Installation guide
H-5627-8504-04-A

RENISHAW
apply innovation™

RLP40 radio lathe probe

Renishaw part no:	H-5627-8504-04-A
First issued:	02.2010
Revised:	05.2010
	02.2012
	08.2016

Contents

Before you begin

Before you begin

Disclaimer

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

Warranty

Equipment requiring attention under warranty must be returned to your equipment supplier.

Unless otherwise specifically agreed in writing between you and Renishaw, if you purchased the equipment from a Renishaw company, the warranty provisions contained in Renishaw's CONDITIONS OF SALE apply. You should consult these conditions in order to find out the details of your warranty, but in summary, the main exclusions from the warranty are if the equipment has been:

- neglected, mishandled or inappropriately used; or
- modified or altered in any way except with the prior written agreement of Renishaw.

If you purchased the equipment from any other supplier, you should contact them to find out what repairs are covered by their 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 RLP40 probe, and other similar Renishaw probes, are the subject of one or more of the following patents and/or patent applications:

CN 100466003
CN 101287958
CN 101482402
EP 1185838
EP 1373995
EP 1425550
EP 1457786
EP 1477767
EP 1477768
EP 1576560
EP 1701234
EP 1734426
EP 1804020
EP 1931936
EP 1988439
EP 2216761
IN WO2007/028964
IN 215787
IN WO2004/057552
JP 3967592
JP 4237051
JP 4575781
JP 4754427
JP 4773677
JP 4851488
JP 5238749
JP 5390719
KR 1001244
TW I333052
US 6776344
US 6941671
US 7145468
US 7285935
US 7441707
US 7486195
US 7665219
US 7812736
US 7821420
US 9140547

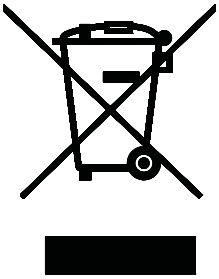
EC declaration of conformity

CE

Renishaw plc hereby declares that the RLP40 and RMP40M are in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Contact Renishaw plc or visit www.renishaw.com/rlp40 for the full EC declaration of conformity.

WEEE directive



The use of this symbol on Renishaw products and/or accompanying documentation indicates that the product should not be mixed with general household waste upon disposal. It is the responsibility of the end user to dispose of this product at a designated collection point for waste electrical and electronic equipment (WEEE) to enable reuse or recycling. Correct disposal of this product will help to save valuable resources and prevent potential negative effects on the environment. For more information, please contact your local waste disposal service or Renishaw distributor.

FCC Information to user (USA only)

47 CFR 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, and
2. This device must accept any interference received, including interference that may cause undesired operation.

47 CFR 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

Radio equipment – Canadian warning statements

English

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Français

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada.

Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radio approvals

Argentina: CNC 16-9811

Australia: E2067 R-NZ

Brazil: 2266-11-2812

ANATEL 2266-11-2812 (01)07898914243063

"Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário."

Canada: IC: 3928A-RLP40

China: CMIIT ID: 2011DJ0780

Europe: CE

India: 1794/2012/WRLO

Israel: 51-29404

Japan: 004WWA0752

Malaysia: 00683

New Zealand: E2067 R-NZ

Russia: 77-14/0360/2020

Singapore: Reg. No: N0594-11

Complies with IDA Standards DA104642

South Africa: TA-2011/1397

ICASA TA-2011/1397 APPROVED

South Korea: KCC-CRI-REN-RMP40

Taiwan: CCAB10LP508AT2

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。

USA: FCC ID: KQGRLP40

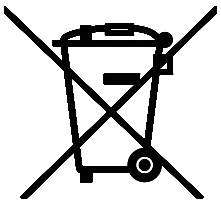
Vietnam A0592230713BE11A2

Iceland Liechtenstein Montenegro Norway Switzerland Turkey

Safety

Information to the user

The RLP40 and RMP40M are supplied with two non-rechargeable ½ AA lithium-thionyl chloride batteries (approved to IEC 62133). Once the charge in these batteries is depleted, do not attempt to recharge them.



The use of this symbol on the batteries, packaging or accompanying documents indicates that used batteries should not be mixed with general household waste. Please dispose of the used batteries at a designated collection point. This will prevent potential negative effects on the environment and human health which could otherwise arise from inappropriate waste handling. Please contact your local authority or waste disposal service concerning the separate collection and disposal of batteries. All lithium and rechargeable batteries must be fully discharged or protected from short circuiting prior to disposal.

Please ensure replacement batteries are of the correct type and are fitted in accordance with the instructions in this manual (see Section 5, “Maintenance”), and as indicated on the product. For specific battery operating, safety and disposal guidelines, please refer to the battery manufacturer’s literature.

- Ensure that all batteries are inserted with the correct polarity.
- Do not store batteries in direct sunlight.
- Do not heat or dispose of batteries in a fire.
- Do not short-circuit or force discharge the batteries.
- Do not disassemble, pierce, deform or apply excessive pressure to the batteries.
- Do not swallow the batteries.
- Keep the batteries out of the reach of children.
- Do not get batteries wet.
- If a battery is damaged, exercise caution when handling it.

Please ensure that you comply with international and national battery transport regulations when transporting batteries or the products.

Lithium batteries are classified as dangerous goods and strict controls apply to their shipment by air. To reduce the risk of shipment delays, if you need to return the RLP40 or RMP40M to Renishaw for any reason, do not return any batteries.

The RLP40 and RMP40M have 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 EC 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 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, i.e. motor power supply cables etc, 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.

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RLP40 basics

Introduction

Welcome to the RLP40 job set-up and inspection probe. At only 40 mm diameter, this compact probe sets industry standards for functionality, reliability and robustness in the harshest of machine tool environments.

The RLP40 forms part of Renishaw's family of new generation radio transmission probes. It is ideally suited to large machining centres where line-of-sight between probe and receiver is difficult to achieve or where Z travel is limited.

The RLP40 complies with FCC regulations and operates in the 2.4 GHz band. It delivers interference-free transmission through the use of frequency hopping spread spectrum (FHSS), which allows several systems to operate in the same machine shop without risk of cross-interference.

All RLP40 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
- Filter on / filter off
- Multiple probe mode on / multiple probe mode off

Getting started

Three multicolour 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 Section 3 and Section 5 for further information).

When the batteries are inserted, the LEDs will begin to flash (see Section 4 for further information).

System interface

The RMI and RMI-Q integrated interfaces/ receivers are used to communicate between the RLP40 probe and the machine controller.

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 deflections (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 reinserting them, which activates the Trigger Logic review sequence.

Probe modes

The RLP40 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 RLP40 is ready for use.

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

Configurable settings

Switch-on/switch-off methods

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

- Radio on / radio off
- Radio on / timer off
- Spin on / spin off
- Spin on / timer off

RLP40 switch-on method Switch-on options are configurable	RLP40 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 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.	**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. **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.

NOTE: After being switched on, the RLP40 must be on for 1 second minimum before being switched off. When using spin on / spin off, ensure that the probe is stationary for 1 second minimum after it has stopped spinning before using spin off.

Enhanced trigger filter

Probes subjected to high levels of vibration or shock loads may output 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 10 ms delay is introduced to the probe's output.

The RLP40 is factory-set to trigger filter off.

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

Multiple probe mode

The RLP40 can be configured, using Trigger Logic, to allow multiple radio probes to be used with a single RMI or RMI-Q.

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.

RLP40 probes which are set to “multiple probe mode on” can coexist alongside any number of RLP40 probes set to “mode off”.

To allow multiple radio probes to work in close proximity, and with a single RMI or RMI-Q, 16 choices of “mode on” colours are available, each representing a different machine tool installation. The colour choices available are as shown in Section 4, “Trigger Logic”.

All probes operating with a single RMI or RMI-Q 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 or RMI-Q 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 Section 4, “Trigger Logic”.

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

All RLP40 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 is then repartnered with the RMI or RMI-Q.

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 by using Trigger Logic and powering-on the RMI or RMI-Q, or applying ReniKey. Partnering is only required during initial system set-up. Further partnering will be required if the RLP40, RMI or RMI-Q is changed.

