seconds) after the last probe trigger or reseat.
Spin on Spin at 650 rev/min for 1 second minimum (6 seconds maximum).	**Spin off** Spin at 650 rev/min for 1 second minimum (6 seconds maximum). A timer automatically switches the probe off after 90 minutes from the last trigger if not spun. **Timer off** (time out) Time out will occur (12, 33 or 134 seconds) after the last probe trigger or reseat.
Shank switch on	**Shank switch off**

Multiple probe mode

RMP60 can be user configured using trigger logic to allow multiple RMP60s to be used with a single RMI.

Note:
Radio turn on cannot be used in multiple probe mode.

To allow multiple probes/single RMI in close proximity, 16 choices of 'mode-on' colours are available – each representing a different machine tool installation. The choices are shown on the next page and in 'Changing probe settings'.

All probes on a single RMI machine should be set to the same 'mode-on' colour choice; any multiple probes on adjacent machines should all be set to an alternative 'mode-on' colour choice. Multiple probe mode will not appear in the configuration of the probe if radio turn on has been selected.

Only one of the multiple probes per machine will need partnering as, by configuring multiple probes to a single 'mode-on' choice, all probes have the same identification. The probe to be partnered, is partnered after selection of multiple probe on in 'Changing probe settings'.

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

All RMP60s are factory-set to 'mode off'.

The addition of further probe(s) into a single probe installation requires all probes to be re-configured to the same multiple probe 'mode-on' choice and the repartnering of one of the probes to the installed RMI.

The addition of further probes (or replacements) into a multi probe installation is achieved simply by reconfiguration to the same 'mode-on' colour choice.

Note:
Any number of RMP60s set to 'mode-off' can be used alongside RMP60s set to 'Multiple probe mode'.

MULTIPLE PROBE MODE				
MODE OFF	**MODE ON**			
	MACHINE 1	**MACHINE 2**	**MACHINE 3**	**MACHINE 4**
🟡 🟡 🟨	🟡 🔴 🟥	🟡 🟢 🟥	🟡 🟣 🟥	🟡 🔵 🟥

Deflect stylus < 4 sec to cycle to next setting →

MACHINE 5	**MACHINE 6**	**MACHINE 7**	**MACHINE 8**
🟡 🔴 🟩	🟡 🟢 🟩	🟡 🟣 🟩	🟡 🔵 🟩

MACHINE 9	**MACHINE 10**	**MACHINE 11**	**MACHINE 12**
🟡 🔴 🟪	🟡 🟢 🟪	🟡 🟣 🟪	🟡 🔵 🟪

MACHINE 13	**MACHINE 14**	**MACHINE 15**	**MACHINE 16**
🟡 🔴 🟦	🟡 🟢 🟦	🟡 🟣 🟦	🟡 🔵 🟦

Return to **MODE OFF** ←

Reviewing current probe settings

1. Insert batteries, or if already inserted remove for 5 seconds and replace.

2. **DO NOT** deflect the stylus when reviewing settings.

3. The LEDs will show the following sequence.

LED CHECK
🔴 🟢 🔵

⬇

SWITCH-ON METHOD				
RADIO ON (omitted if Multiple Probe Mode was selected)		**SHANK ON**		**SPIN ON**
🟣 🟣 🟨	or	🟣 🟣 🟩	or	🟣 🟣 🟦

⬇
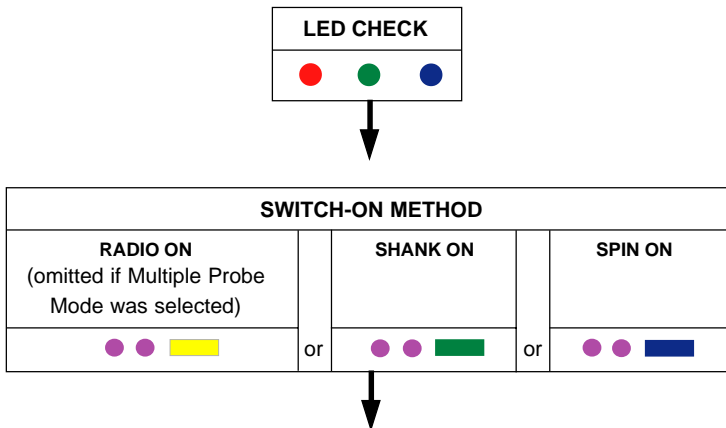
continued on next page

SWITCH-OFF METHOD (omitted for shank-on)						
RADIO OFF or SPIN OFF		**SHORT TIME OUT** 12 sec		**MEDIUM TIME OUT** 33 sec		**LONG TIME OUT** 134 sec
🔴 🔴 🟥	or	🔴 🔴 🟩	or	🔴 🔴 🟦	or	🔴 🔴 🟨

