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RMP24-micro radio machine probe

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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 RMP24-micro, and other similar Renishaw products, are the subject of one or more of the following patents and/or patent applications:

CN 100416216	IN 215787	US 6941671	**These are patents from the 1st issue and will need to be checked and updated before this version is issued.**
CN 100466003	IN 234921	US 7145468	
CN 101476859	IN 8707/DELNP/2008	US 7285935	
CN 101482402	IN WO2004/057552	US 7316077	
EP 1457786	JP 4575781	US 7486195	
EP 1576560	JP 4852411	US 7665219	
EP 1613921	JP 5238749	US 7812736	
EP 1931936		WO 2022/219305	
		WO 2022/219306	
		WO 2022/219307	

Other patents pending

RMP24-micro software notices

The RMP24-micro includes embedded software (firmware) to which the following notices apply:

US government notice

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Intended use

The RMP24-micro is a miniature radio spindle probe that enables automated workpiece inspection and job set-up on small machining centres.

Safety

Information to the user

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

*   Do not attempt to recharge the batteries.

*   Replace the batteries only with the specified type.

*   Do not mix new and used batteries in the product.

*   Do not mix different types or brands of batteries in the product.

*   Ensure that all batteries are inserted with the correct polarity in accordance with the instructions in this manual and indicated on the product.

*   Do not store the batteries in direct sunlight.

*   Do not expose the batteries to water.

*   Do not expose the batteries to heat or dispose of the batteries in a fire.

*   Avoid forced discharge of the batteries.

*   Do not short circuit the batteries.

*   Do not disassemble, apply excessive pressure, pierce, deform or subject the batteries to impact.

*   Do not swallow the batteries.

*   Keep the batteries out of the reach of children.

*   If the batteries are swollen or damaged do not use them in the product and exercise caution when handling them.

*   Dispose of waste batteries in accordance with your local environmental and safety laws.

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

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

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The RMP24-micro has a plastic window. Handle with care if broken to avoid injury.

Information to the machine supplier / installer

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

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

Information to the equipment installer

All Renishaw equipment is designed to comply with the relevant UK, EU and FCC regulatory requirements. It is the responsibility of the equipment installer to ensure that the following guidelines are adhered to, in order for the product to function in accordance with these regulations:
Any interface MUST be installed in a position away from any potential sources of electrical noise (for example, power transformers, servo drives).

- All 0 V/ground connections should be connected to the machine "star point" (the "star point" is a single point return for all equipment ground and screen cables). This is very important and failure to adhere to this can cause a potential difference between grounds.

- All screens must be connected as outlined in the user instructions.

- Cables must not be routed alongside high current sources (for example, motor power supply cables), or be near high-speed data lines.

- Cable lengths should always be kept to a minimum.

Equipment operation

The probe may reset when subjected to an extreme electrostatic discharge (ESD) event. To ensure self recovering operation under these circumstances, configure the RMI-QE into Level start.
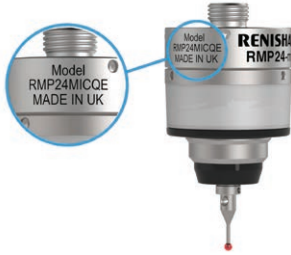
If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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RMP24-micro basics

Introduction

The RMP24-micro is a new generation radio transmission probe that is compatible for application with the RMI-QE radio machine interface.

The RMP24-micro enables automated workpiece inspection and job set-up on small multi-tasking machines and machine centres. It is ideally suited to machining centres where line-of-sight between probe and receiver is difficult to achieve or where Z travel is limited.

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

The probe operates in the 2.4 GHz band and delivers interference-free transmission through the use of hybrid FHSS (frequency-hopping spread spectrum) technology, which allows multiple systems to operate in the same machine shop without risk of cross-interference.

All probe settings are configured using Trigger Logic™. This technique enables the user to review and subsequently change probe settings.

Configurable settings are:

- Trigger filter setting

Getting started

A multicolour LED provides visual indication of selected probe settings and status.

- Trigger filter setting

- Probe status – triggered or seated

- Battery condition

Batteries are inserted or removed as shown (for more information, see **page 3-4,** "Installing the batteries").

On insertion of batteries, the LED will begin to flash starting with an LED check (for more information, see **page 4-1**, "Reviewing the probe settings"). An LED check displaying double flashes of red, green, blue indicates that the probe is operating with an RMI-QE.

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System interface

The RMI-QE is an integrated interface/receiver used to communicate between the probe and the machine controller. For more details, refer to the *RMI-QE radio machine interface* installation guide (Renishaw part no. H-6551-8520).

It is necessary that the RMP24-micro is partnered to an RMI-QE.

NOTE: The RMP24-micro (model RMP24MICQE) probe is **not** compatible with the older RMI integrated interface/receiver.

Trigger Logic™

Trigger Logic™ (for more information, see **page 4-1**, "Reviewing the probe settings") is a method that allows the user to view and select all available mode settings in order to customise a probe to suit a specific application. Trigger Logic is activated by battery insertion and uses a sequence of stylus deflections (triggering) to systematically lead the user through the available choices to allow selection of the required mode options.

Current probe settings can also be reviewed by simply removing the batteries for a minimum of 5 seconds, and then replacing them to activate the Trigger Logic review sequence (for more information, see **page 4-1**, "Reviewing the probe settings").

Probe modes

The RMP24-micro can be in one of three modes:

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

Operational mode – When activated, via radio communication with the RMI-QE, the probe is switched on and ready for use.

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

Trigger filter

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

Level 1 disables the trigger filter.

Level 2 adds a nominal 10 ms delay to the output.

Factory set to Level 1 (off).

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Partnering mode

System set-up is achieved using Trigger Logic and powering-on the RMI-QE. Alternatively "ReniKey" may be used (see notes below).

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

NOTES:

Prior to partnering for the first time, the LED check will display double flashes of red, green, blue.

Systems using the RMI-QE can be partnered with up to four RMP24-micro manually. Alternatively, partnering to an RMI-QE, can be achieved by using ReniKey; a Renishaw machine macro cycle which does not require the RMI-QE to be power cycled.

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

Partnering will not be lost by reconfiguration of probe settings or when changing batteries.

Partnering can take place anywhere within the operating envelope.

Switch-on time (configured by RMI-QE)

When the RMP24-micro radio machine probe is used with an RMI-QE, the turn-on time can be configured (in the interface) to either "fast" or "standard". For best battery life, select 'standard' turn-on time.

A timer automatically switches the probe off 90 minutes after the last probe status change if not turned off by an M-code.

NOTE: After being switched on, the RMP24-micro must be on for 1.0 second minimum before being switched off.

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RMP24-micro dimensions
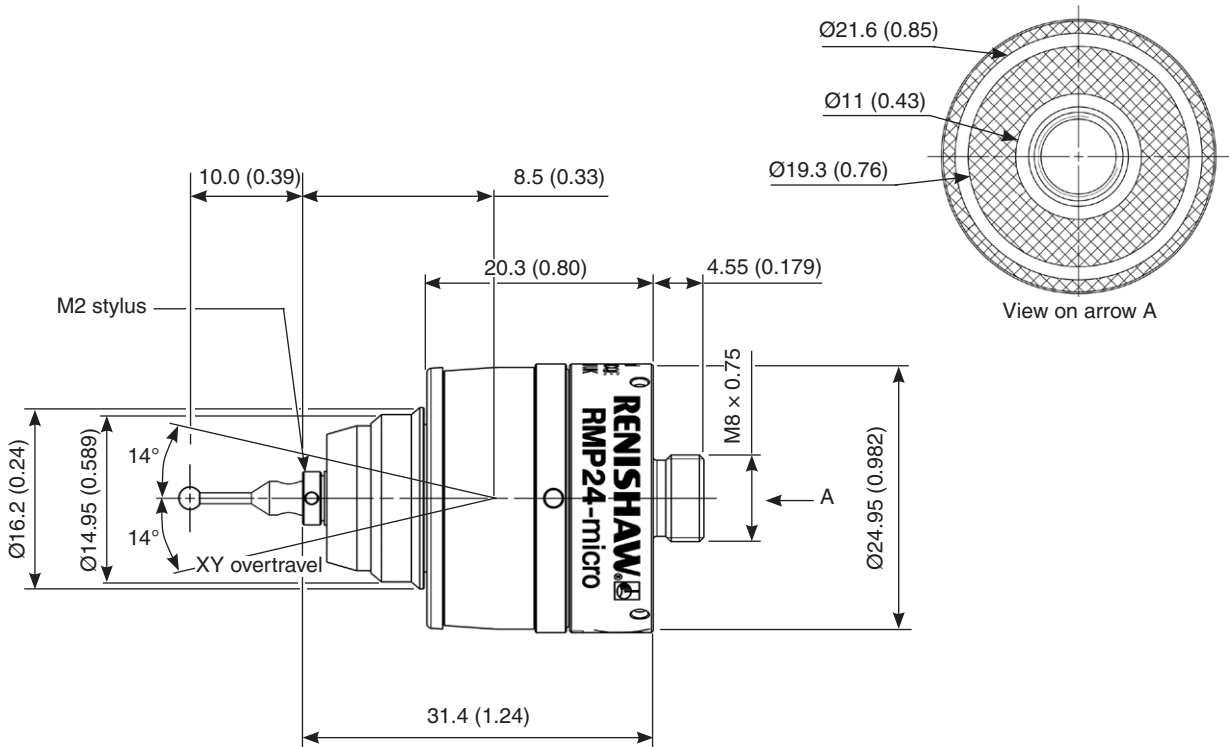
Dimensions given in mm (in)

