Installation guide
H-6551-8520-01-A

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RMI-QE radio machine interface

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Contents

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Before you begin

Radio probe family

The radio probe family consists of the RMP40, RMP40M, RLP40, RLP40H, RMP400, RMP60, RMP60M and RMP600. The RTS radio tool setter also forms part of Renishaw's family of radio transmission probes. The term radio probe used throughout this installation guide refers to both the probes and the tool setter.

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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 interface

Keep system components clean.

Patents

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

CN 100466003	JP 4575781
CN 101482402	JP 5238749
EP 1576560	JP 5390719
EP 1931936	KR 1001244
EP 2216761	TW I333052
IN 215787	US 7665219
IN WO2004/057552	US 7821420
	US 9140547

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Intended use

The RMI-QE, which acts as a combined radio transceiver and machine interface, converts signals from the radio probe into voltage-free solid state relay (SSR) and driven outputs for transmission to the CNC machine controller.

Safety

Information to the machine supplier/installer

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

The RMI-QE has a glass window. Handle with care if broken to avoid injury.

Information to the machine supplier/installer

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

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

Information to the equipment installer

All Renishaw equipment is designed to comply with the relevant UK, EU and FCC regulatory requirements. It is the responsibility of the equipment installer to ensure that the following guidelines are adhered to, in order for the product to function in accordance with these regulations:

- any interface MUST be installed in a position away from any potential sources of electrical noise, (for example power transformers, servo drives);
- all 0 V/ground connections should be connected to the machine "star point" (the "star point" is a single point return for all equipment ground and screen cables). This is very important and failure to adhere to this can cause a potential difference between grounds;
- all screens must be connected as outlined in the user instructions;
- cables must not be routed alongside high current sources (for example, motor power supply cables), or be near high-speed data lines;
- cable lengths should always be kept to a minimum.

Equipment operation

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

RMI-QE basics

Introduction

CNC machine tools which are using Renishaw spindle probes with radio signal transmission for workpiece inspection, or tool setters with radio signal transmission, require a Renishaw radio machine interface (such as the RMI-QE) for communication.

The RMI-QE is designed to be mounted within the machine's working envelope.

The RMI-QE is available with 8 m or 15 m cable.

Application of the RMI-QE enables individual radio switch-on and subsequent operation of up to four separate third-generation radio probes, permitting numerous combinations of radio inspection probes and/or radio tool setters to be used on the same machine tool.

Probe compatibility

Only third-generation radio probes can be used with RMI-QE. These are easily identified by a “model QE” marking. First and second-generation radio probes, which do not have the “model QE” marking, cannot be used with the RMI-QE.

To upgrade from RMI or RMI-Q to RMI-QE the probes will also need to be upgraded to third-generation “model QE” probes. It is possible to set up the RMI-QE to operate with the same behaviour as the RMI or RMI-Q.

Optimum communication performance between the RMI-QE and the radio probe is achieved when the RMI-QE is aligned towards the radio probe, both positioned within the machine working environment. Other alignments within the machine working environment are permissible with negligible reduction in communication performance.

Mounting of the RMI-QE outside of the machine working envelope should be avoided as a reduced communication performance may result (see page 2.4 **“SIGNAL LED”** for further information).

NOTES:

RMI-QE does not support multiple probe mode.

When an RMI-QE is mounted outside of the machine working envelope, the radio communication to the radio probe will be via reflective surfaces such as floors, ceiling and walls. It is highly likely that the radio communication link will be subjected to external radio signals from other devices and will result in a less robust communication performance. A reflective path must not exceed 15 m (49.2 ft).

Power supply

The RMI-QE can draw its supply from the CNC machine tool's 12 Vdc to 30 Vdc supply and present a peak load of up to 500 mA during power-up (typically < 200 mA from 12 V to 30 V).