NOTES:

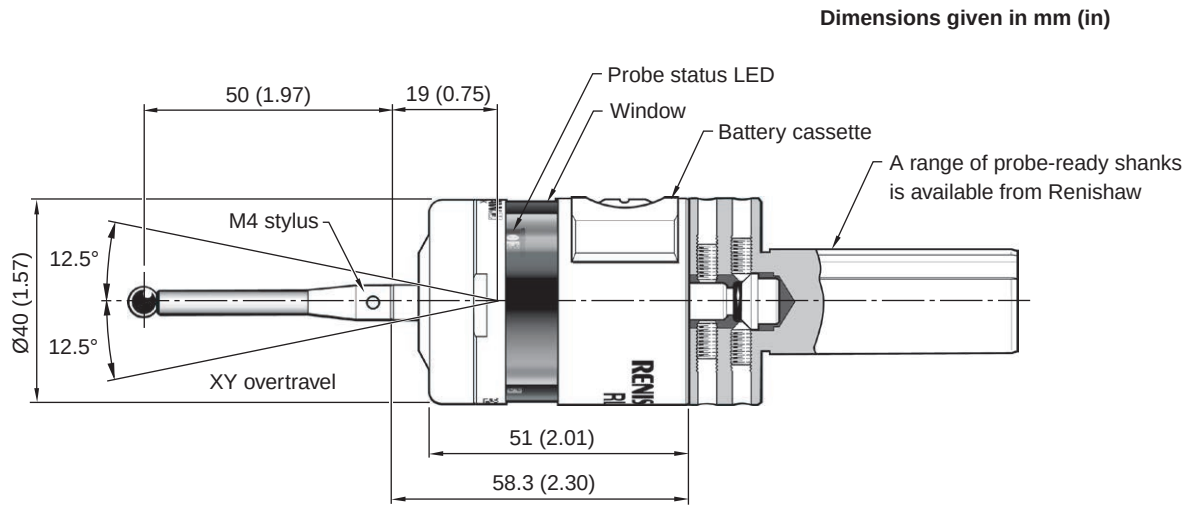
Systems using the RMI-Q can be partnered with up to four RLP40s manually. Alternatively this can be achieved by using ReniKey: a Renishaw machine macro cycle which does not require the RMI-Q to be power cycled.

For more information or to download Renikey free of charge visit:
www.renishaw.com/mtpsupport/renikey

Partnering by ReniKey is not available for RMI.

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

RLP40 dimensions



Stylus overtravel limits		
Stylus length	**±X/±Y**	**+Z**
50 (1.97)	12 (0.47)	6 (0.24)
100 (3.94)	22 (0.87)	6 (0.24)

RLP40 specification

Principal application	Workpiece inspection and job set-up on multi-tasking machines and lathes	
Dimensions	Length Diameter	58.3 mm (2.30 in) 40 mm (1.57 in)
Weight (without shank)	With batteries Without batteries	260 g (9.17 oz) 240 g (8.47 oz)
Transmission type	Frequency hopping spread spectrum (FHSS) radio	
Radio frequency	2400 MHz to 2483.5 MHz	
Switch-on methods	Radio M-code, spin	
Switch-off methods	Radio M-code, spin, timeout	
Spindle speed (maximum)	1000 rev/min	
Operating range	Up to 15 m (49.2 ft)	
Receiver/interface	RMI or RMI-Q combined antenna, interface and receiver unit	
Sense directions	Omni-directional ±X, ±Y, +Z	
Unidirectional repeatability Maximum 2σ value in any direction	1.00 µm (40 µin) 2σ (see note 1)	
Stylus trigger force (see notes 2 and 3) Factory setting: XY low force XY high force Z	 0.40 N, 40 gf (1.40 ozf) 0.80 N, 80 gf (2.80 ozf) 5.30 N, 530 gf (18.70 ozf)	
Maximum setting: XY low force XY high force Z	 0.80 N, 80 gf (2.80 ozf) 1.60 N, 160 gf (5.60 ozf) 10.00 N, 1000 gf (35.30 ozf)	
Minimum setting: XY low force XY high force Z	 0.30 N, 30 gf (1.10 ozf) 0.60 N, 60 gf (2.10 ozf) 4.00 N, 400 gf (14.10 ozf)	
Stylus overtravel	XY plane +Z plane	±12.5° 6 mm (0.24 in)
Environment	IP rating	IPX8 (EN/IEC 60529)
	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 × ½ AA (3.6 V) lithium-thionyl chloride	

Battery reserve life	Approximately one week after a low battery warning is first given
Low battery indication	Blue flashing LED in conjunction with normal red or green probe status LED
Dead battery indication	Constant or flashing red
Typical battery life	See table below

Note 1 Performance specification is tested at a standard test velocity of 480 mm/min (18.9 in/min) with a 50 mm stylus. 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 (overtravel). The force value depends on related variables including measuring speed and machine deceleration.

Note 3 Using a 50 mm (1.97 in) straight stylus.

Spin switch on		Radio switch on		Continuous use
Standby life	**5% usage** (72 minutes/day)	**Standby life**	**5% usage** (72 minutes/day)	
240 days	150 days	290 days	170 days	450 hours

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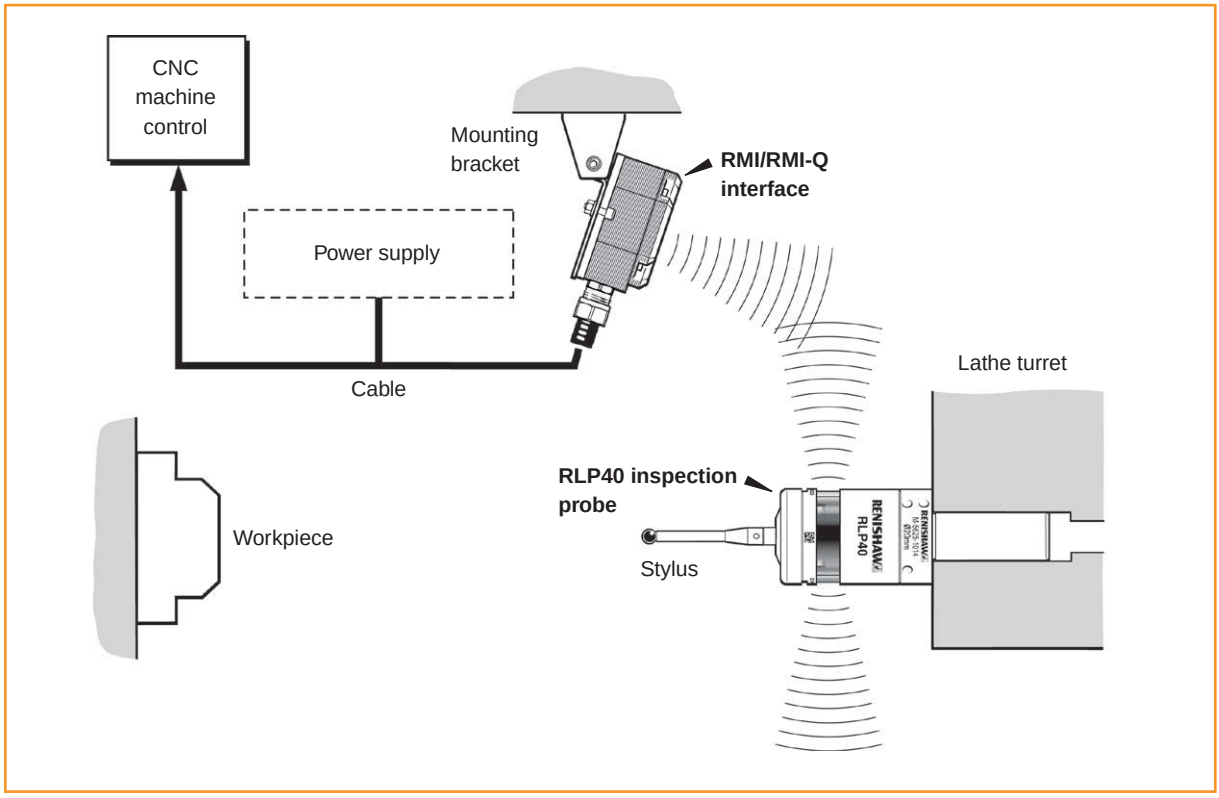
System installation

Installing the RLP40 with an RMI or RMI-Q



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 RLP40 and RMI or RMI-Q may have a detrimental effect on transmission performance. Wipe clean as often as is necessary to maintain unrestricted transmission.

When operating, do not cover the probe glass window, RMI or RMI-Q with your hands, as this will affect the performance.