NOTES:

Shank mounting face dimensions shown are actual face nominal dimensions. Diameters of the mating shank face must give a reasonable contact face and allow for any adjustment mechanism.

Shank interface greater than 24 mm (0.94 in) faces no restriction.

Stylus overtravel limits		
Stylus length	±X/±Y	+Z
30 (1.18)	9.3 (0.37)	4 (0.16)
10 (0.39)	4.5 (0.18)	4 (0.16)

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RMP24-micro specification

Principal application	Workpiece inspection and job set-up on small machining centres and multi-tasking machines	
Dimensions	Length Diameter	31.4 mm (1.24 in) 24 mm (0.94 in)
Weight (without shank)	With batteries Without batteries	36.5 g (1.28 oz) 32.5 g (1.14 oz)
Transmission type	Frequency-hopping spread spectrum (FHSS) radio	
Radio frequency	2400 MHz to 2483.5 MHz	
Switch-on / methods	Radio M-code	
Switch-off methods	Radio M-code	
Spindle speed (maximum)	1000 r/min	
Recommended styli	Steel lengths 10 mm (0.39 in) to 30 mm (1.18 in)	
Operating range	Up to 5 m (16.4 ft)	
Receiver/interface	RMI-QE combined antenna, interface and receiver unit	
Sense directions	Omni-directional ±X, ±Y, +Z	
Unidirectional repeatability Maximum 2σ value in any direction	0.35 µm (14 µin) 2σ [1]	
Stylus trigger force [2] [3] XY low force XY high force Z	0.08 N, 8.2 gf (0.29 ozf) 0.16 N, 16.3 gf (0.58 ozf) 0.75 N, 76.5 gf (2.70 ozf)	
Stylus overtravel [4]	XY plane +Z plane	±14° 4 mm (0.16 in)
Environment [5]	IP rating	IPX8, BS EN 60529:1992+A2:2013
	IK rating	IK02 BS EN IEC 62262: 2002
	Storage temperature	−25 °C to +70 °C (−13 °F to +158 °F)
	Operating temperature	+5 °C to +55 °C (+41 °F to +131 °F)
	Indoor/outdoor use	Indoor use
	Altitude	≤3000 m
	Relative humidity	5% to 95%
	Wet location	Yes, water/oil/coolant
	Pollution degree	Level 2
Battery types	2 × CR1632 lithium manganese dioxide (Li/MnO2)	
Battery reserve life	Approximately one week after a low battery warning is first given (based on 5% usage)	

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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 the table on page 2-6

1   Performance specification is tested at a standard test velocity of 480 mm/min (18.89 in/min) with a 10 mm stylus. For best performance probing feedrates of up to 100 mm/min (3.94 in/min) and back-off feed of greater than 1000 mm/min (39.34 in/min) are recommended.

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, machine deceleration and system latency.

3   These are the factory settings; manual adjustment is not possible.

4   Stylus overtravel is designed to protect the probe and stylus from a collision. We do not recommend utilising the extent of travel in normal probing mode.

5   With the battery cap removed the sealing rating is not applicable.

Typical battery life

Typical battery type		2 × CR1632 Li/MnO2	
Typical battery life		Radio on	
		(1 s turn-on)	(0.5 s turn-on)
	Standby life	5.0 months	2.7 months
	Light usage 1%	4.4 months	2.5 months
	Heavy usage 5%	2.9 months	2.0 months
	Continuous use	228 hours	228 hours

NOTES:

Battery life figures quoted in the above table are applicable to the probe when used in conjunction with an RMI-QE interface/receiver.
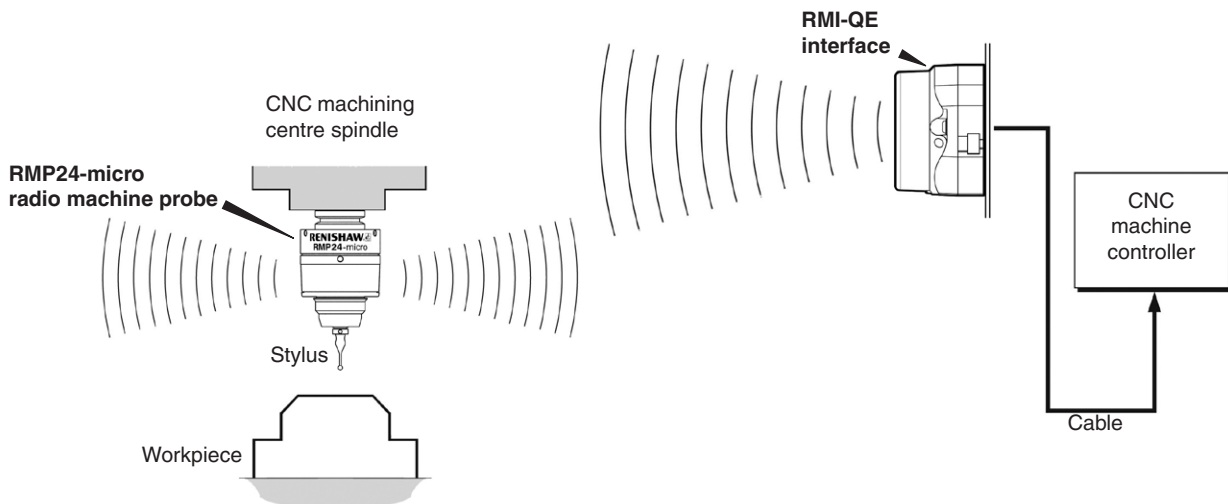
1% usage = 14 minutes/day.

5% usage = 72 minutes/day.

Battery life is dependent on the quality of the external RF environment in which the probing system is operating.

System installation

Installing the RMP24-micro with an RMI-QE

Operating envelope

Radio transmission does not require line-of-sight between the probe and transmitter, and will pass through very small gaps and machine tool windows. This allows easy installation inside the machine, as long as the probe and RMI-QE are kept within the performance envelope shown on page 3-2.

Coolant and swarf residue accumulating on the probe and RMI-QE 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 probes window or RMI-QE with your hands, as this will affect the performance.