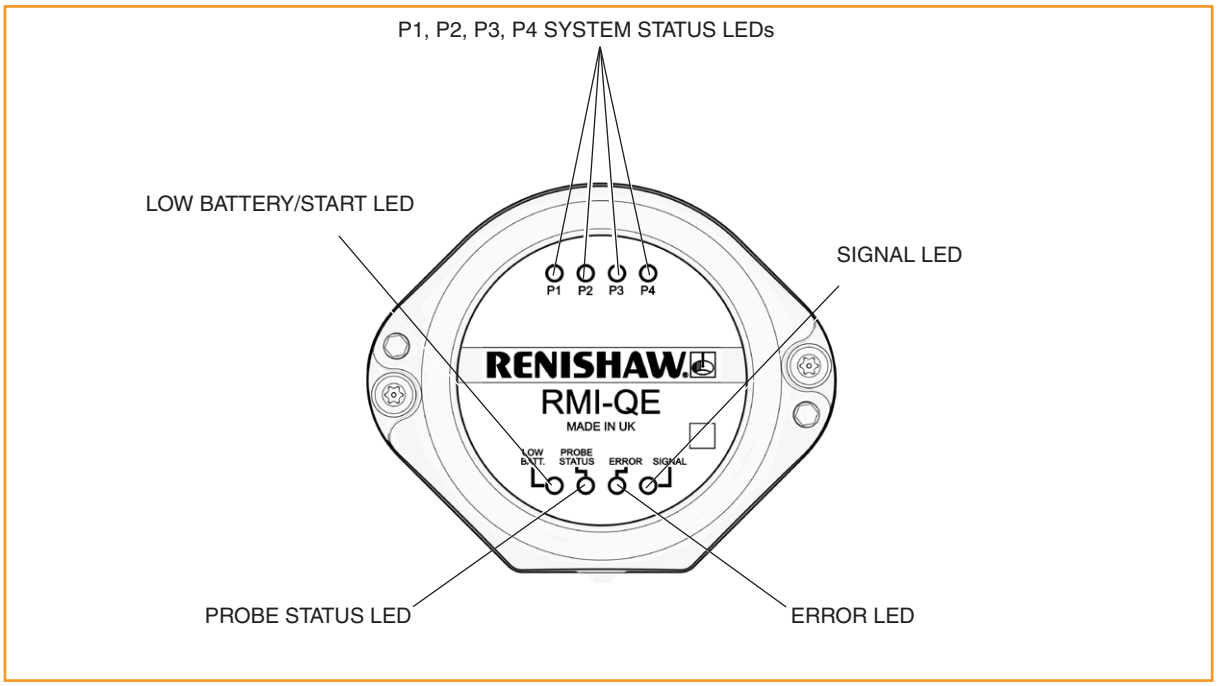
Input voltage ripple

The input voltage ripple must not cause the voltage to fall below 12 V or rise above 30 V.

RMI-QE visual diagnostics

A visual indication of system status is provided by LEDs. Status is continuously updated and indication is provided for:

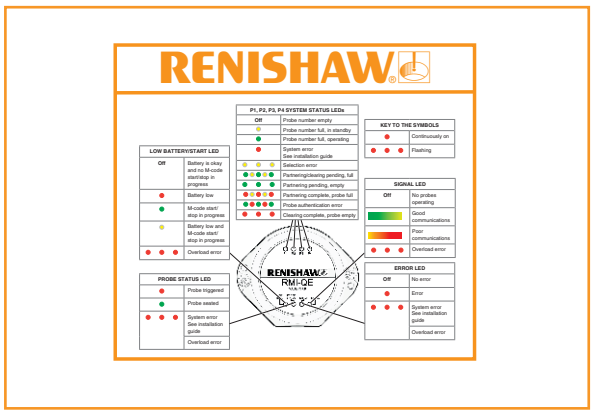
- P1, P2, P3, P4 SYSTEM STATUS;
- LOW BATTERY/START;
- PROBE STATUS;
- ERROR;
- SIGNAL CONDITION.



NOTE: Keep the front cover clean. All four lower LEDs flashing indicates a wiring fault or output overcurrent.

Magnetic label

A summary of RMI-QE activity is provided on a magnetic label. The label may be placed on any machine flat metal surface.



P1, P2, P3, P4 SYSTEM STATUS LEDs

Off	–	Probe number empty.
Orange	–	Probe number full, in standby.
Green	–	Probe number full, operating.
Red	–	System error.
Orange/off	–	Flashing: Selection error.
Green/orange	–	Flashing: Partnering/clearing pending, probe full.
Green/off	–	Flashing: Partnering pending, probe empty.
Red/orange	–	Flashing: Partnering complete, probe full.
Red/off	–	Flashing: Clearing complete, probe empty.
Green/red	–	Flashing: Probe authentication error.