Positioning the RLP40 and RMI or RMI-Q

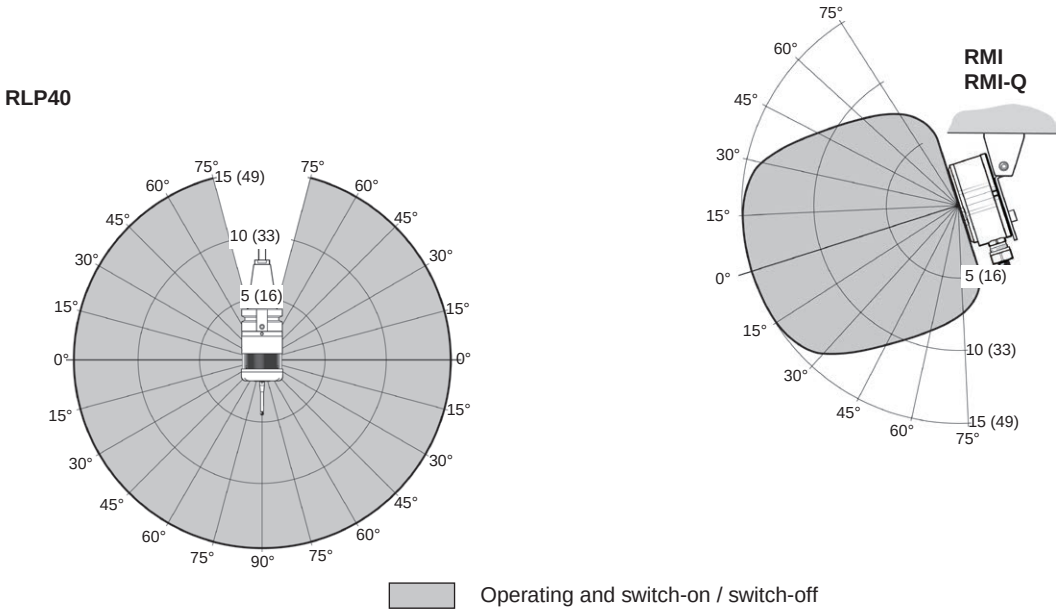
The probe system should be positioned so that the optimum range can be achieved over the full travel of the machine's axes. Always face the front cover of the RMI or RMI-Q in the general direction of the machining area and the tool magazine, ensuring both are within the performance envelope shown below.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

NOTE: Installing the RLP40 and RMI or RMI-Q with the RLP40 in radio-on configuration

The RLP40 has a built-in hibernation mode (battery-saving mode) that saves battery life when the RMI or RMI-Q is unpowered in radio-on (radio-off or timer-off) configurations. The RLP40 goes into hibernation mode 30 seconds after the RMI or RMI-Q is unpowered (or the RLP40 is out of range). When in hibernation mode, the RLP40 checks for a powered RMI or RMI-Q every 30 seconds. If found, the RLP40 goes from hibernation mode to standby mode, ready for radio-on.

Performance envelope

The RLP40 and RMI or RMI-Q 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.



Typical plot at +20 °C (+68 °F)
Transmission range in m (ft)

Preparing the RLP40 for use

Fitting the stylus

1

2

M-5000-3707

Installing the batteries

NOTES:

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

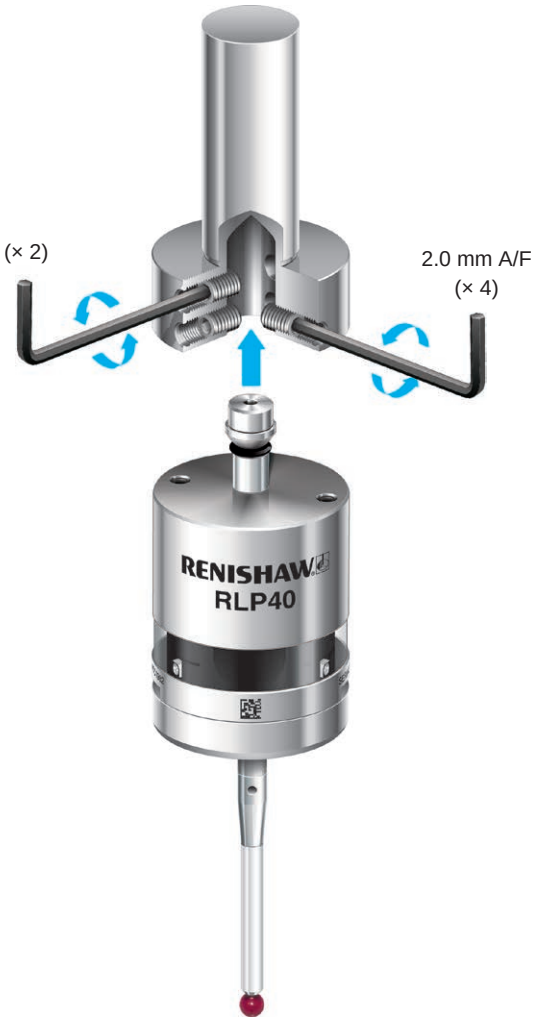
If dead batteries are inadvertently inserted, the LEDs will remain a constant red.

Do not allow coolant or debris to enter the battery compartment. When inserting batteries, check that the battery polarity is correct.

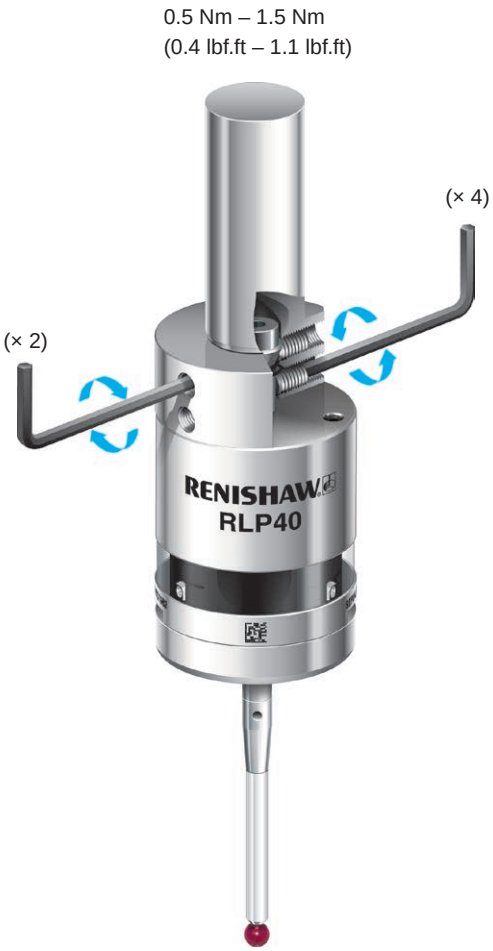
After the batteries have been inserted, the LEDs will display the current probe settings (for details, see Section 4, “Trigger Logic™”).

Mounting the probe on a shank

1



2



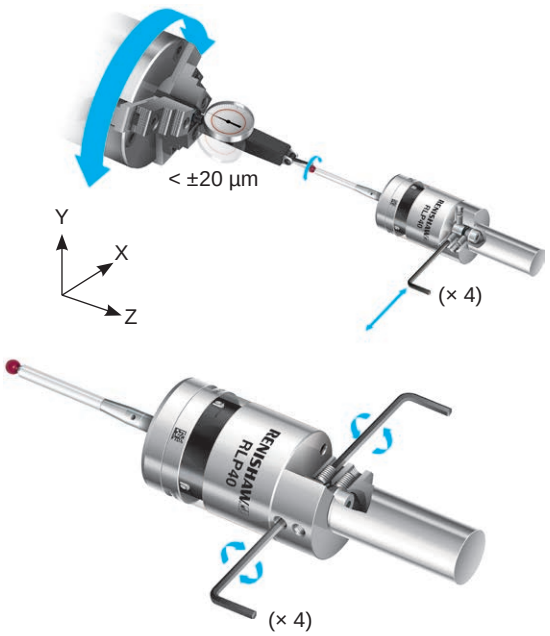
Stylus on-centre adjustment

NOTES:

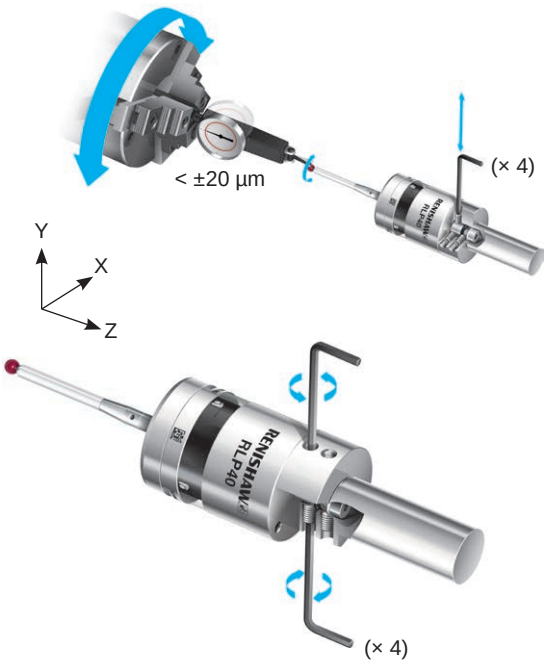
If a probe and shank assembly is dropped, it must be rechecked for correct on-centre adjustment.