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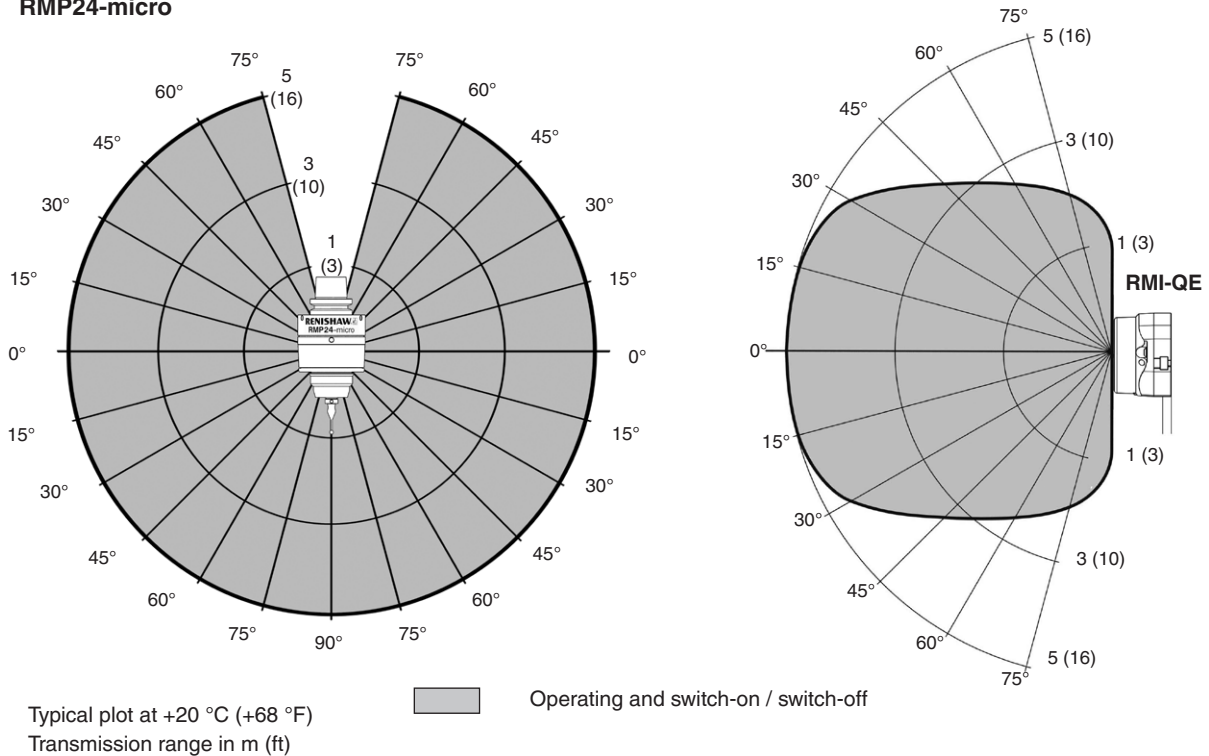
Positioning the RMP24-micro and RMI-QE

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-QE 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-QE, the signal quality is displayed on an RMI-QE signal LED.

Performance envelope

The probe and RMI-QE must be within each other's performance envelope, as shown below. The performance envelope shows line-of-sight performance, however, this is not necessary for the probes radio transmission as it will operate with any reflected radio path provided that the reflected path length does not exceed the 5 m (16.4 ft) operating range

Performance envelope when using the RMP24-micro with the RMI-QE

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

Operating and switch-on / switch-off

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Preparing the RMP24-micro for use

Fitting the stylus

0.05 Nm – 0.15Nm
(0.037 lbf.ft – 0.11 lbf.ft)

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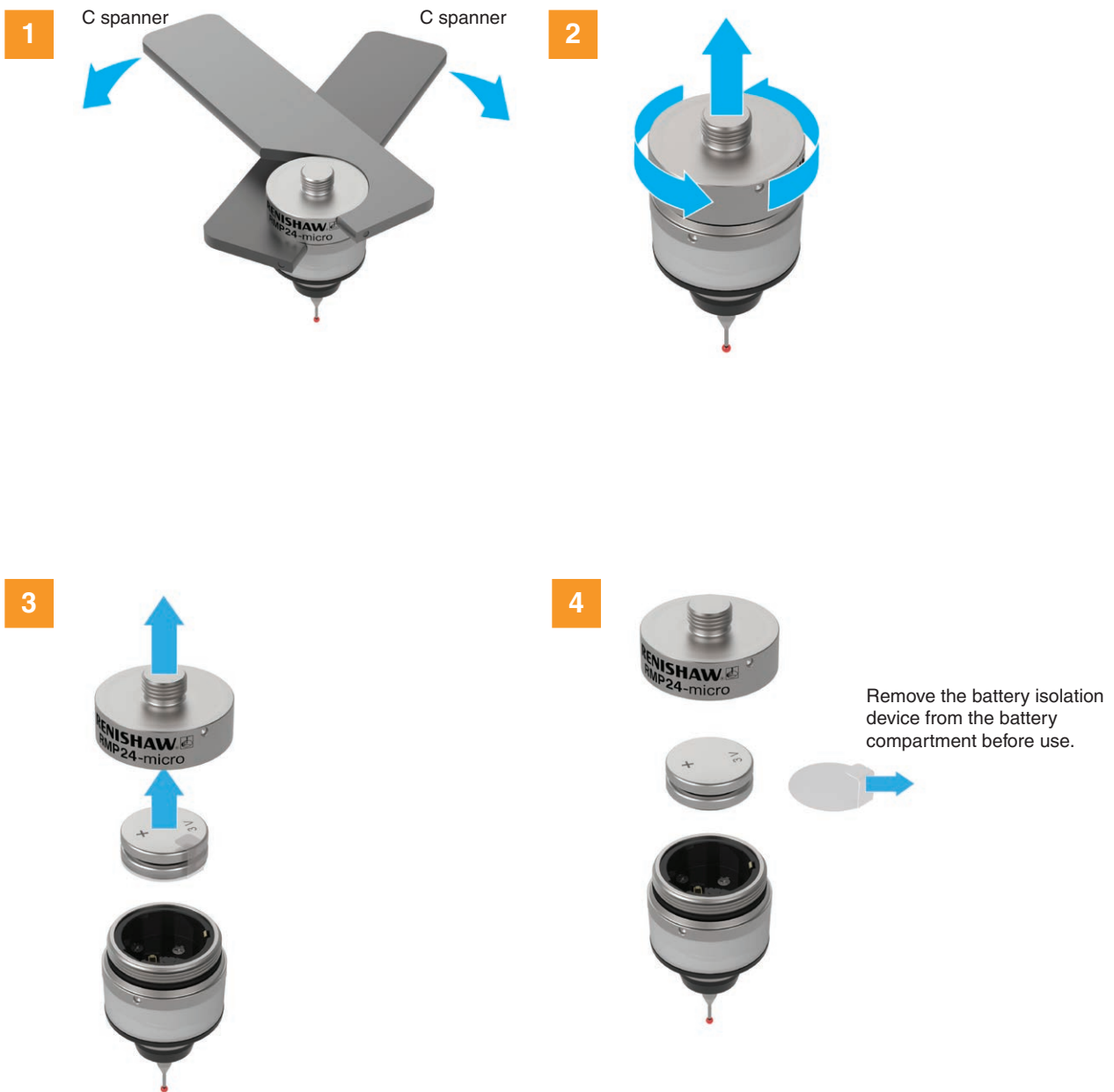
Installing the batteries

NOTES:

See **Section 5**, "Maintenance", for a list of suitable battery types.
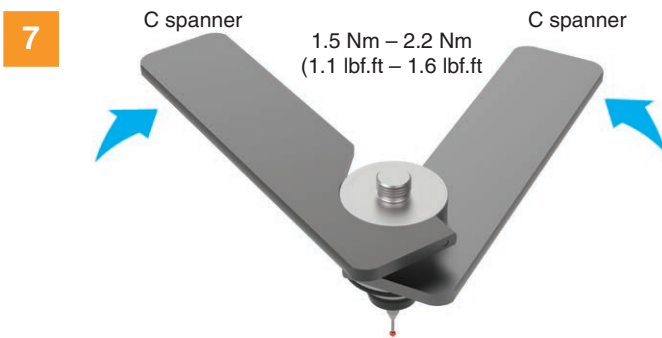
If dead batteries are inadvertently inserted, the LED will remain a constant red.

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 LED will display the current probe settings (see **page 4-1**,"Reviewing the probe settings", for further information).

1 C spanner   C spanner

2

3

4

Remove the battery isolation device from the battery compartment before use.

NOTE: With the battery cap removed the sealing rating is not applicable.

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7

C spanner   C spanner

1.5 Nm – 2.2 Nm
(1.1 lbf.ft – 1.6 lbf.ft

NOTE: Ensure that the probe is calibrated after installing the batteries.