MULTIPLE PROBE MODE (omitted for radio-on) (see 'Multiple probe mode' to view all 16 choices)								
MODE OFF		**MODE ON**						
		MACHINE 1		**MACHINE 2**		— — — ➔		**MACHINE 16**
🟡 🟡 🟨	or	🟡 🔴 🟥	or	🟡 🟢 🟥		⚪ ⚪ ⬜		🟡 🔵 🟦

BATTERY STATUS		
BATTERY GOOD		**BATTERY LOW**
🟢 🟢 🟢 🟢 🟢	or	🔵🔵 🟢🔵 🔵🟢 🟢🔵 🟢🔵 🟢🔵

PROBE IN STAND-BY MODE (after 5 sec)

Changing probe settings

Probe settings can be configured using the trigger logic.

1. Insert the batteries, or if already inserted, remove for 5 seconds and replace.

2. Deflect the stylus and hold deflected until 5 red flashes occur at end of the review sequence.

   Note:
   If battery power is low then each of the 5 red flashes will be followed by a blue flash. See 'Probe settings' for further details.

3. The probe will now be in the configuration mode and the current switch on method will flash. The probe settings can be changed as shown below.

   Note:
   Settings are saved as they are changed

4. To exit the trigger logic at any point, leave the stylus undeflected for over 20 seconds.

5. **Settings record table**

   For quick reference, Renishaw suggest that you record your settings in the table at the back of this guide.

   These settings will be needed if the probe is replaced.

TO CHANGE SWITCH-ON METHOD				
RADIO ON (omitted if Multiple Probe Mode was selected)	Deflect stylus < 4 s	**SHANK ON**	Deflect stylus < 4 s	**SPIN ON**
🟣 🟣 🟨	→	🟣 🟣 🟩	→	🟣 🟣 🟦

Deflect stylus < 4 seconds

Deflect stylus **>** 4 seconds

↓

TO CHANGE SWITCH-OFF METHOD						
(omitted if shank turn on was selected)						
RADIO or SPIN	Deflect stylus < 4 s	**SHORT TIME OUT** 12 s	Deflect stylus < 4 s	**MEDIUM TIME OUT** 33 s	Deflect stylus < 4 s	**LONG TIME OUT** 134 s
🔴 🔴 🟥	→	🔴 🔴 🟩	→	🔴 🔴 🟦	→	🔴 🔴 🟨

Deflect stylus < 4 seconds

Deflect stylus **>** 4 seconds

↓

ACQUISTION MODE		
ACQUISITION MODE OFF	Deflect stylus < 4 s	**ACQUISITION MODE** ON
● ● ▬	→	● ● ▬

Deflect stylus < 4 seconds

Cease triggering here, unless the

multiple probe mode is required

in which case

Deflect stylus **>** 4 seconds

Note: After the RMI has been acquired, the RMP60 will only show Acquistion Mode Off.

See RMP60 - RMI partnership.

MULTIPLE PROBE MODE (see "Multiple probe mode" to view all 16 choices)						
MODE OFF	**MODE ON**					
	Deflect stylus < 4 s →	**MACHINE 1**	Deflect stylus < 4 s →	**MACHINE 2**	– – – →	**MACHINE 16**
⬤⬤▭		⬤⬤▭		⬤ ⬤ ▭	○ ○ ▭	⬤ ⬤ ▭

Deflect stylus < 4 seconds

Deflect stylus **>** 4 seconds

ACQUISTION MODE		
ACQUISITION MODE OFF	Deflect stylus < 4 s →	**ACQUISITION MODE** ON
⬤ ⬤ ▭		⬤ ⬤ ▭