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

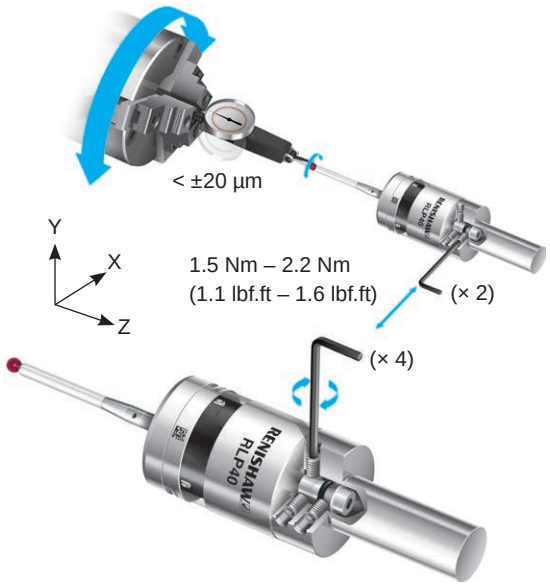
1 **Adjust in X axis**



2 **Adjust in Y axis**



3



Stylus trigger force and adjustment

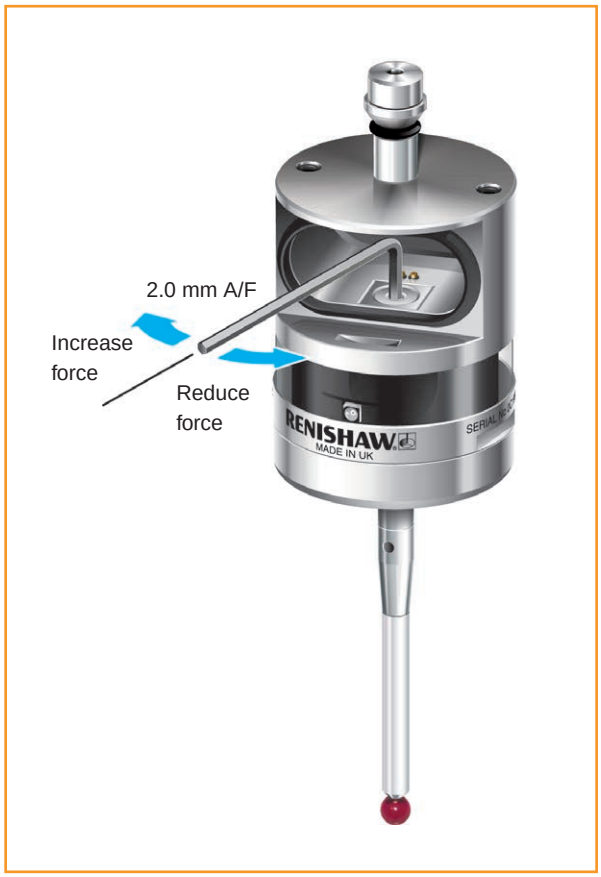
Spring force within the probe causes the stylus to sit in a unique position and return to this position following each stylus deflection.

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 (as shown) to reduce the force (more sensitive); eventually it reaches a stop. Turn the adjusting screw clockwise (as shown) to increase the force (less sensitive). If the internal screw becomes disengaged, remove any pressure on the stylus and turn the key anticlockwise to re-engage the thread.

Trigger forces in the XY plane vary around the stylus and depend on trigger direction.

Stylus trigger force adjustment and use of styli other than test stylus types may cause probe repeatability to differ from the calibration certificate results.



Factory setting

XY low force	0.40 N, 40 gf (1.40 ozf)
XY high force	0.80 N, 80 gf (2.80 ozf)
Z	5.30 N, 530 gf (18.70 ozf)

Maximum setting

XY low force	0.80 N, 80 gf (2.80 ozf)
XY high force	1.60 N, 160 gf (5.60 ozf)
Z	10.00 N, 1000 gf (36.30 ozf)

Minimum setting

XY low force	0.30 N, 30 gf (1.10 ozf)
XY high force	0.60 N, 60 gf (2.10 ozf)
Z	4.00 N, 400 gf (14.10 ozf)

Calibrating the RLP40

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 been crashed;
- at regular intervals to compensate for mechanical changes of your machine tool;
- if repeatability of relocation of the probe shank in the machine spindle is poor. In this case, the probe may need to be recalibrated each time it is selected.

On lathes without a Y axis, it is important to set the tip of the stylus to the spindle centre-line (see page 3.6) to ensure that the measurement is made on the full diameter of the hole/ring or shaft/ball. Otherwise the resulting (cosine) error will be proportional to the difference between the calibration diameter and the current feature diameter. This effect is only large enough to detect on diameters less than 50 mm. On larger diameters it can safely be ignored. On lathes with a Y axis, an additional adjustment to the Y axis position can be made prior to measurement to ensure that the stylus tip is on the spindle centre line.

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 size;
- 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 offset values between actual and theoretical stylus ball position and also the electronic ball radius of the stylus being used. The stored values are then used automatically in the measuring cycles. Measured values are compensated by these offsets so that positional and size measurements relative to spindle centre line are accurate.

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.

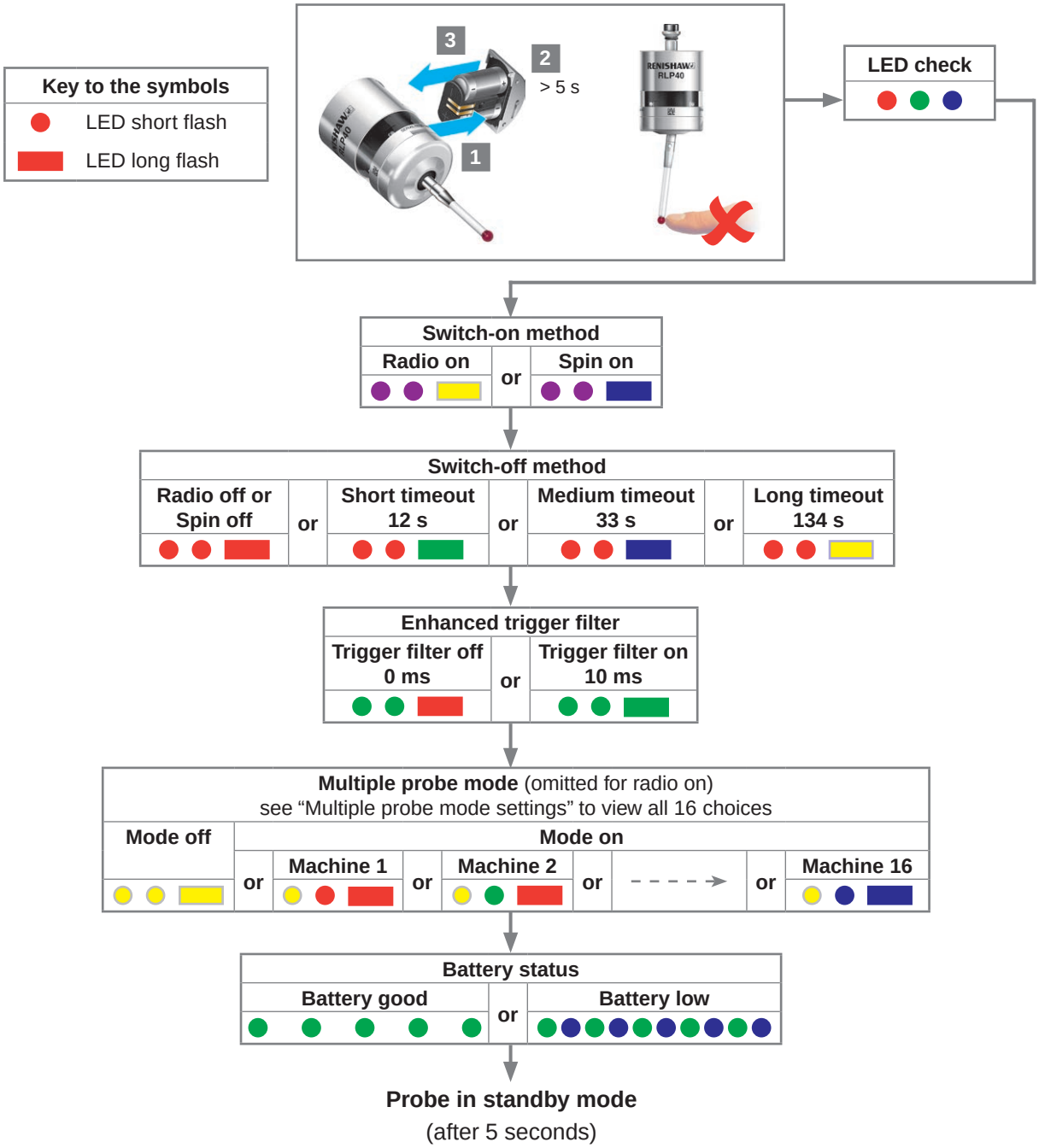
NOTE: The stored radius values are based on the true electronic trigger points. These values are different from the physical sizes.

Calibrating the probe length

Calibrating a probe on a known reference surface automatically stores the position of the stylus ball (probe length or geometry offset) relative to either a turret or workpiece reference face.