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Mounting the probe on a shank

C spanner

1.5 Nm – 2.2 Nm
(1.1 lbf.ft – 1.6 lbf.ft
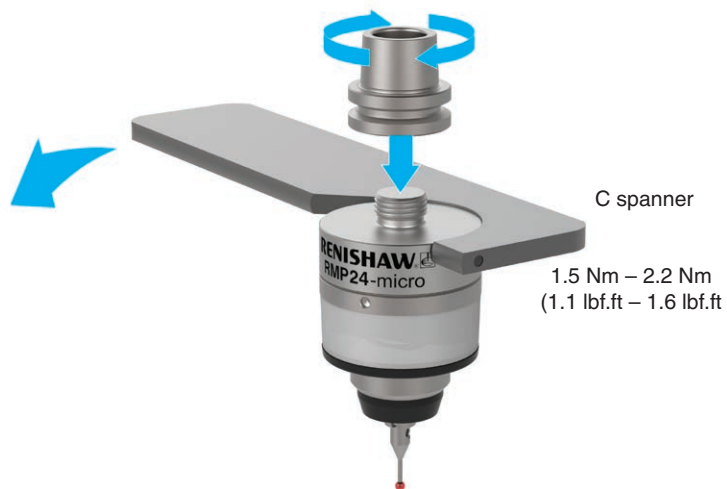
Calibrating the RMP24-micro

Why calibrate a probe?

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

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

- When a probe system is to be used for the first time.

- When the batteries have been removed or replaced.

- When the trigger filter is changed.

- When a new stylus is fitted to the probe.

- When it is suspected that the stylus has become distorted or that the probe has been 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.

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.

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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.
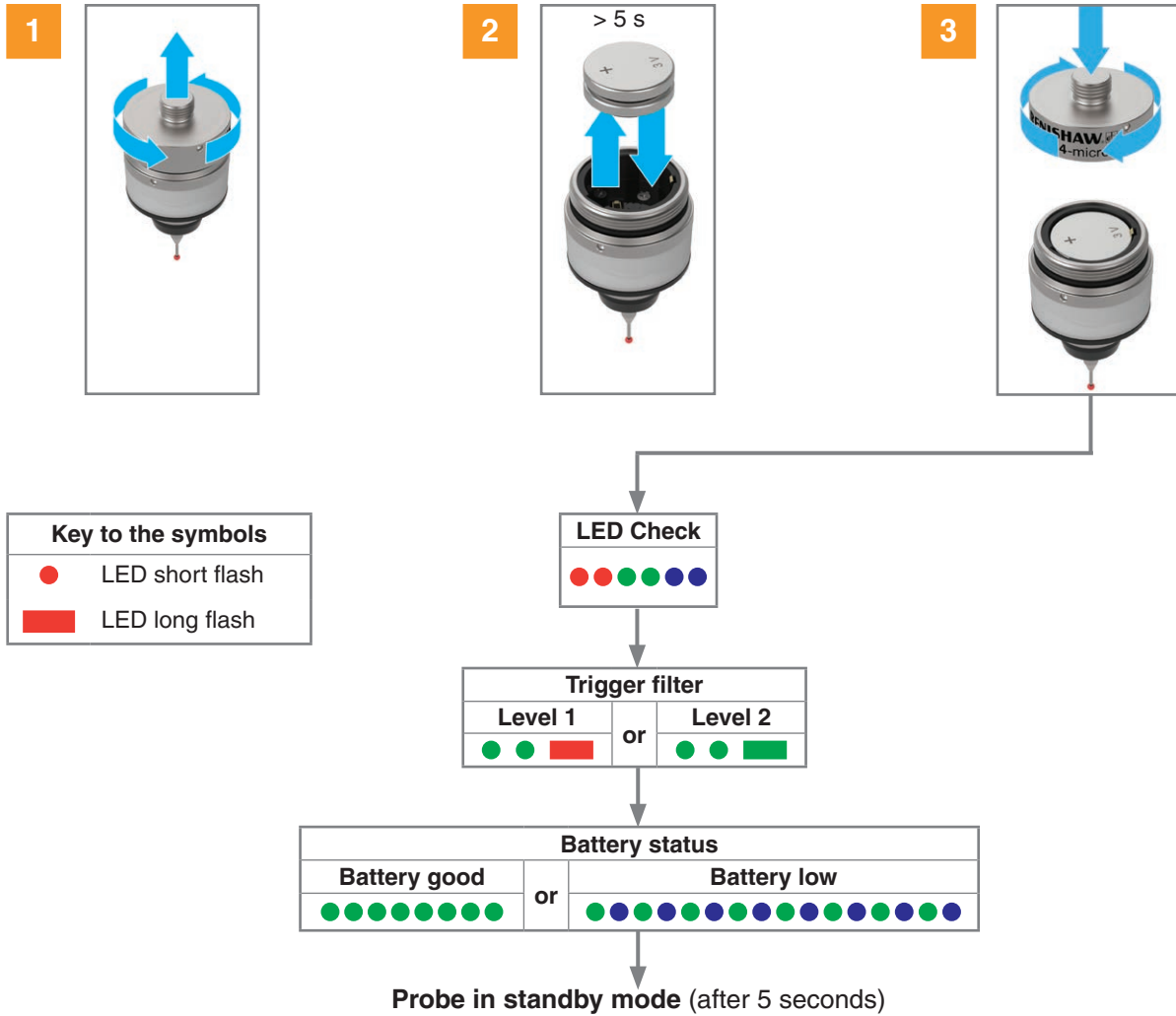
Application notes

	Machine spindle capability		
	Spindle reference only (M19)	**M19 and programmable spindle orientation (0/180°)**	**Neither M19 or 0/180°**
RMP24- micro	Stylus runout cannot be mechanically removed. The stylus runout (offset) must be compensated within the measurement cycles.	Stylus runout cannot be mechanically removed. The stylus runout (offset) must be compensated within the measurement cycles.	Stylus runout cannot be mechanically removed. The stylus runout (offset) cannot be compensated.
	XY position of the calibration artefact must be known. Using DTI, establish and store its position. Max +/-5 µm.	XY position of calibration artefact can be unknown if measuring cycles use 0/180 spindle orientation to accurately establish artefact centre.	XY position of the calibration artefact must be known. Using DTI, establish and store its position. Max +/-5 µm.

Overtravel force

After a trigger occurs (0.08 N, 8.2 gf (0.29 ozf) minimum and 0.16 N, 16.3 gf (0.58 ozf) maximum) the probe will exert an increasing force on the part at a rate of 0.03N/mm until overtravel is reached (14°).

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Probe configuration

Reviewing the probe settings

Key to the symbols	
🔴	LED short flash
🟥	LED long flash

LED Check
🔴🔴🟢🟢🔵🔵

Trigger filter

Level 1	or	Level 2
🟢 🟢 🟥		🟢 🟢 🟩

Battery status

Battery good	or	Battery low
🟢🟢🟢🟢🟢🟢🟢		🔵🟢🔵🟢🔵🟢🔵🟢🔵🟢🔵🟢🔵🟢

Probe in standby mode (after 5 seconds)

NOTES:

Ensure that the probe is securely screwed together and torque tightened to between 1.5 Nm and 2.2 Nm (1.1 lbf.ft – 1.6 lbf.ft).

Ensure that the probe is calibrated after installing the batteries.