LOW BATTERY

Off	–	Battery is OK and no M-code start/stop in progress.
Red	–	Battery is low.
Green	–	M-code start/stop in progress.
Orange	–	Battery low and M-code start/stop in progress.
Red/off	–	Flashing: RMI-QE has an overcurrent condition.

PROBE STATUS LED

Red	–	Probe triggered.
Green	–	Probe seated.
Red/off	–	Flashing: RMI-QE has an overcurrent condition

.

ERROR LED

Off	–	No error.
Red	–	Error, other outputs may be incorrect.
Red/off	–	Flashing: RMI-QE has an overcurrent condition

SIGNAL LED

Off	–	No probes operating.
Green	–	Good communications.
Green/orange	–	Good communications.
Red	–	Poor communications, radio link may fail.
Red/off	–	Flashing: RMI-QE has an overcurrent condition.

ERROR DISPLAY

The following LED combination means there is a system error:

Probe status	–	Red/off flashing.
Error	–	Red/off flashing.
Low battery	–	Not lit.
Signal	–	Not lit.

P1, P2, P3 and P4 system status LEDs - 1, 2 or 3 LEDs may be continuous red.

If powering the RMI-QE off and back on does not clear the error, contact Renishaw.

NOTES:

The “PROBE STATUS” LED is always illuminated when power is present at the RMI-QE (as the RMI-QE does not incorporate a separate “power present” indicator).

All LEDs report the status of the partner radio probe. If there is no partner in range, or the partner is off, then the “PROBE STATUS” and “ERROR” LEDs will illuminate red. The “LOW BATTERY” and “SIGNAL” LEDs will be off.

When the RMI-QE is powered on, each of the eight LEDs will flash orange in sequence starting from the top left and finishing at the bottom left. After this it will enter the acquire partner mode. This is indicated by a flashing green “SIGNAL” LED (no change in outputs). After ~60 seconds it will switch to its normal mode listening for its partner.

The conditions shown by the “LOW BATTERY”, “PROBE STATUS” and “ERROR” LEDs are the same as those present on the electrical signal outputs.

RMI-QE inputs

Machine start inputs (P1, P2, P3, P4):

Machine start inputs are configurable as a level or pulsed signal.

P1	12 to 30 V (2.4 mA at 24 V) Dedicated start – level Common start – pulsed/level
P2, P3, P4	12 to 30 V (10 mA at 24 V) Dedicated start – level Common start – level

P1 machine start wires
(white positive and brown negative).

P2 machine start wires
(pink positive and brown negative).

P3 machine start wires
(white/red positive and brown negative).

P4 machine start wires
(white/blue positive and brown negative).

RMI-QE outputs

There are five outputs:

- Probe status 1 (SSR).
- Probe status 2a (5 V isolated driven skip).
- Probe status 2b (driven at power supply voltage).
- Error (SSR).
- Low battery (SSR).

All outputs can be inverted by using switches SW1 and SW2, (see page 2.10, **"Switches SW1 and SW2"**, for further information).

Probe status 1, Error, Low battery (SSR):

- "On" resistance = 50 Ω max.
- Load voltage = 40 V max.
- Load current = 100 mA max.

Probe status 2a (5 V isolated driven skip):

- Load current = 50 mA max.

Output voltages

- Sourcing voltage drop = 4.2 V max. at 10 mA.
  = 2.2 V min. at 50 mA.
- Sinking voltage drop = 0.4 V max. at 10 mA.
  = 1.3 V max. at 50 mA.

Probe status 2b (driven at power supply voltage):

- Load current = 50 mA max.

Output voltages

- Sourcing voltage drop = 4.2 V max. at 10 mA.
  = 2.2 V min. at 50 mA.
- Sinking voltage drop = 0.4 V max. at 10 mA.
  = 1.3 V max. at 50 mA.

The "LOW BATTERY/START", "PROBE STATUS", "ERROR" and "SIGNAL" LEDs will start flashing red when an output overload has occurred. All outputs will be switched off. If this occurs, turn off the power supply and remove the source of the problem. Turning on the power supply will reset the RMI-QE.