Deflect stylus
> 4 seconds

Deflect stylus < 4 seconds
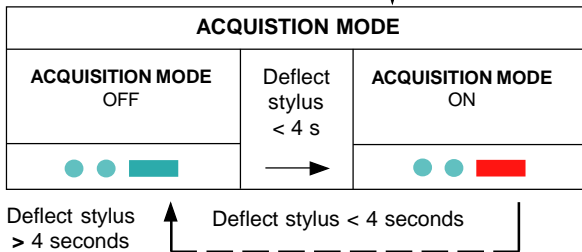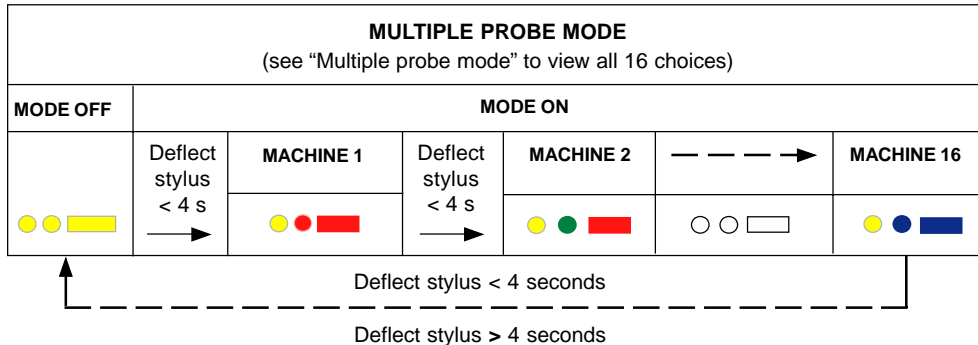
Return to
TO CHANGE SWITCH-ON METHOD

Note: After the RMI
has been acquired, the
RMP60 will only show
Acquistion Mode Off.

See RMP60 - RMI
partnership.

RMP60-RMI partnership

System setup is achieved using trigger logic and powering on the RMI.

Trigger logic is a method that allows user configuration of the options available in the RMP60. Trigger logic uses a sequence of RMP60 triggering and battery insertion followed by further RMP60 triggering.

This leads the user through a series of choices, allowing selection of the required options.

Reviewing of choices can be made by battery insertion alone. See Reviewing probe settings.

To partner an RMP60 and 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. Partnering can take place anywhere within the operating envelope.

1. Use trigger logic to access the RMP60 configuration mode.

2. Configure the turn on method (if not configured).

3. Configure the turn off method (if not configured).

4. Enter the acquisition mode by deflecting the stylus.

5. Remain in 'Acquisition Mode Off' by not releasing the stylus. This allows time to get the RMI ready for partnering.

6. Power on the RMI.

7. Watch the RMI signal LED; after a couple of seconds the LED will repeatedly flash on and off green. This is the start of a 10 second interval in which the RMI is in acquisition mode.

8. Release the RMP60 stylus and trigger it a couple of times. This causes the RMP60 to go into (and out of) acquisition mode.

9. The RMI signal LED will change to repeatedly flashing red and yellow (for the remainder of the 10 second interval), indicating a successful partnering.

10. Leave the RMP60 for 20 seconds to go into standby.

11. The system is ready to use.

Note
To check that turn on and off settings have not accidentally been changed, remove and insert batteries to review the current probe settings.

Note
When holding the RMP60, do NOT wrap a hand, or anything else, around the glass window.

Note
When the RMP60 and RMI become partners the RMI records the RMP60 identity. It is not possible for an RMI to be partnered with more than one RMP60 in 'Standard Mode' - see Multiple Probe Mode.

It is possible for an RMP60 to be partnered with more than one RMI, but the system will not function correctly.

RMP60 batteries

Replacing batteries

Only use specified batteries.

Clean and dry the RMP60 with a cloth or paper towel before removing the battery cover. Where the RMP60 has been exposed to coolant, it is recommended that the area around the battery cover is cleaned.

To access the RMP60 batteries, remove the battery cover by rotating the securing screw 30° anticlockwise and withdraw the battery cassette.

Take care to avoid damaging the cover gasket.

When inserting the batteries, ensure they are loaded as shown (see next page).

If one or more batteries are incorrectly loaded the probe will not respond.