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Probe partnering function

The probe partnering function enables the probe to be partnered with an RMI-QE interface independently of the configuration process for other probe settings. To partner the probe with an RMI-QE, remove the batteries for 5 seconds and then refit them.
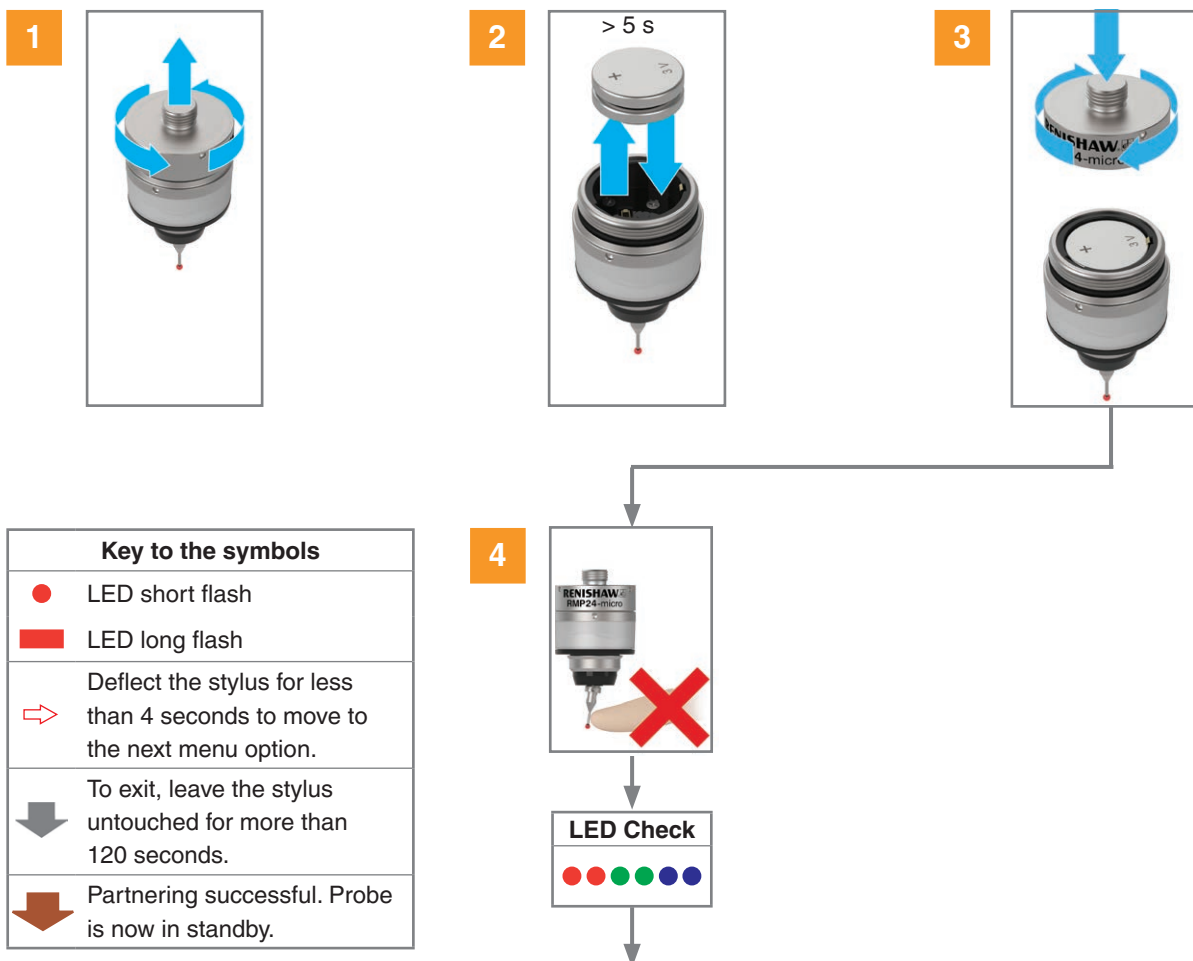
Following the LED check, the probe will proceed to show the probe settings. This will end with "**Battery status**" being displayed. If the battery power is good, battery status will be eight green flashes. If battery power is low, each green flash will be followed by a blue flash.

Whilst the "**Battery status**" is being displayed, deflect and immediately release the stylus to enter "**Partnering mode**".

"**Partnering mode off**" will be displayed as a sequence of light blue flashes. At this point the RMI-QE must be turned on.

If an RMI-QE is turned on, the probes display sequence will now incorporate a long yellow flash.

On the probe, select "**Partnering mode on**" by deflecting the stylus for less than 4 seconds. After successful partnering indicated by a light blue, light blue, green flash, the probe will timeout after 20 seconds and then go into standby. If "**Partnering mode on**" is not selected, the probe will timeout after 120 seconds and then go into standby (see **page 4-4**, "RMP24-micro – RMI-QE partnership", for further information).

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.
⬇	To exit, leave the stylus untouched for more than 120 seconds.
⬇	Partnering successful. Probe is now in standby.

LED Check

● ● ● ● ●

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All probe settings will be shown, ending
with **"Battery status"** being displayed.

Battery status		
Battery good	**or**	**Battery low**
🟢🟢🟢🟢🟢🟢🟢🟢		🟢🔵🔵🔵🔵🔵🟢🟢🔵🔵🔵🔵🔵🔵🟢
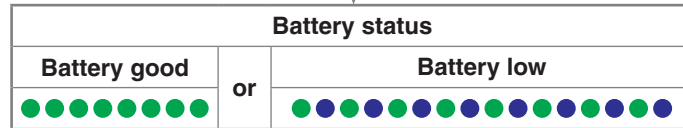
Whilst the **"Battery status"** is being displayed, deflect and
release the stylus to enter **"Partnering mode"**. Probe status
will flash red to acknowledge this.

NOTE: Wait until the first battery status flash has occurred
before deflecting the stylus, and then release the stylus
when the red flash is observed. Ensure this is done before
the last battery status flash is displayed.

Battery status		
Battery good	**or**	**Battery low**
🟢🟢🟢🟢🔴🟢🟢🟢		🟢🔵🔵🔵🔵🟢🔵🔴🔵🔵🔵🟢🔵🔵🟢🔵
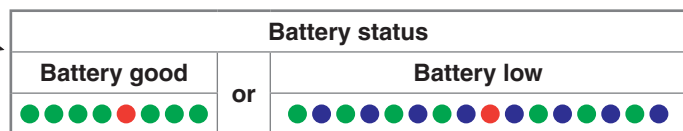
At this point turn on the RMI-QE.

Switch on RMI-QE

RMI-QE

Partnering mode
Off
🔵 🔵 🟦

→ 120 seconds probe in standby if
RMI-QE is turned off

**After 8
seconds**

Partnering mode		
Off (**RMI-QE** found)	⇨	**Active**
🔵 🔵 🟨		🔵 🔵 🟥
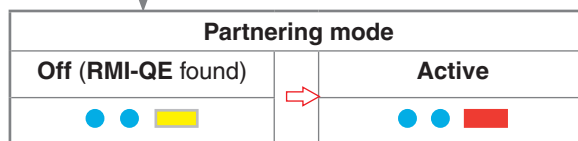
🔵 🔵 🟩 → **Partnering
successful**

**120 seconds probe
in standby**

**20 seconds probe
in standby**

If partnering is unsuccessful "**Partnering mode off**" will be displayed again after 8 seconds.
When **"Partnering mode off** (**RMI-QE** found)" is displayed, deflect the stylus for less than
4 seconds to select "**Partnering mode active**" again.

NOTES:

Ensure that the probe is securely screwed together and torque tightened to between 1.5 Nm and 2.2 Nm
(1.1 lbf.ft – 1.6 lbf.ft).

Ensure that the probe is calibrated after installing the batteries.