CAUTIONS:

Power supply voltage

Do not exceed 30 V between: the black wire and the screen wire (green/yellow); the red wire and screen wire (green/yellow); or the red and black wires (power supply), as this could result in permanent damage to the RMI-QE and/or the customer power supply.

The use of in-line fuses at the machine cabinet end is recommended to provide protection for the RMI-QE and cable.

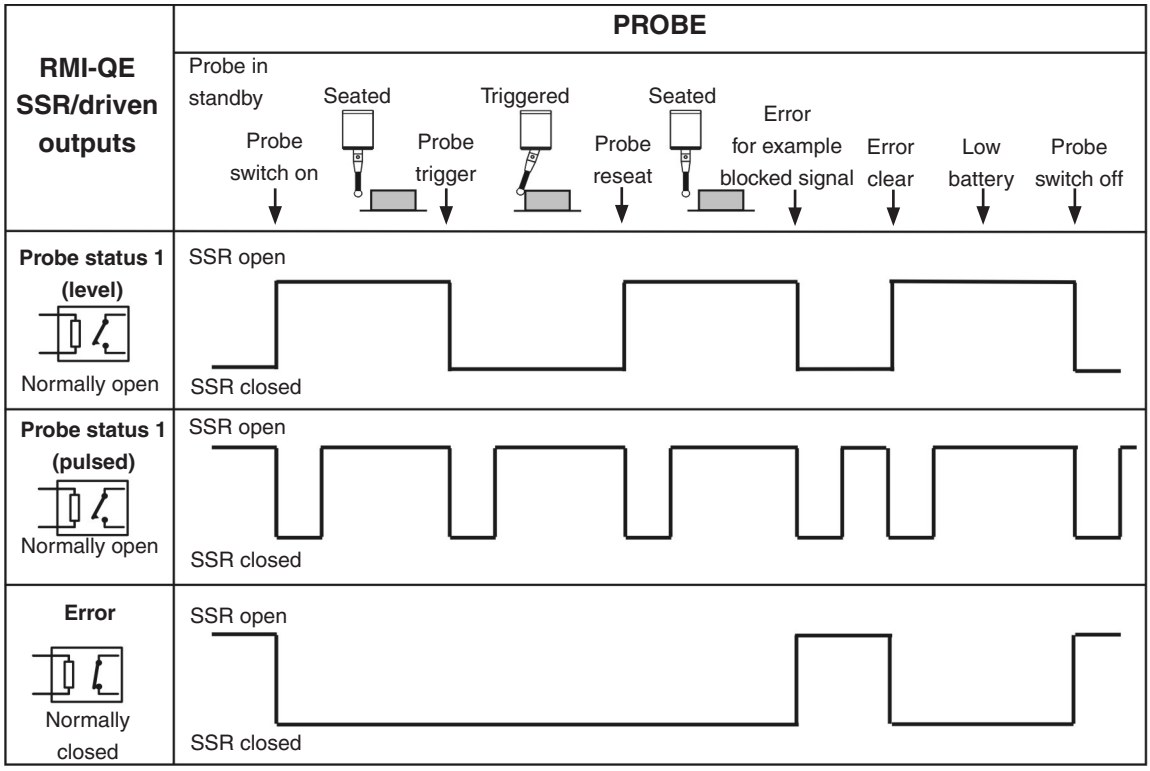
Screen connection

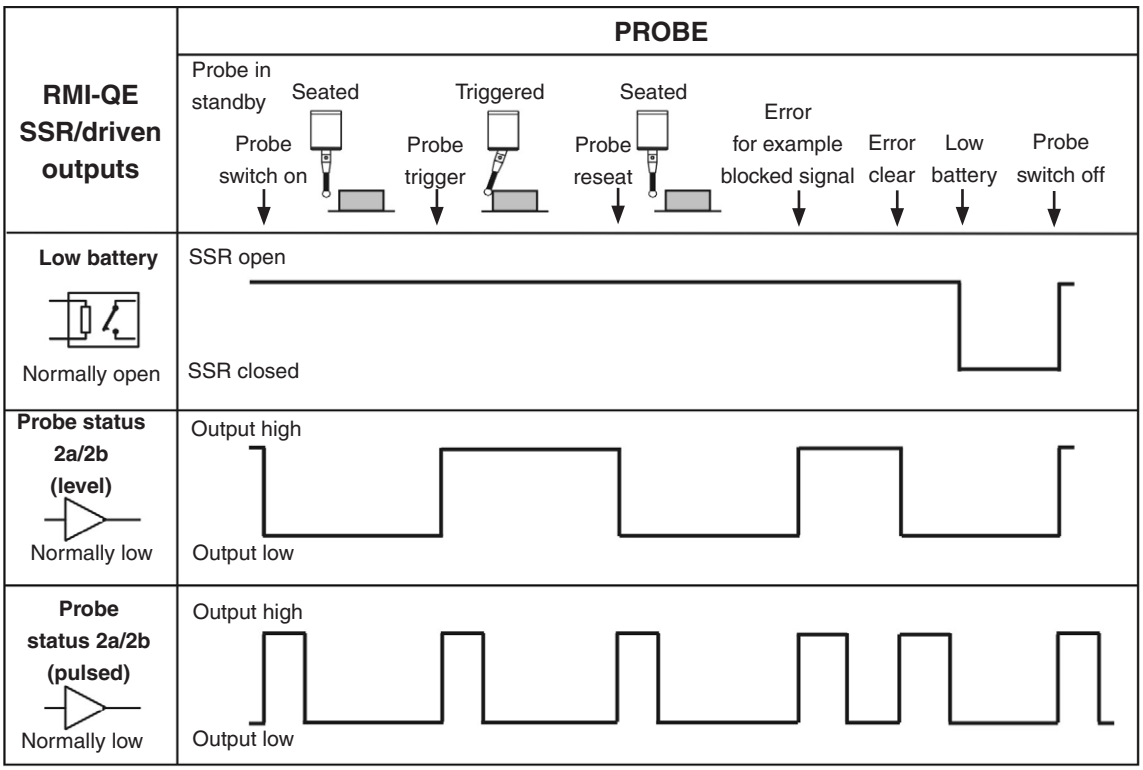
A good connection must be made to machine ground (“star point”).

Output stage circuit

Ensure that outputs from the RMI-QE do not exceed specified current ratings.