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 cover gasket and mating surfaces are clean and free from damage before reassembly.
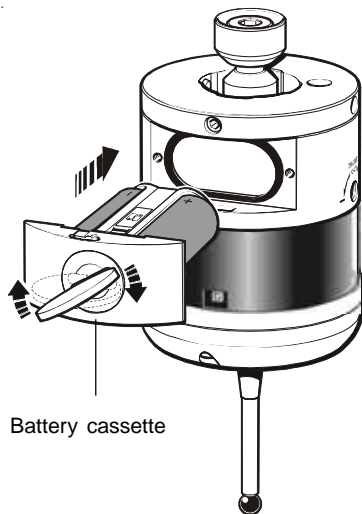
Battery cassette
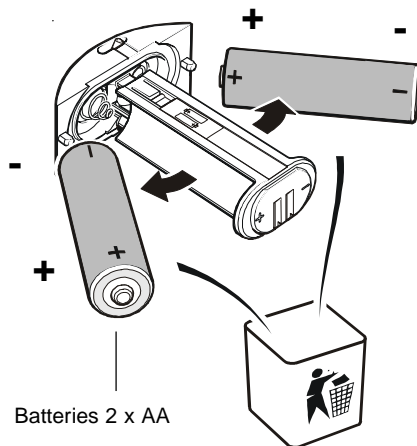
Batteries 2 x AA

DO NOT leave exhausted batteries in probe

DO NOT allow coolant or debris to enter the battery compartment

DO check for correct battery polarity

Please dispose of exhausted batteries in accordance with local regulations. Do not dispose of batteries in fire.

Battery life expectancy

Typical battery life

Using standard alkaline batteries at 5 % usage, typically the probe will continue to operate for approximately 1 week after a low battery warning is first indicated.

Replace the batteries as soon as is practicable.

After batteries are inserted into the RMP60, the LEDs will indicate the current settings.

In order to achieve the stated radio turn-on life (stand-by or 5% usage), the RMP60 must be in range of its powered partner RMI.

BATTERY	SHANK/SPIN TURN ON		RADIO TURN ON		CONTINUOUS USE
Two AA type	**STAND-BY LIFE** (days - typical)	**5% USAGE** 72 min/day (days - typical)	**STAND-BY LIFE** (days - typical)	**5% USAGE** 72 min/day (days - typical)	(hours - typical)
Alkaline	650	100	130	65	140
LTC	1,300	200	260	130	280

LTC (Lithium Thionyl Chloride)

Low battery indicator

The low battery warning will be signalled by the alternate blue flashing of the probe status LED when the end of the usable battery life is approaching. Simultaneously, the low battery LED on the RMI will be lit.

Dead battery indicator

When the battery voltage drops below the threshold where performance can no longer be guaranteed, the RMP60 probe status LED will change to constant red, followed by flashing red.

Battery specification

The RMP60 requires two identical AA size batteries, individually rated at a voltage of between 1.2 V and 3.6 V.

The standard batteries are AA alkaline. Alternative batteries are lithium thionyl chloride (3.6 V), Nickel Cadmium (NiCd) or Nickel Metal Hydride (NiMh).

Rechargeable batteries: either Nickel Metal Hydride (NiMh) or Nickel Cadmium (NiCd) can be used. Expect a battery life of approximately 50% of alkaline figures.

For applications requiring maximum battery life, a high capacity lithium thionyl chloride type is essential.

Sources for lithium thionyl chloride batteries

Please use these specified part numbers only

Supplier	Part number
RS	596-602, 201-9438,
Radio Shack	23-037

Manufacturer	Part number
Saft	LS 14500
Sonnenschein	SL 760/S
Tadiran	TL-5903/S, TL-2100/S
Xeno	XL-060F

RMP60 shank mounting

Stage 1 RMP60 shank mounting

If the RMP60 is not to be used with a shank switch, proceed from step 3.

1. Remove the plug from the rear of the RMP60 using pliers.

2. Place the bobbin into the shank.

3. Fully slacken the four screws **A**.

4. Grease the two screws **B**, and fit into the shank.

5. Fit the RMP60 onto the shank, and visually position it central relative to the shank.

6. Partially tighten screws **B** to 2 - 3 Nm (1.5 - 2.2 lbf.ft).

(If the RMP60 is NOT to be on-centre adjusted, fully tighten screws **B** to 6-8 Nm (4.4 - 5.9 lbf ft).

The RMP60 assembly is ready for use.

For on-centre adjustment, complete steps 7-10 (see next page).