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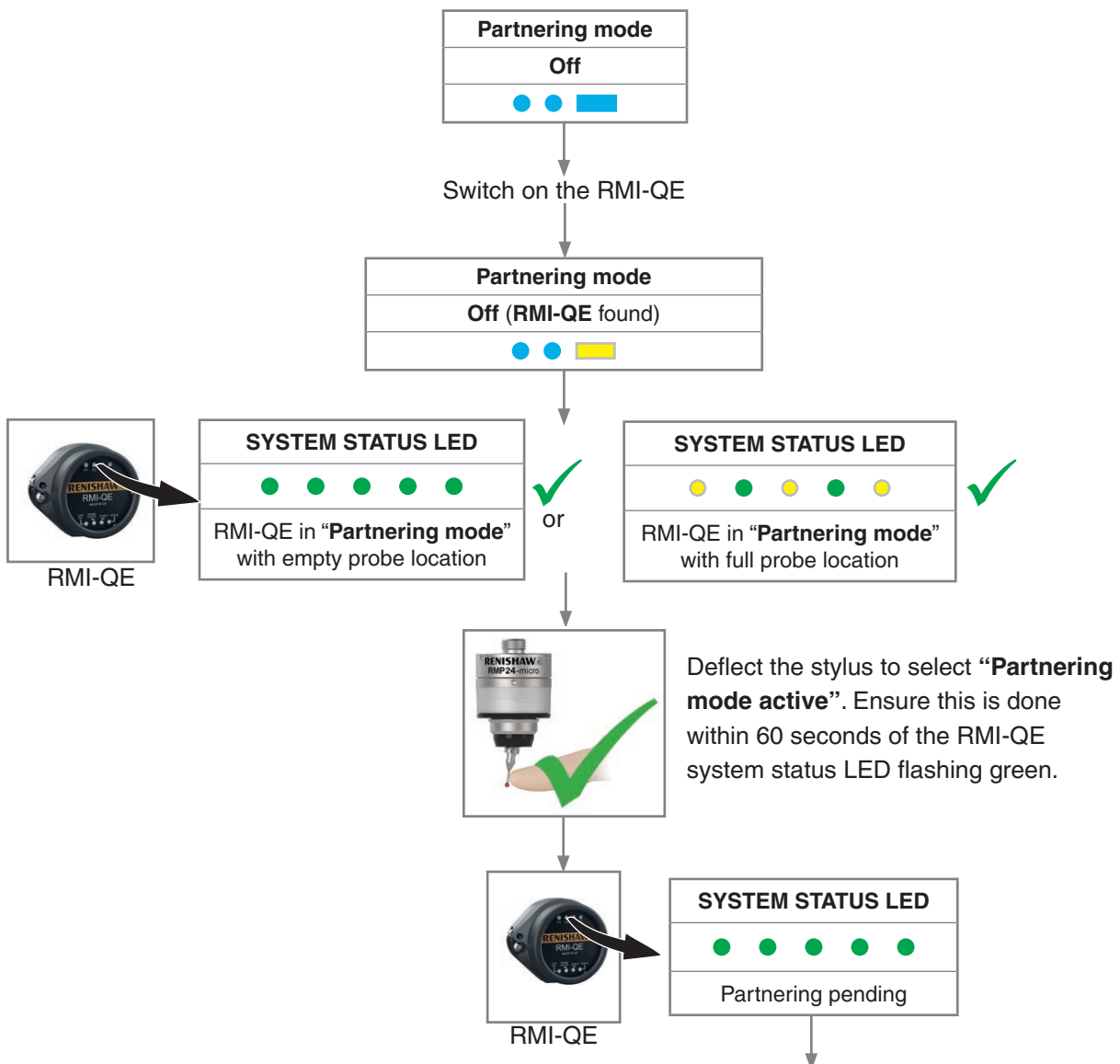
RMP24-micro – RMI-QE partnership

System set-up is achieved by using Trigger Logic™ and powering on the RMI-QE. Alternatively, partnering to an RMI-QE can be achieved by using ReniKey; a Renishaw machine macro cycle which does not require the RMI-QE to be power cycled.
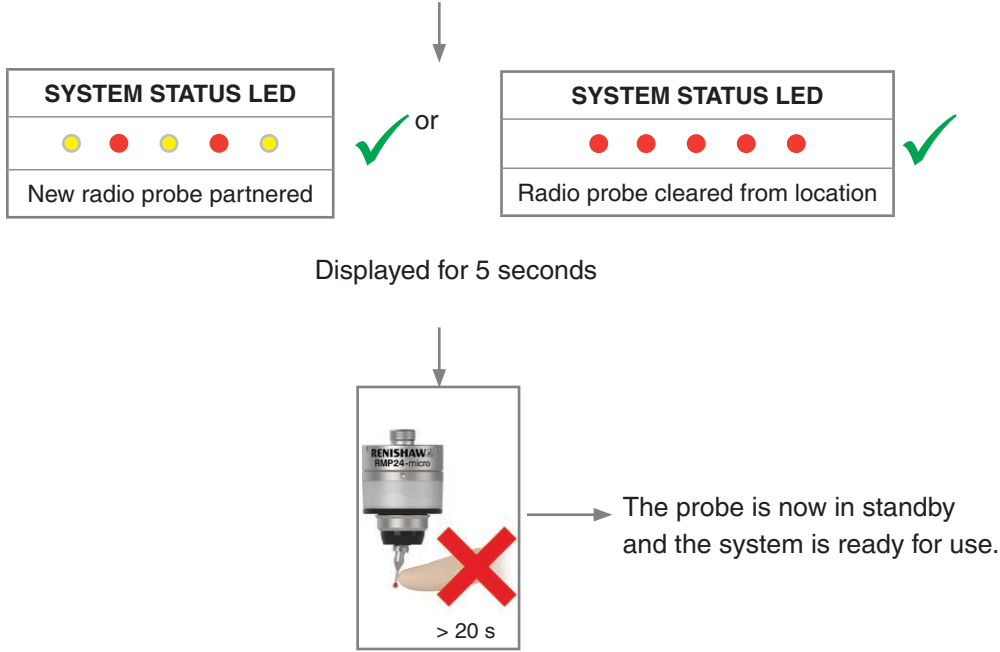
Partnering is required during initial system set-up. Further partnering will be required if either the probe or RMI-QE is changed.

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

A probe that is partnered with the RMI-QE but then used with another system will need to be repartnered before being used again with the RMI-QE.

See **page 4-2** "Probe partnering function" for further information on how to reach **"Partnering mode"**.
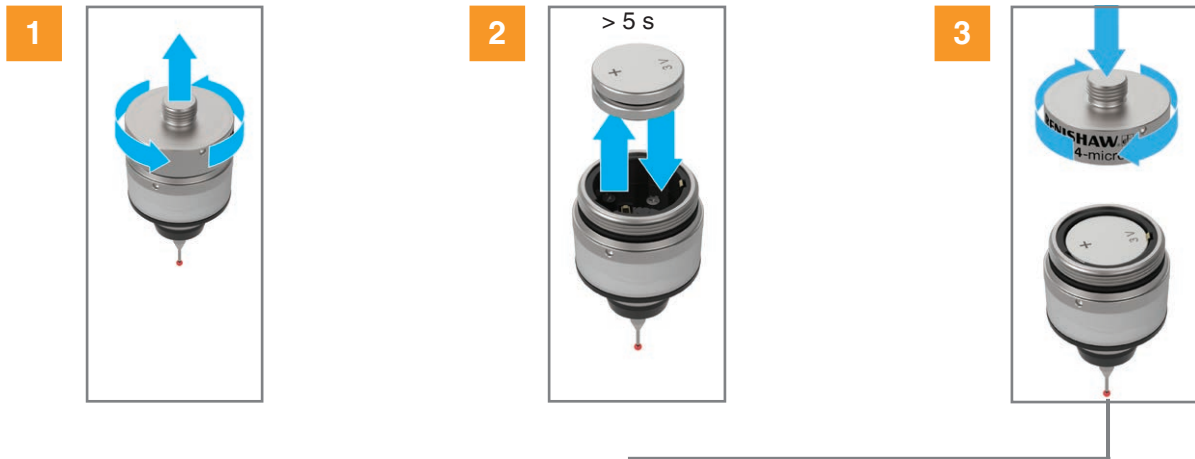
Partnering mode
Off
● ● ▬

Switch on the RMI-QE

Partnering mode
Off (**RMI-QE** found)
● ● ▭

SYSTEM STATUS LED
● ● ● ● ●
RMI-QE in "**Partnering mode**" with empty probe location

or

SYSTEM STATUS LED
○ ● ○ ● ○
RMI-QE in "**Partnering mode**" with full probe location

RMI-QE

Deflect the stylus to select **"Partnering mode active"**. Ensure this is done within 60 seconds of the RMI-QE system status LED flashing green.

SYSTEM STATUS LED
● ● ● ● ●
Partnering pending

RMI-QE

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SYSTEM STATUS LED		SYSTEM STATUS LED
🟡 🔴 🟡 🔴 🟡	✓ or	🔴 🔴 🔴 🔴 🔴 ✓
New radio probe partnered		Radio probe cleared from location

Displayed for 5 seconds

> 20 s

The probe is now in standby and the system is ready for use.

NOTE: Refer to the *RMI-QE radio machine interface* installation guide (Renishaw part no. H-6551-8520) when partnering up to four radio probes.