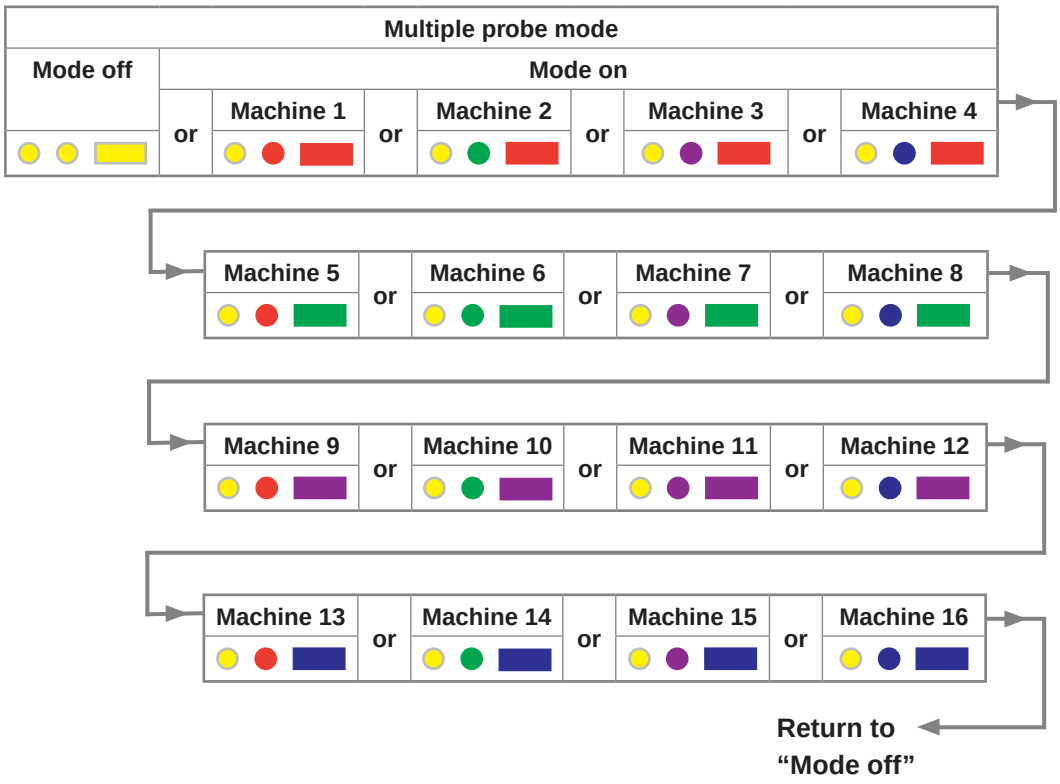
Trigger Logic™

Reviewing the 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	● ● ▬	✓	
	Spin on	● ● ▬		
Switch-off method	Radio or spin	● ● ▬	✓	
	Short timeout (12 s)	● ● ▬		
	Medium timeout (33 s)	● ● ▬		
	Long timeout (134 s)	● ● ▬		
Enhanced trigger filter	Trigger filter off	● ● ▬	✓	
	Trigger filter on	● ● ▬		
Multiple probe mode	Off (factory set)	○ ○ ▬	✓	
	On (machine number)	See "Multiple probe settings"		

RLP40 serial no .....

Changing the probe settings

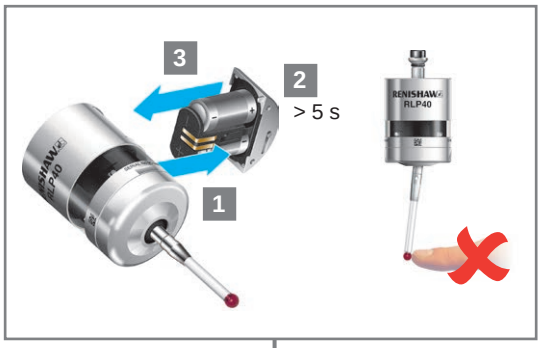
Insert the batteries or, if they have already been installed, remove them for 5 seconds and then refit them.

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, each red flash will be followed by a blue flash).

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

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

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.



LED check

Battery status

Battery good	or	Battery low
●●●●●		●●●●●●●●

Switch-on method
(omitted if multiple probe mode was selected)

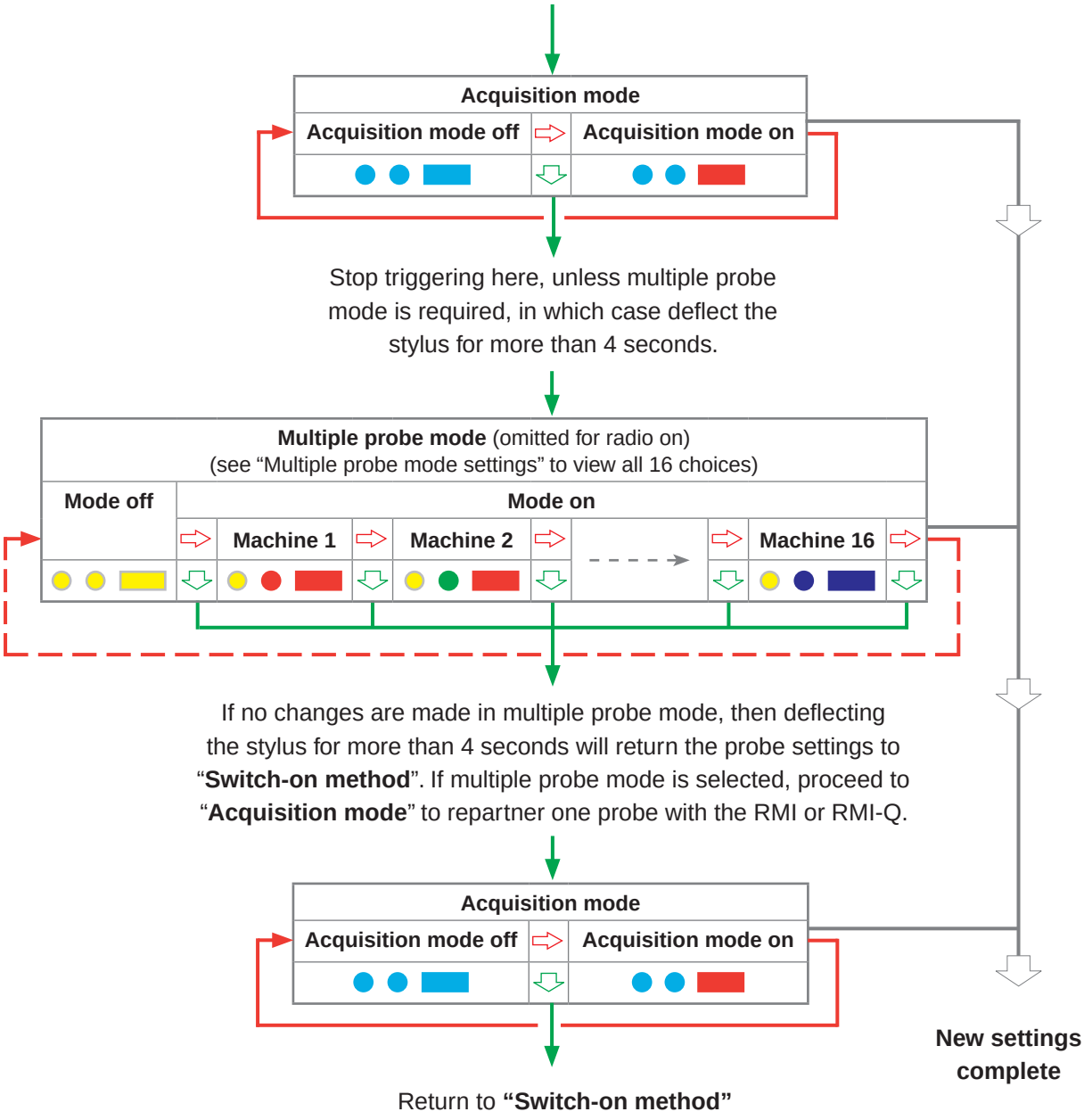
Radio on	⇨	Spin on	⇨
●● ▭	⇩	●● ▬	⇩

Switch-off method

Radio off or Spin off	⇨	Short timeout 12 s	⇨	Medium timeout 33 s	⇨	Long timeout 134 s	⇨
●● ▬	⇩	●● ▬	⇩	●● ▬	⇩	●● ▭	⇩

Enhanced trigger filter

Trigger filter off 0 ms	⇨	Trigger filter on 10 ms	⇨
●● ▬	⇩	●● ▬	⇩



NOTE: If using mutiple probe mode, refer to the *RMI installation guide* (Renishaw part no. H-4113-8554) or the *RMI-Q installation guide* (Renishaw part no. H-5687-8504).

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

NOTE: To partner an RLP40 with an RMI please see "RLP40 – RMI partnership". Once acquisition has been successful, the RLP40 will revert to "Acquisition mode off".