RMI-QE output waveforms



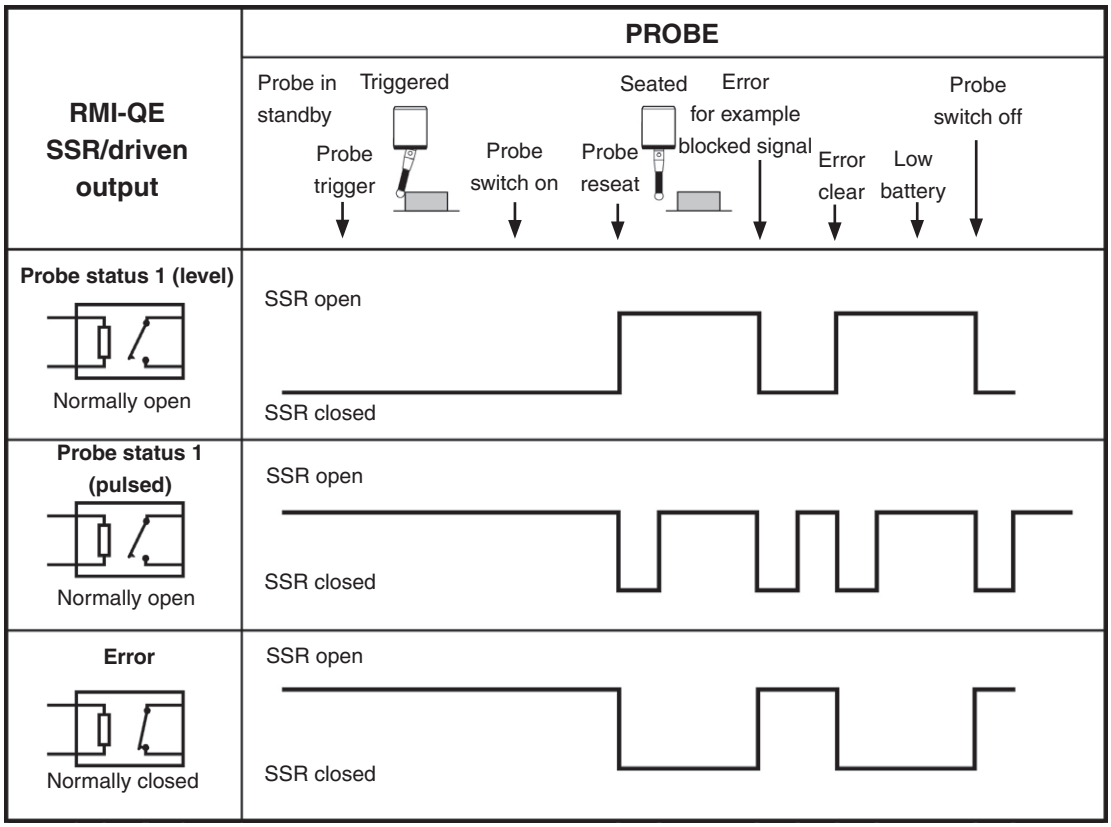


SIGNAL DELAYS

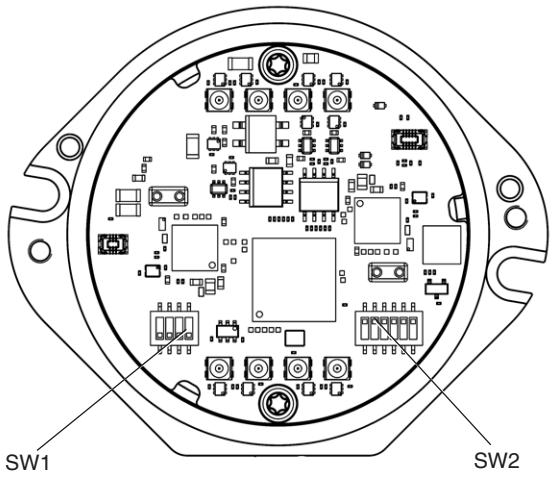
1. **Transmission delay** Probe trigger to output change of state = 5 ms variation ±1 µs. (Enhanced trigger filter off)
2. **Start delay** Time from initiation of start signal to valid signal transmission = 1 second max. (Standard turn on mode)

NOTE: Pulsed outputs are 40 ms ±1 ms duration.

RMI-QE seated start option



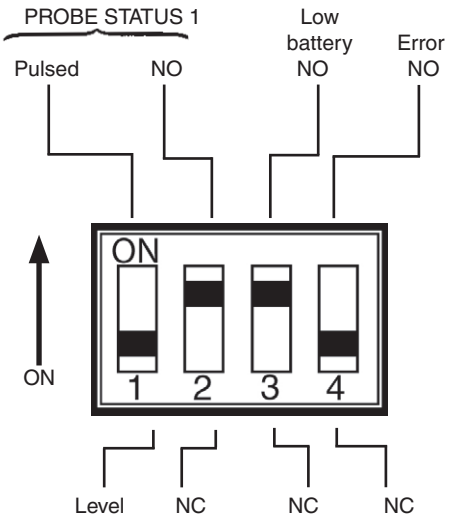
Switches SW1 and SW2



CAUTION: When changing the RMI-QE's DIP switch settings use a suitable implement and take care not to damage the switch.

NOTE: To gain access to the switches, remove the front cover, (see section 4, **"Maintenance"** for further information).