Probe to shank alignment dot (used when bobbin is fitted)

Bobbin

Rear plug

A

B

Shank switch (optional)
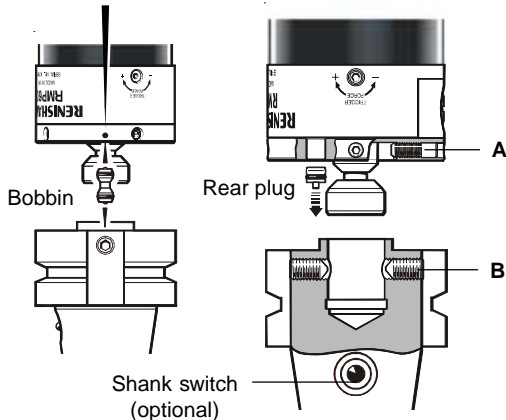
Note :

1. During adjustment, care should be taken NOT to rotate the probe relative to the shank, as damage to the shank switch bobbin may occur (if fitted).

2. If a probe on a shank is accidentally dropped, it should be checked for on-centre position.

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

Stylus on-centre adjustment (if required)

Stage 2   On-centre adjustment

7. Each of the four screws **A** will move the probe relative to the shank, in the X or Y direction, as pressure is applied.

   Tighten individually, backing off after each movement.

8. When the stylus tip run-out is less than 20 μm, fully tighten screws **B** to 6 - 8 Nm (4.4 - 5.9 lbf.ft).

9. For final centering, use screws **A** to move the RMP60, progressively slackening on one side and tightening the opposite screw, as the final setting is approached, using two hexagon keys.

   Tip run out of 5 μm (0.0002 in) should be achievable.

10. It is important that all four screws **A** are tight or tightened to 1.5 - 3.5 Nm (1.1 - 2.6 lbf.ft) once the final setting has been achieved.

SHANK

4 mm AF

2.5 mm AF

B

A
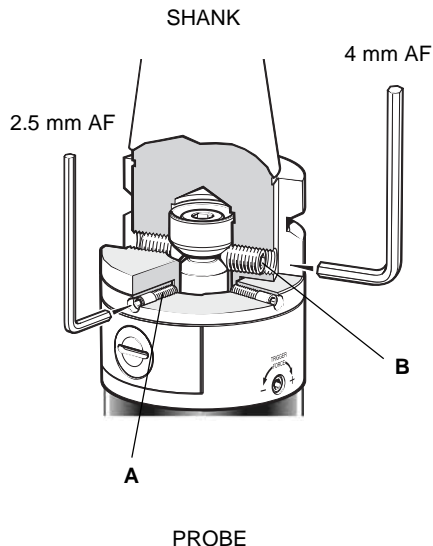
PROBE

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. excessive machine vibration or insufficient force to support the stylus weight.

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

Stylus trigger force

Z direction
5.30 N / 530 gf (18.69 ozf)

X/Y direction (50 mm stylus)
X/Y trigger forces vary, depending on trigger direction.
There are 3 high force and 3 low force X/Y directions:

Factory setting for low force direction = 0.75 N / 75 gf (2.6 ozf)
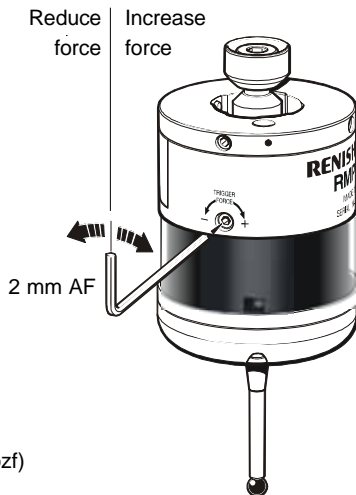Factory setting for high force direction = 1.4 N / 140 gf (4.9 ozf)
Maximum setting for low force direction = 2 N / 200 gf (7.0 ozf)
Maximum setting for high force direction = 3.5 N / 350 gf (12.3 ozf)
Minimum setting for low force direction = 0.5N / 50 gf (1.7 ozf)
Minimum setting for high force direction = 0.9 N / 90 gf (3.2 ozf)

Reduce force | Increase force

2 mm AF

Diaphragm replacement

RMP60 DIAPHRAGMS

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

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

The user must not remove the inner diaphragm. If damaged, return the probe to your supplier.

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

5. Inspect the inner diaphragm for damage.

If damaged return the probe to your supplier.

DO NOT REMOVE THE INNER DIAPHRAGM AS THE WARRANTY WILL BE VOID.