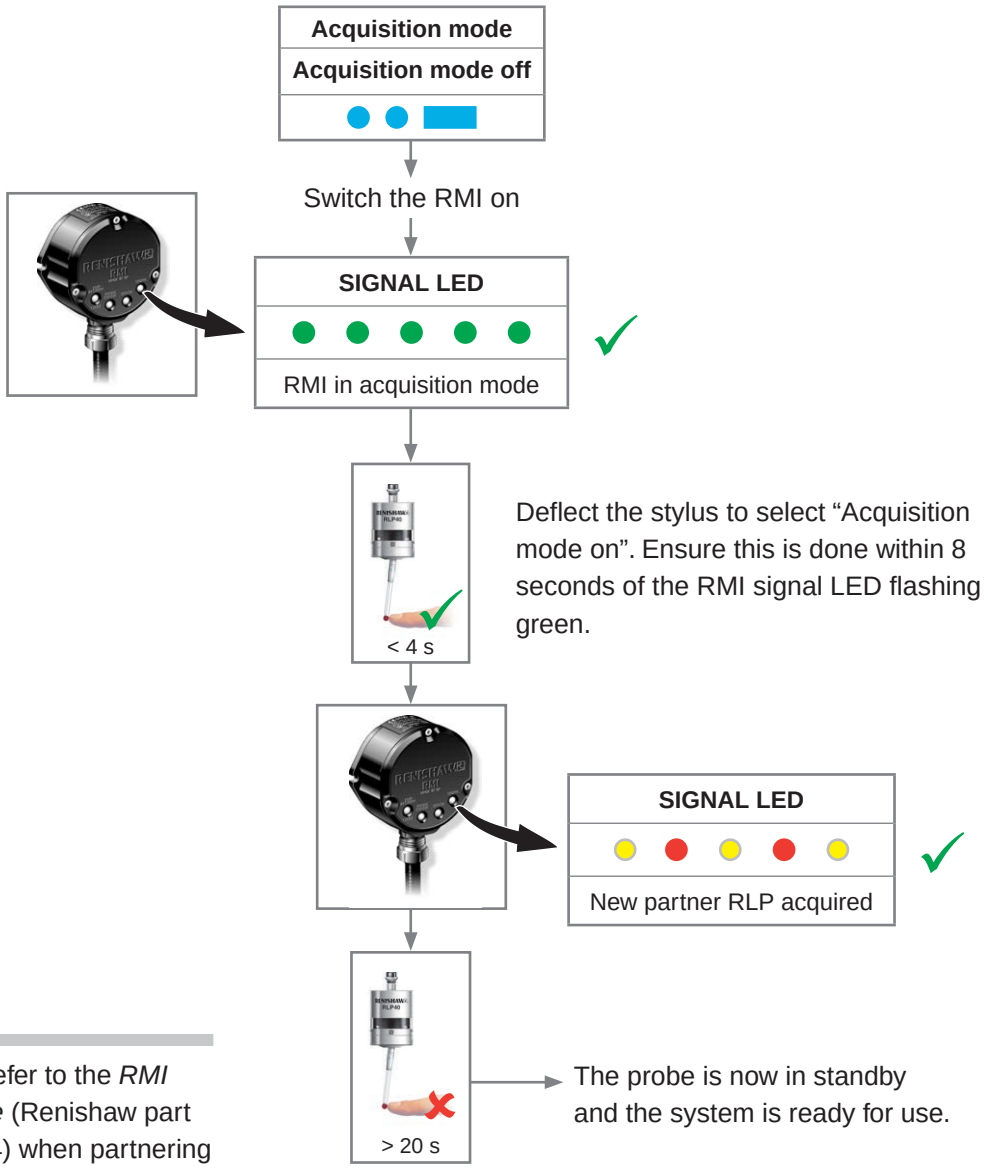
NOTE: To partner an RLP40 with an RMI-Q please see "RLP40 – RMI-Q partnership". Once acquisition has been successful, the RLP40 will revert to "Acquisition mode off".

RLP40 – 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 will be required if either the RLP40 or RMI are changed, or if 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, which defaults to “Acquisition mode off”.



NOTE: Please refer to the *RMI installation guide* (Renishaw part no. H-4113-8554) when partnering the RLP40.

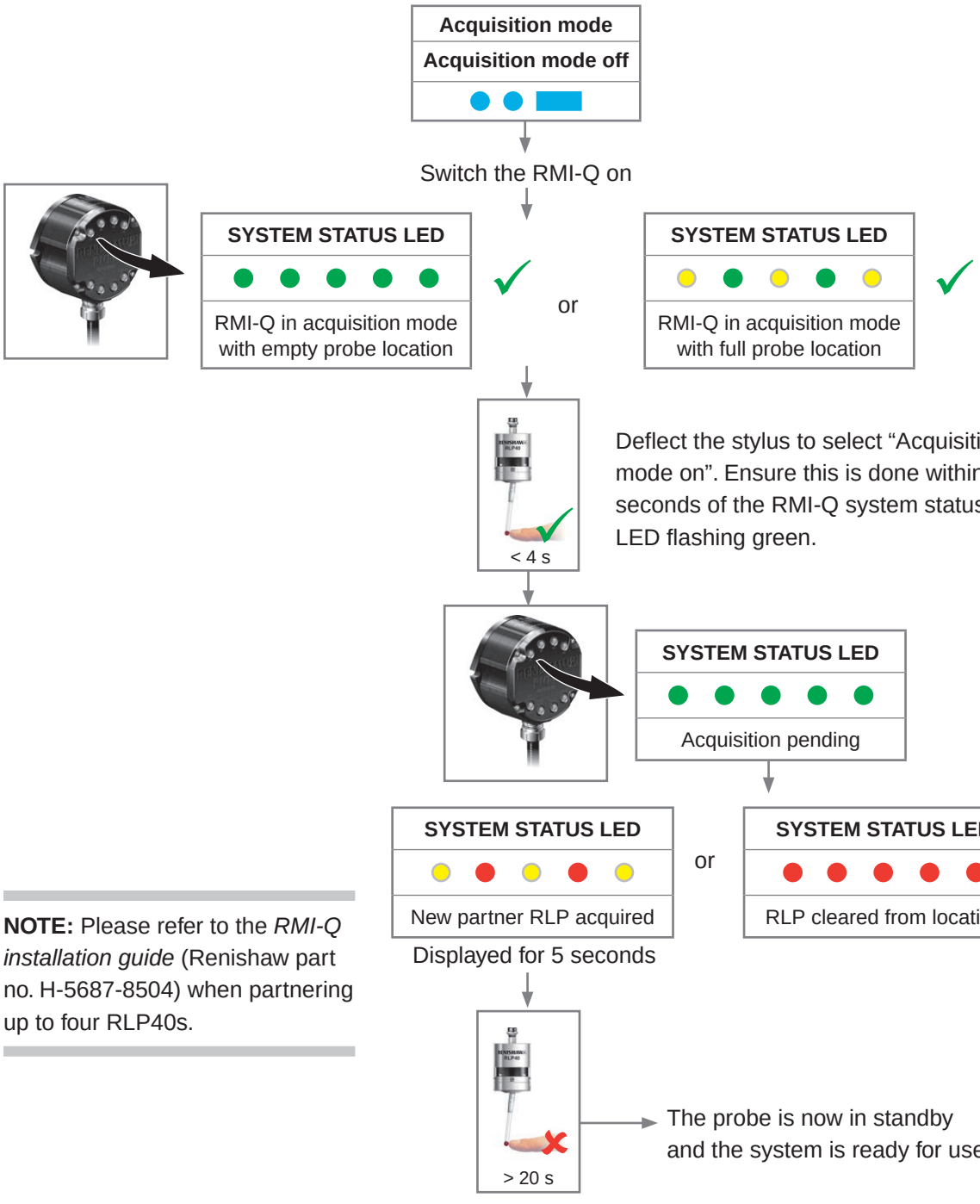
RLP40 – RMI-Q partnership

System set-up is achieved by using Trigger Logic and powering on the RMI-Q or applying ReniKey. Partnering is required during initial system set-up. Further partnering will be required if either the RLP40 or RMI-Q is changed.

Partnering will not be lost by reconfiguring the probe settings or changing the batteries. Partnering can take place anywhere within the operating envelope.