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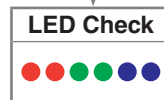# Changing the probe settings when partnered to an RMI-QE

Probe settings can be changed using Trigger Logic. 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 eight red flashes have been observed (if the battery power is low, each red flash will be followed by a blue flash).
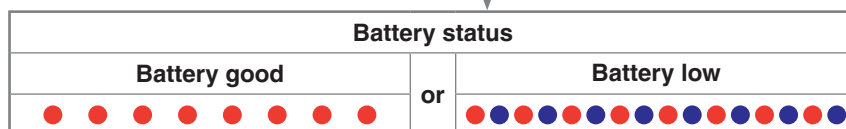
Keep the stylus deflected until the "**Filter level**" setting is displayed, then release it.
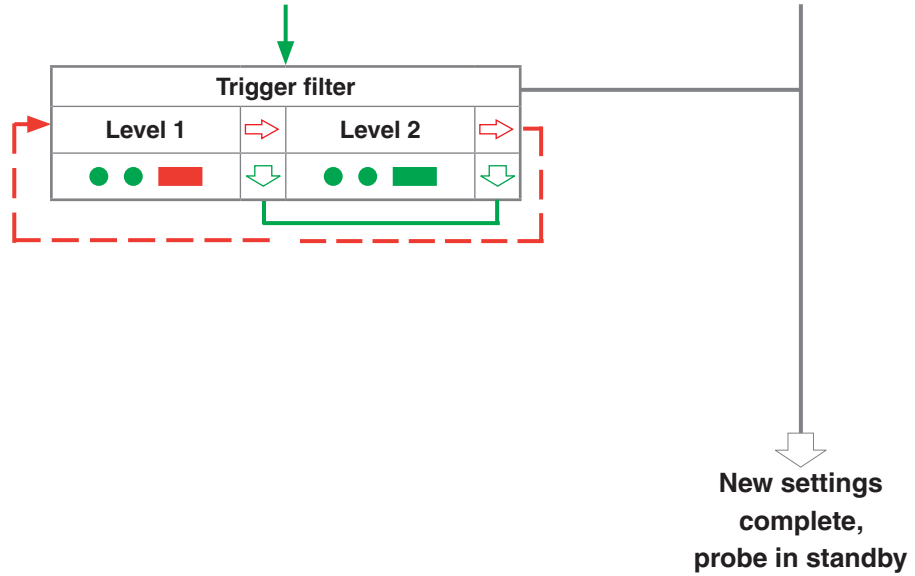

LED Check

Deflect the stylus and hold it deflected until after the battery status has been displayed at the end of the review sequence.

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 120 seconds.
⇩	To exit, leave the stylus untouched for more than 20 seconds.

Battery status			
Battery good	or	**Battery low**	
● ● ● ● ● ● ● ●		● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	

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Trigger filter

| Level 1 | | Level 2 | |

**New settings
complete,
probe in standby**

NOTES:

To partner the probe with an RMI-QE; see page 4-2 **"Probe partnering function"** for further information on how to reach **"Partnering mode".**

Ensure that the probe is securely screwed together and torque tightened to between 1.5 Nm and 2.2 Nm (1.1 lbf.ft – 1.6 lbf.ft).

Ensure that the probe is calibrated after installing the batteries.

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Master reset function

The probe features a master reset function to assist users who have mistakenly changed the probe settings into an unintended state.

The application of the master reset function will clear all current probe settings and return the probe to default settings.
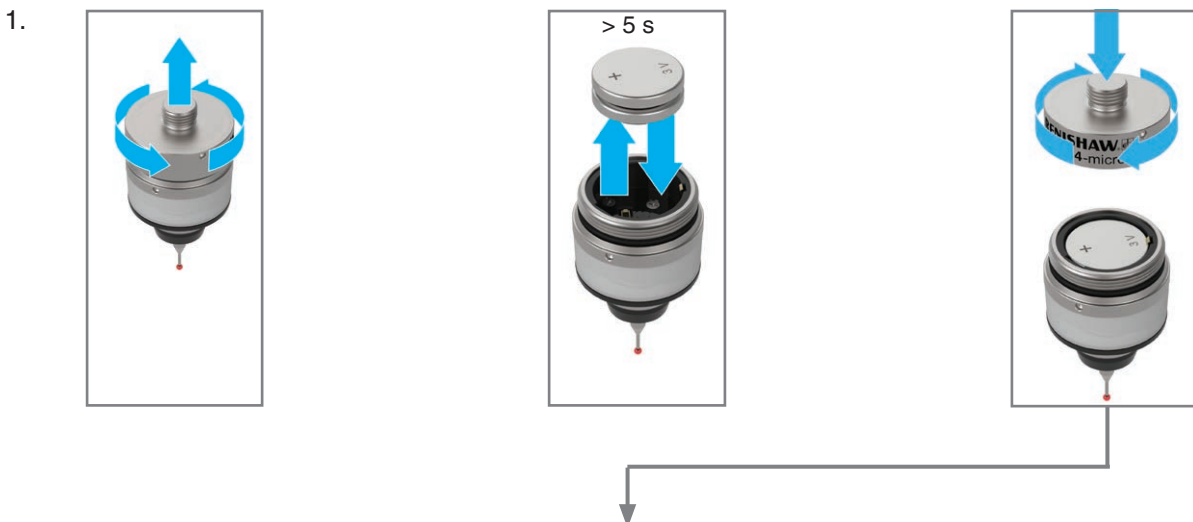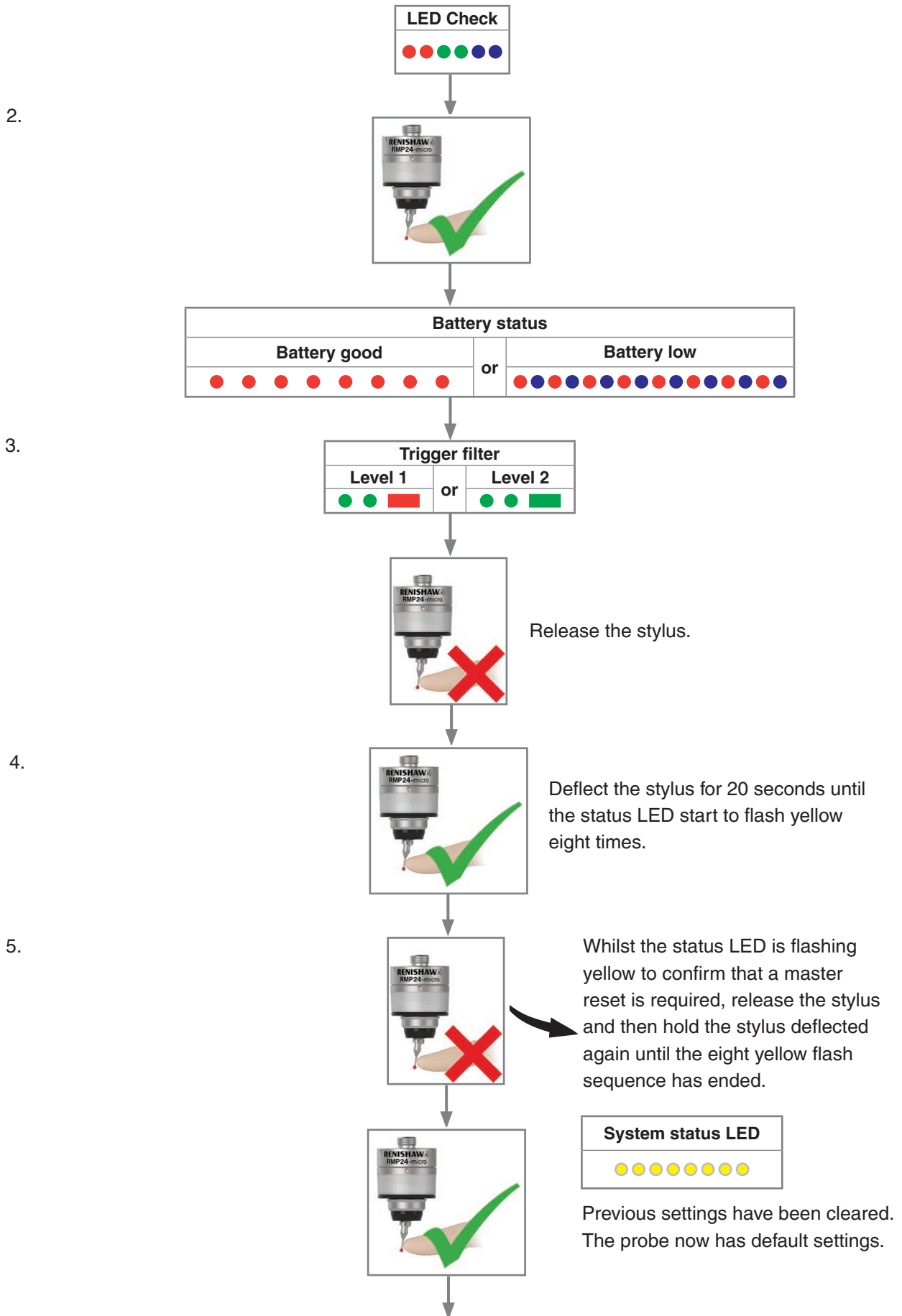
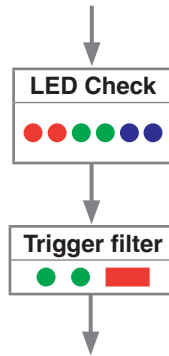The default setting is as follows:

•   Trigger filter: Level 1

The default settings may not be representative of the required probe settings. Further configuration of the probe may subsequently be necessary to achieve the required probe settings.