OUTER DIAPHRAGM REPLACEMENT

6. Fit the new diaphragm over centre.

7. Locate the outer edge of the diaphragm to rest on the outer edge of the inner diaphragm.

8. Refit the front cover and the M3 screws.

9. Refit the stylus and re-calibrate the probe.

M3 screw
2.5 mm AF
1 Nm
(0.74 lbf.ft)

Cover

Outer
diaphragm

Inner
diaphragm
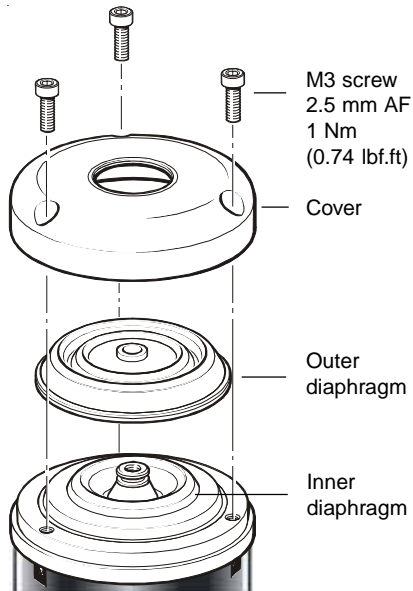
RMP60M system

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.

LPE extension bar

LP2 probe

M4 stylus

RMP60M LP2 adaptor

RMP60M module

MA4 90° adaptor

RMP60M extension

RMP60M probe module

M4 stylus

see parts list

RMP60M dimensions

66,25
(2.61)

50,00 / 100,00 / 150,00
(1.97) / (3.94) / (5.91)

40,75
(1.60)

12,50 (0.49)

Ø25,00
(Ø0.98)

Ø63,00
(Ø2.48)

dimensions mm (in)

66,25
(2.61)

100,00 / 150,00 / 200,00
(3.94) / (5.91) / (7.88)

50,50
(1.99)

Ø63,00
(Ø2.48)

Ø63,00
(Ø2.48)
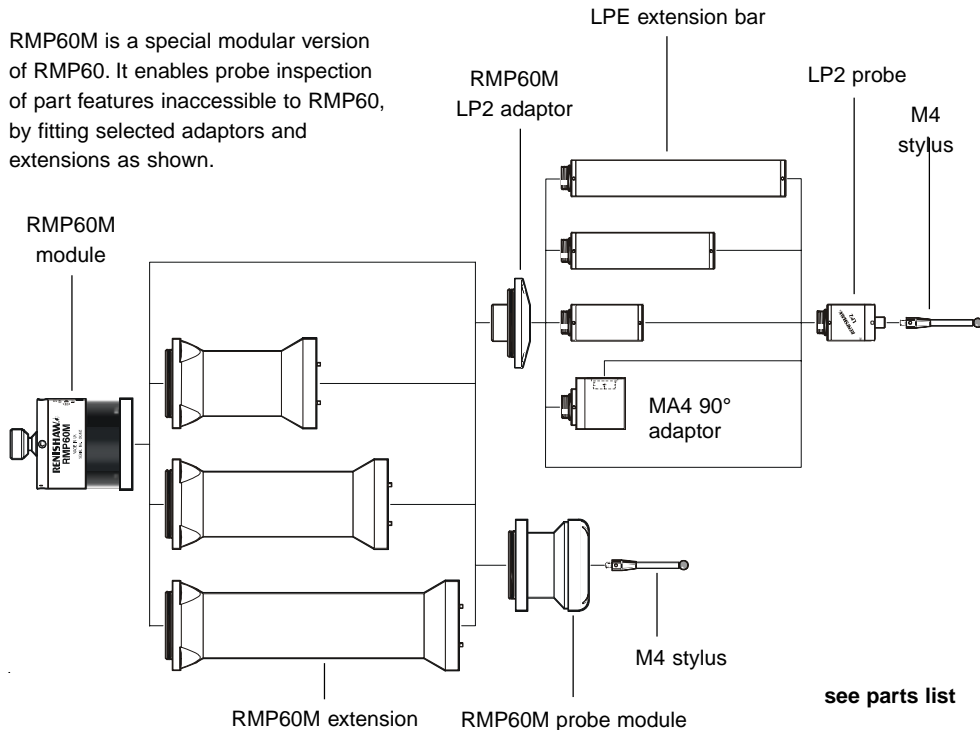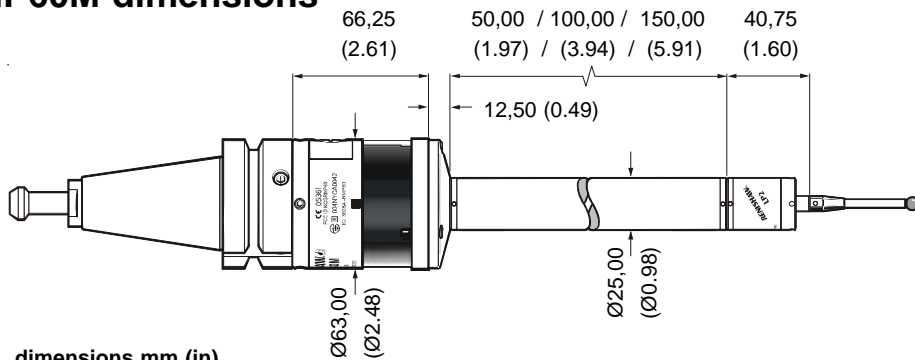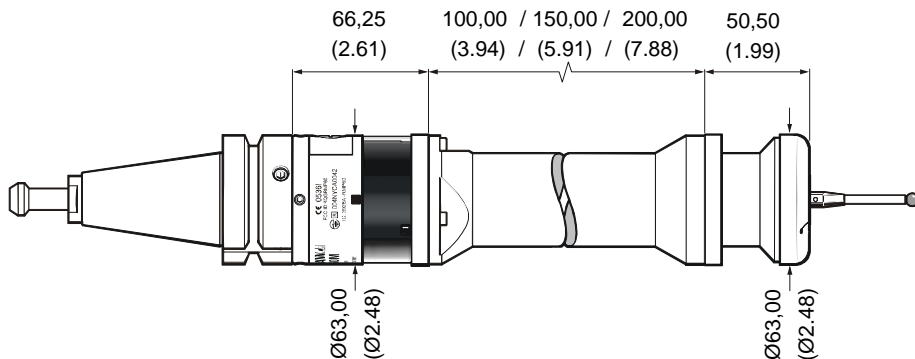
RMP60M screw torque values