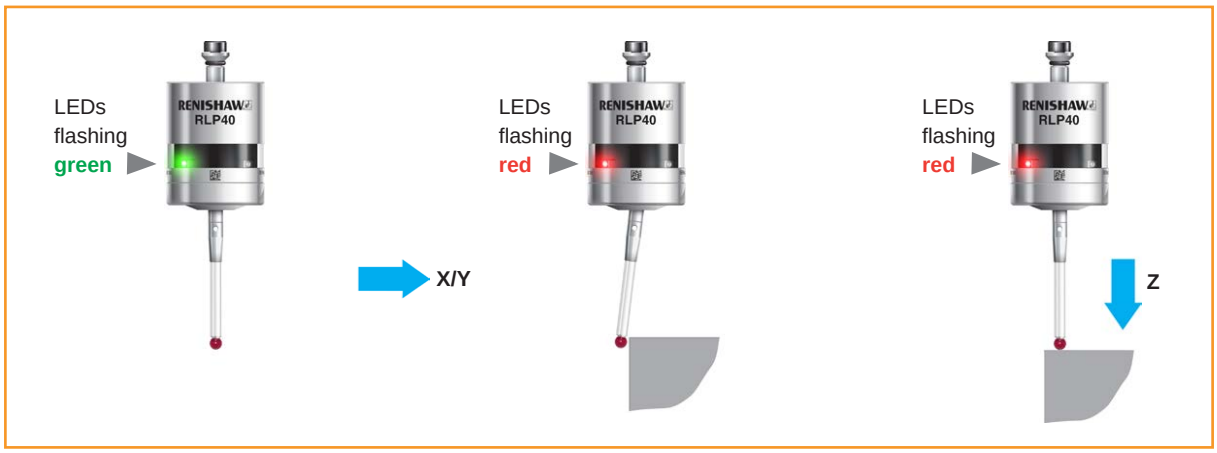
An RLP40 that is partnered with the RMI-Q but then used with another system will need to be repartnered before being used again with the RMI-Q.

In configuration mode, configure the probe settings as required until you reach the “Acquisition mode” menu, which defaults to “Acquisition mode off”.



NOTE: Please refer to the *RMI-Q installation guide* (Renishaw part no. H-5687-8504) when partnering up to four RLP40s.

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 warning is ignored, 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 probe settings” earlier in this section).
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 repeats itself.

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 an authorised Renishaw Service Centre.

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

Cleaning the probe

Wipe the window 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 RLP40 has a glass window. Handle with care if broken to avoid injury.

Changing the batteries

1

CAUTIONS:

Do not leave dead batteries in the probe.

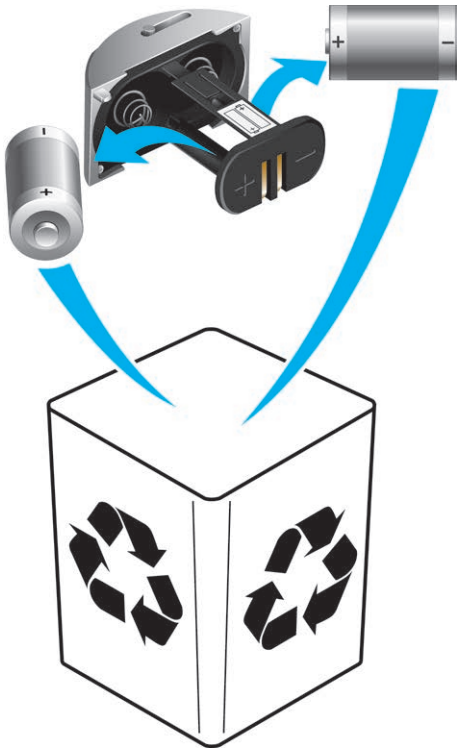
When changing batteries, do not allow coolant or debris to enter the battery compartment.

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

Take care to avoid damaging the battery cassette gasket.

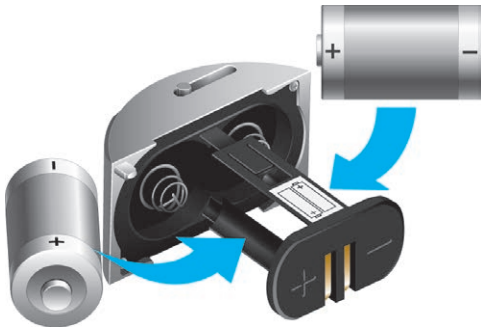
Only use specified batteries.

2



CAUTION: Please dispose of dead 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, the LEDs will remain a constant red.

Battery type			
½ AA Lithium-thionyl chloride (3.6 V) × 2			
Ecocel:	EB1426	**Dubilier:**	SB-AA02
Saft:	LS 14250C, LS 14250	**Maxell:**	ER3S
Tadiran:	SL-750	**Sanyo:**	CR 14250SE
Xeno:	XL-050F	**Tadiran:**	SL-350, SL-550, TL-4902, TL-5902, TL-2150, TL-5101
		Varta:	CR ½ AA

4

5

RLP40 eyelid

The RLP40 is fitted with a metal eyelid that protects the internal components of the probe from hot chip and coolant environment. Dirt may accumulate in the cavity underneath the metal eyelid seal.

To remove this dirt, once a month, remove the front cap (using a coin or flat blade screwdriver) and then remove all the residue with a low-pressure jet of coolant.

Do not use a sharp tool or a degreasing agent. The cleaning interval may be extended or reduced, depending on the rate dirt accumulates. If the inner diaphragm is damaged, return the probe to your supplier for repair.

Reassembling the probe

DO NOT use the probe with the cap removed. Check that the probe is firmly secured in its mounting.

1

Apply a coin or flat blade screwdriver to both sides to sequentially lever the front cap from the probe body.

2

3

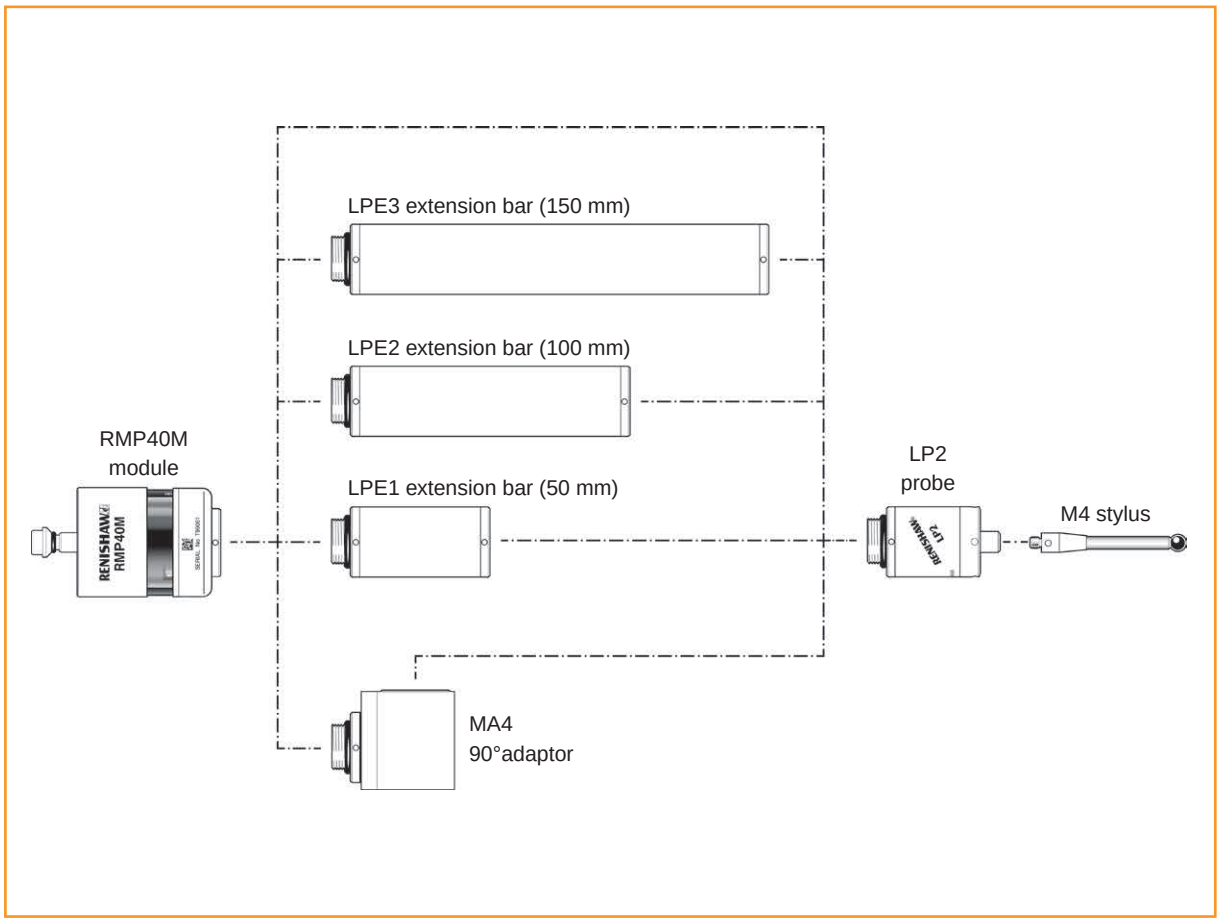
4

RMP40M system

RMP40M system

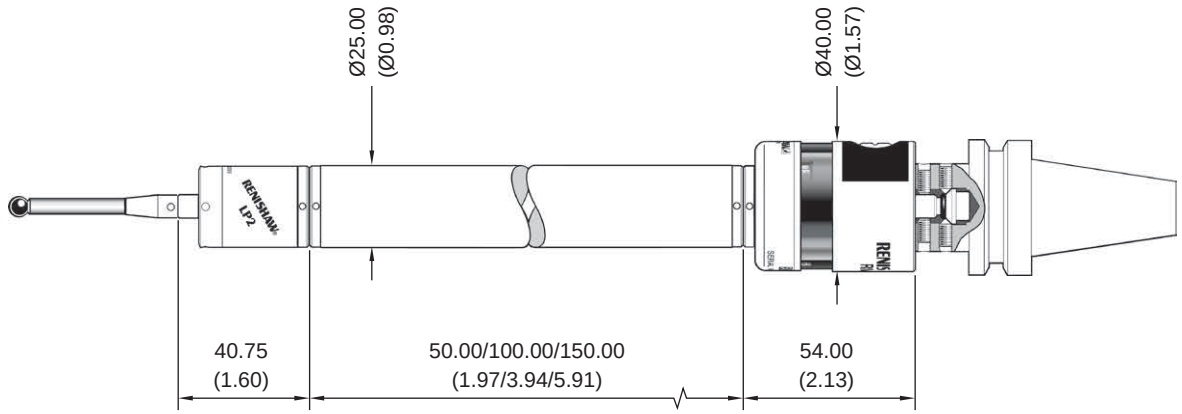
The RMP40M is a special modular version of the RMP40. It enables probe inspection of part features that are inaccessible to the RMP40, by fitting selected adaptors and extensions, as shown below.