To reset the probe

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

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

3.   Keep the stylus deflected until the "**Trigger filter**" setting (or first Trigger Logic menu) is displayed, then release it.

4.   Deflect the stylus for 20 seconds. The status LED will flash yellow eight times. A confirmation for master reset is required; if no action is taken, the probe will time out.

5.   To confirm that a master reset is required, release the stylus and then hold the stylus deflected again until the eight yellow flash sequence has ended. This action clears all probe settings and returns the probe to default settings. Following an LED, check the probe returns to Trigger Logic and displays "**Trigger filter**".

6.   Further configuration using Trigger Logic may be necessary to achieve the required probe settings.

1.

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LED Check

2.

Battery status		
Battery good	or	**Battery low**
● ● ● ● ● ● ● ●		● ● ● ● ● ● ● ● ● ● ● ● ● ● ●

3.

Trigger filter		
Level 1	or	**Level 2**
● ● ▬		● ● ▬

Release the stylus.

4.

Deflect the stylus for 20 seconds until the status LED start to flash yellow eight times.

5.

Whilst the status LED is flashing yellow to confirm that a master reset is required, release the stylus and then hold the stylus deflected again until the eight yellow flash sequence has ended.

System status LED
● ● ● ● ● ● ●

Previous settings have been cleared. The probe now has default settings.

```
        │
        ▼
┌──────────────────┐
│    LED Check     │
│  🔴🔴🟢🟢🔵🔵    │
└──────────────────┘
        │
        ▼
┌──────────────────┐         Probe is now back in the Trigger
│  Trigger filter  │         Logic menu and will display "**Trigger
│   🟢 🟢 ▭       │         filter**".
└──────────────────┘
        │
        ▼
```

6.   Configure probe settings as required
              using Trigger Logic

NOTES:

The probe will continue to be partnered with the RMI-QE following the activation of the master reset function.

Ensure that the probe is securely screwed together and torque tightened to between 1.5 Nm and 2.2 Nm (1.1 lbf.ft – 1.6 lbf.ft).

Ensure that the probe is calibrated after installing the batteries.

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Operating mode

LED flashing **green** ▶

LED flashing **red** ▶   X/Y

LED flashing **red** ▶   Z

Probe status LED

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 manganese dioxide 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, 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 **page 4-1**, "Reviewing the probe settings", for further information).

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.

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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 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 probe has a plastic window. Handle with care if broken to avoid injury.

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Changing the batteries

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5

6

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 LED will remain a constant red.

Battery type		
2 × CR1632 lithium manganese dioxide (3 V)		
✓	**Panasonic Murata**	CR1632

NOTE: Lithium manganese oxide CR1632 batteries are available from other manufacturers. However, these are untested by Renishaw so correct operation of the probe cannot be guaranteed.
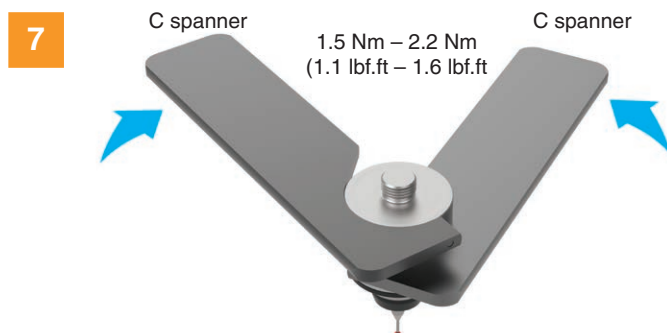
7

C spanner   1.5 Nm – 2.2 Nm   C spanner
(1.1 lbf.ft – 1.6 lbf.ft

NOTE: Ensure that the probe is calibrated after installing the batteries.

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Fault-finding

Symptom	Cause	Action
The probe fails to power up (LED not illuminated or fails to indicate current probe settings).	Dead batteries.	Change 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 batteries and contacts.	Remove any dirt and clean the contacts before reassembly.
The probe fails to switch on.	Dead batteries.	Change batteries.
	Batteries inserted incorrectly.	Check battery insertion/polarity.
	Probe out of range.	Check position of RMI-QE; for more information, see **page 3-2**, "Performance envelope".
	No RMI-QE "start/stop" signal.	Check RMI-QE for green start LED.
The machine stops unexpectedly during a probing cycle.	Radio link failure/probe out of range.	Check interface/receiver and remove obstruction.
	RMI-QE receiver/machine fault.	Refer to receiver/machine user's guide.
	Dead batteries.	Change batteries.
	Excessive machine vibration causing false probe trigger.	Change trigger filter setting.
	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).
	False probe trigger.	Change trigger filter setting.
	Selection error for RMI-QE.	Review interface error indication and correct.
The 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.

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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.	Change trigger filter setting. Eliminate vibrations.
	Calibration out of date and/or incorrect offsets.	Review probing software.
	Calibration and probing speeds not the same.	Review probing software and make speeds the same.
	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 low.	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.
Probe status LED does not correspond to RMI-QE status LEDs.	Radio link failure – probe out of RMI-QE range.	Check position of RMI-QE; for more information, see **page 3-2**, "Performance envelope".
	Probe has been enclosed/ shielded by metal.	Review installation.
	Probe and RMI-QE are not partnered.	Partner RMP24-micro and RMI-QE; for more information, see **page 4-4**, "RMP24-micro – RMI-QE partnership".
RMI-QE 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-QE; for more information, see **page 3-2**, "Performance envelope".
	Dead batteries.	Change batteries.
	Probe and RMI-QE are not partnered.	Partner RMP24-micro and RMI-QE; for more information, see **page 4-4**, "RMP24-micro – RMI-QE partnership".
	Probe selection error.	Verify that one radio probe is working and is correctly selected on the RMI-QE.
	0.5 second turn-on error.	Change the RMI-QE turn-on time to 1 second.

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Symptom	Cause	Action
RMI-QE low battery LED lit.	Low batteries.	Change batteries soon.
Reduced range.	Local radio interference.	Identify and remove.
The probe fails to switch off.	No RMI-QE "start/stop" signal	Check RMI-QE for green start LED.
The 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.

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Parts list

Type	Part number	Description
RMP24-micro	A-6906-0001	RMP24-micro probe with batteries, tools and support card (factory-set to trigger filter off).
Stylus	A-5000-7807	M2 stainless steel stylus 10 mm long with Ø2 mm ball.
Mounting bracket	A-2033-0830	Mounting bracket.
Tools	A-6906-0104	Probe tool kit comprising stylus tool (× 2), C spanner (× 2), rubber ball and O-ring (× 2).
RMI-QE	A-6551-0049	RMI-QE (side exit) with 8 m (26.2 ft) cable, tools and support card.
RMI-QE	A-6551-0050	RMI-QE (side exit) with 15 m (49.2 ft) cable, tools and support card.
RMI-QE mounting bracket	A-6551-0120	RMI-QE mounting bracket with fixing screws, washers and nuts.
Styli tool	M-5000-3540	Tool for tightening/releasing styli.
Publications. These can be downloaded from our website at **www.renishaw.com**		
RMI-QE	H-6551-8520	Installation guide: for set-up of the RMI-QE.
Styli	H-1000-3200	Technical specifications: *Styli and accessories* – or visit our Online store at **www.renishaw.com/shop**.
Probe software	H-2000-2298	Data sheet: *Probe software for machine tools – programs and features*.

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