2,6 Nm
(1.92 lbf.ft)

10 Nm - 12 Nm
(7.37 lbf.ft - 8.84 lbf.ft)

2,6 Nm
(1.92 lbf.ft)

2,6 Nm
(1.92 lb. ft)
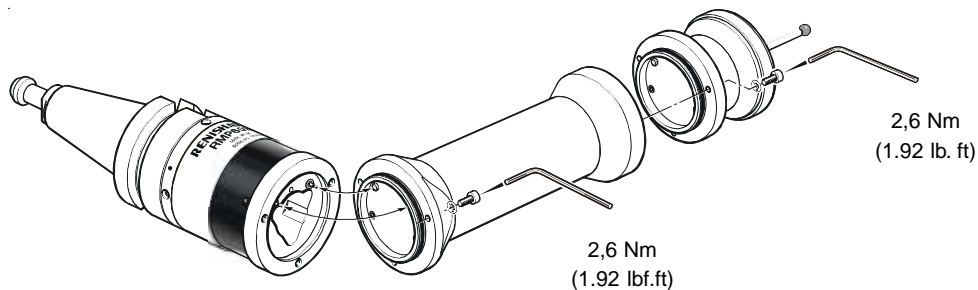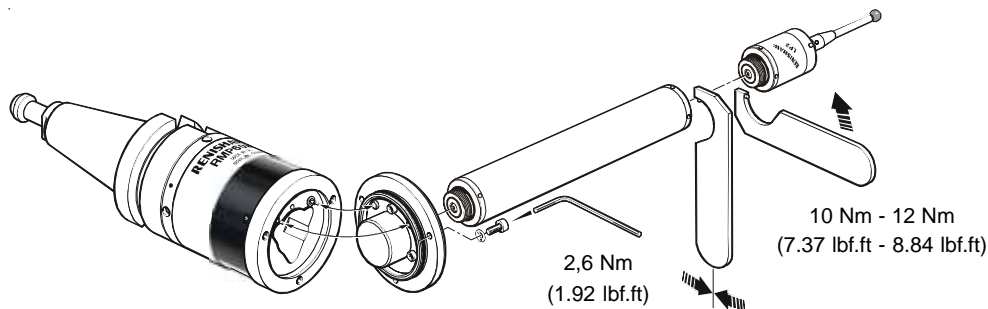
Fault finding - If in doubt, consult your probe supplier.

Sympton	Cause	Action
RMP60 fails to switch on.	Dead batteries.	Change batteries.
	Batteries incorrectly inserted.	Check/change batteries.
	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.
	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 hibernate mode (radio-on mode only).	Ensure probe is in range and wait up to 30 seconds.
		Check position of RMI, see Operating envelope.