See Section 8, “Parts list”.

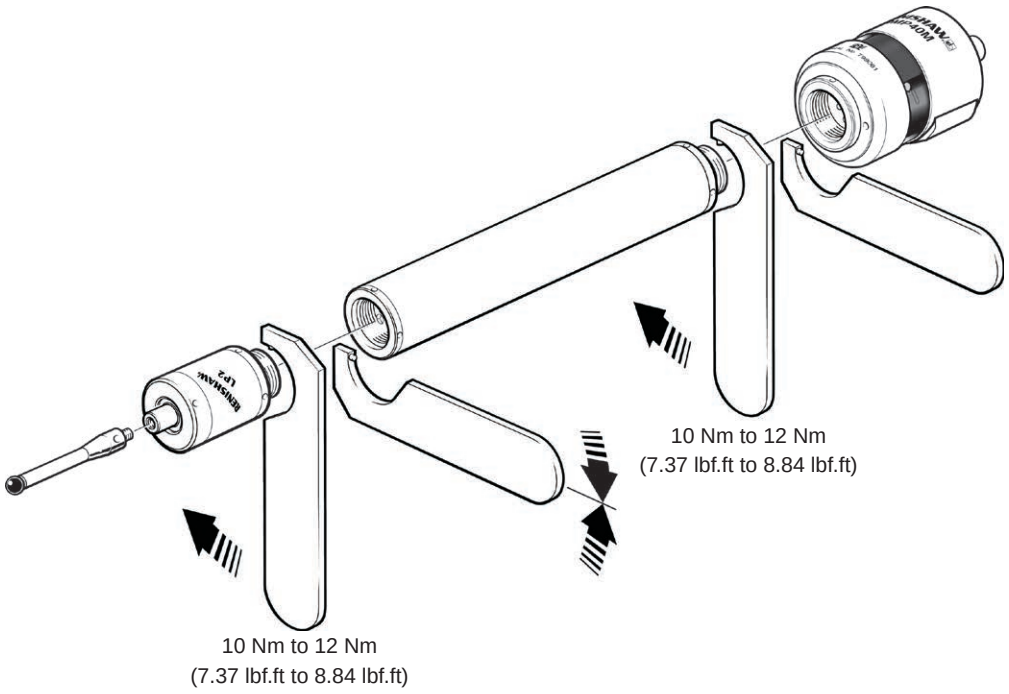


RMP40M dimensions

Dimensions given in mm (in)



RMP40M screw torque values



Fault-finding

Symptom	Cause	Action
Probe fails to power up (no LEDs illuminated) or fails to indicate the current probe settings.	Dead batteries.	Fit new batteries.
	Unsuitable batteries.	Fit suitable 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.
	Poor connection between battery cassette mating sufaces and contacts.	Remove any dirt and clean the contacts before reassembly.
Probe fails to switch on.	Dead batteries.	Fit new batteries.
	Batteries inserted incorrectly.	Check battery insertion/polarity.
	Probe out of range.	Check position of RMI or RMI-Q (see operating envelope).
	No RMI or RMI-Q “start/stop” signal (radio-on method only).	Check RMI or RMI-Q for green start LED.
	Incorrect spin speed (spin switch-on method only).	Check spin speed and duration.
	Incorrect switch-on method configured.	Check configuration and alter as required.
	Incorrect multiple probe mode setting configured.	Check configuration and alter as required.

Symptom	Cause	Action
Machine stops unexpectedly during a probing cycle.	Radio link failure/RLP40 out of range.	Check interface/receiver and remove obstruction.
	RMI or RMI-Q receiver/machine fault.	Refer to receiver/machine user's guide.
	Dead batteries.	Fit new batteries.
	Excessive machine vibration causing false probe trigger.	Enable enhanced trigger filter.
	Probe unable to find target surface.	Check 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 1 second.
Probe crashes.	Workpiece obstructing probe path.	Review probing software.
	Probe length offset missing.	Review probing software.
	In cases where there is more than one probe on a machine, incorrect probe activated.	Review interface wiring or part program.

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.
	Excessive machine vibration.	Enable enhanced trigger filter. Eliminate vibrations.
	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 the 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.
RLP40 status LEDs do not correspond to RMI or RMI-Q status LEDs.	Radio link failure – RLP40 out of RMI or RMI-Q range.	Check position of RMI or RMI-Q, see operating envelope.
	RLP40 has been enclosed/ shielded by metal.	Remove from obstruction.
	RLP40 and RMI or RMI-Q are not partnered.	Partner RLP40 and RMI or RMI-Q.

Symptom	Cause	Action
RMI or RMI-Q error LED lit during probing cycle.	Probe not switched on or probe timed out.	Change setting. Review switch-off method.
	Probe out of range.	Check position of RMI or RMI-Q, see operating envelope.
	Dead batteries.	Fit new batteries.
	RLP40 and RMI or RMI-Q are not partnered.	Partner RLP40 with RMI or RMI-Q.
	Probe selection error.	Verify that one RLP is working and is correctly selected on the RMI or RMI-Q.
	0.5 second turn-on error.	Ensure that all RLPs are “Q” marked probes, or change the RMI-Q turn-on time to 1 second.
RMI or RMI-Q 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 or RMI-Q “start/stop” signal (radio-on method only).	Check RMI or RMI-Q for green start LED.
	Probe in timeout mode and placed in tool magazine and being triggered by movement.	Use shorter timeout setting or use different switch-off method.
	Incorrect spin speed (spin switch-on method 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

Item	Part number	Description
RLP40	A-5627-0001	RLP40 probe with batteries, tool kit and quick-start guide (factory-set to radio on / radio off, trigger filter off).
RMP40M module	A-5628-0001	RMP40M module with batteries, tool kit and quick-start guide (factory-set to radio on / radio off, trigger filter off).
Battery	P-BT03-0007	½ 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.
Probe tool kit	A-4071-0060	Kit comprising: Ø1.98 mm stylus tool, 2.0 mm A/F hexagon key, M4 × 6.0 mm cone point grub screw (× 2) and M4 × 6.0 mm flat point grub screw (× 4).
Service kit	A-5625-0005	RLP40 eyelid service kit.
Battery cassette	A-5625-1166	RLP40 metal battery cassette kit.
Cassette seal	A-4038-0301	Battery cassette housing seal.
RMI	A-4113-0050	RMI (side exit) with 15 m (49.2 ft) cable, tool kit and quick-start guide.
RMI-Q	A-5687-0050	RMI-Q (side exit) with 15 m (49.2 ft) cable, tool kit and quick-start guide.
Mounting bracket	A-2033-0830	Mounting bracket with fixing screws, washers and nuts.
Styli tool	M-5000-3707	Tool for tightening and releasing styli.
Shank	A-5625-1003	Parallel shank kit 25 mm diameter.
Shank	A-5625-1007	Parallel shank kit 1 in diameter.
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.
LP2	A-2063-6098	LP2 probe.

Item	Part number	Description
Publications. These can be downloaded from our website at www.renishaw.com.		
RLP40	H-5627-8500	Quick-start guide: for rapid set-up of the RLP40 probe.
RMI	A-4113-8550	Quick-start guide: for rapid set-up of the RMI (includes CD with installation guides).
RMI-Q	H-5687-8500	Quick-start guide: for rapid set-up of the RMI-Q.
Styli	H-1000-3200	Technical specifications guide: Styli and accessories – or visit our Web shop at www.renishaw.com/shop.
Probe software	H-2000-2298	Data sheet: Probe software for machine tools – programs and features.
Parallel shanks	H-2000-2377	Data sheet: parallel shanks for lathe probes.

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