Symptom	Cause	Action
RMP60 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 time out mode and placed in tool magazine and is being triggered by movement.	Review use of time out mode. Increase spring force.
	Malfunctioning shank switch (shank switch mode only).	Check switch operation.
	Incorrect spin speed (spin switch on only).	Check spin speed.
RMP60 status LEDs continuous red.	Dead batteries.	Change batteries.
Poor battery life.	Radio link failure – RMP out of RMI range.	Check position of RMI, see Operating envelope.
	RMI power has been removed.	Check power to RMI, leave RMI powered all the time.
	Local radio interference.	Identify source and move it away from the RMP60 and RMI.

Symptom	Cause	Action
Probe crash.	Inspection probe using tool setting probe signals.	Review program. Review installation.
	Probe length offset missing/incorrect.	Review probe software.
	Workpiece obstructing probe path.	Review program.
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.	Review installation.
	RMP60 and RMI are not partnered.	Partner RMP60 and RMI.
RMP60 probe status LED continually lit red.	Dead batteries.	Change batteries.

Symptom	Cause	Action
RMI error LED lit during probing cycle.	Probe timed out. Probe out of range.	Change setting. Review turn off method. Check position of RMI, see Operating envelope.
RMI error LED illuminated during intended probe cycle.	Probe not switched on. Probe out of range.	Check configuration and alter as required. Check position of RMI, see Operating envelope.
RMI low battery LED lit.	Low batteries.	Change batteries soon.
Reduced range.	Local radio interference.	Identify and move.
Poor repeatability.	Probing occurs within machine's acceleration/deceleration zones. Probe feedrate too high. Temperature variation. Wear in machine tool.	Review probe software. Check feedrate and correct, test at different speeds. Minimise temperature change. Calibrate more frequently. Calibrate just before use. Perform health check on machine.

Symptom	Cause	Action
Poor measurement results.	Debris on part or stylus.	Clean and recalibrate.
	Repeatability of probe into spindle.	Verify by repeated toolchange and single point move.
	Loose probe to shank mounting or stylus.	Check and tighten as required, recalibrate.
	Offsets not being updated.	Review software.
	Calibrated feature has moved.	Check.
	Measurement occurs as stylus leaves surface.	Review software.
	Calibration and probing speeds different.	Review software.

Parts list - Please quote the Part no. when ordering equipment.

Type	Part no.	Description
RMP60	A-4113-0001	RMP60 probe with batteries, tool kit and user's guide (set to radio on/radio off).
Battery	P-BT03-0005	AA batteries - Alkaline - supplied as standard with probe (two required).
Battery	P-BT03-0008	AA batteries - 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.
TK	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 mm AF hexagon key, shank grub screws (x 2), weak link and 5 mm AF spanner.
Diaphragm kit	A-4038-0302	RMP60 outer diaphragm.
Battery cassette	A-4038-0300	RMP60 battery cassette assembly.
Cassette seal	A-4038-0301	Battery cassette housing seal.

Type	Part no.	Description
Bobbin	A-4038-0303	Bobbin for shank switch.
RMI	A-4113-0050	RMI, side exit, with 15 m (49.2 ft) cable, tool kit and User's guide.
Mtg brkt	A-2033-0830	Mounting bracket with fixing screws, washers and nuts.
Styli	—	For complete listing, please see Renishaw Styli guide. Part no. H-1000-3200.
Software tools	—	For complete listing of Renishaw software for machine, please see data sheets. Part no. H-2000-2289 and H-2000-2298.
Shanks	—	For complete listing, please see Renishaw data sheet H-2000-2011.

Type	Part no.	Description
RMP60M module	A-4113-1003	RMP60M module with batteries, tool kit and User's guide. (set to radio on/radio off).
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.
Probe module	A-4038-1002	RMP60M probe module assembly.
RMP60M/LP2	A-4038-0212	RMP60M 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.

Probe settings record table   ✔ tick

Switch-on method	Radio on	
	Shank on	
	Spin on	
Switch-off method	Radio or spin	
	Short timeout 12 seconds	
	Medium timeout 33 seconds	
	Long timeout 134 seconds	
Multiple probe mode	Off (factory set)	
	On (machine number)	

RMP60 serial no.

RENISHAW

apply innovation™

**For worldwide contact details,
please visit our main web site at
www.renishaw.com/contact**