Switch SW1 output configuration



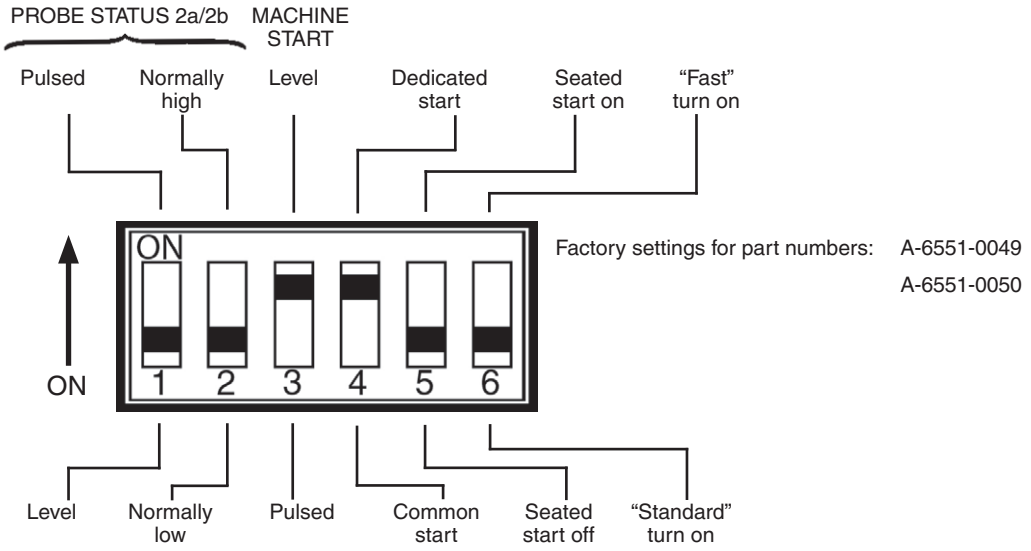
Abbreviations are as follows:

- NO = Normally Open
- NC = Normally Closed

Factory settings are shown.

CAUTION: When using error or probe SSR in NO mode, a wiring fault could cause loss of error condition and therefore could result in a non-failsafe condition.

Switch SW2 output configuration



NOTES:

If **"Level machine start"** is selected and the probe switch on method is selected as **"Radio on"** then, the RMI-QE will disable **"Timer off"** function in the probe. The probe will default to **"Radio off"**.

"Level machine start" is recommended. For each probe, the level control signal represents the probe's operating state at all times.

Seated start on

When **"Seated start on"** is selected, the RMI-QE will not drop the error line until the radio probe has become seated. This provides compatibility with controllers that regard the radio probe to be in error if it is started in a triggered condition.

"Fast" turn on

"Fast" turn on provides compatibility with controllers that have quicker response times, to give a reduced probing cycle time. By selecting **"Fast" turn on**, the system turn on time will be reduced by 0.5 seconds. This will also reduce the probe's battery life. These turn on times apply to radio M-code on only. See the appropriate probe installation guide for more details.

RMI-QE can use up to four probes sequentially. The start inputs can be configured as dedicated or common starts. **"Common start"** requires fewer inputs for all four probes.

Dedicated start (level mode)

In **"Dedicated start"**, a machine start input is required per probe that is configured for radio turn on.

Machine start inputs				Probe selected
P1	P2	P3	P4	
				None
✶				Probe 1 on
	✶			Probe 2 on
		✶		Probe 3 on
			✶	Probe 4 on

✶ Machine start input active. Any attempt to turn on more than one probe simultaneously will result in a selection error; the affected system status will flash orange.

NOTE: "Level start mode" is not compatible with radio probes configured for radio M-code on / time out off.

Common start (level mode)

In **"Common start" (level mode)**, machine start inputs P2 and P3 are used to select the probe and machine start input P1 is used to start the selected probe. All inputs are level.

Machine start inputs P1, P2 and P3			Probe selected
Probe start	Probe selection inputs		
P1	P2	P3	
✶			Probe 1
✶	✶		Probe 2
✶		✶	Probe 3
✶	✶	✶	Probe 4

✶ Machine start input active.
When P1 is off, all probes are off.
When P1 is active, the selected probe will be on.

NOTES:

Any change to the probe selection inputs P2 and P3 whilst the probe is operating will result in a selection error; the affected system status will flash orange.

"Level start mode" is not compatible with radio probes configured for radio M-code on / time out off.

Common start (pulsed mode)

In **"Common start" (pulsed mode)**, machine start inputs P2 and P3 are level inputs used to select the probe. Machine start input P1 is a pulsed input used to start the selected probe.

Machine start inputs P1, P2 and P3			Probe selected
Probe start P1	Probe selection inputs		
	P2	P3	
⎍			Probe 1
⎍	✶		Probe 2
⎍		✶	Probe 3
⎍	✶	✶	Probe 4

⎍ Machine start input pulsed, so selected probe will change state.
✶ Probe selection inputs are level signals.

NOTES:

Machine start input P4 is not used in **"Common start" (level or pulsed mode)**.

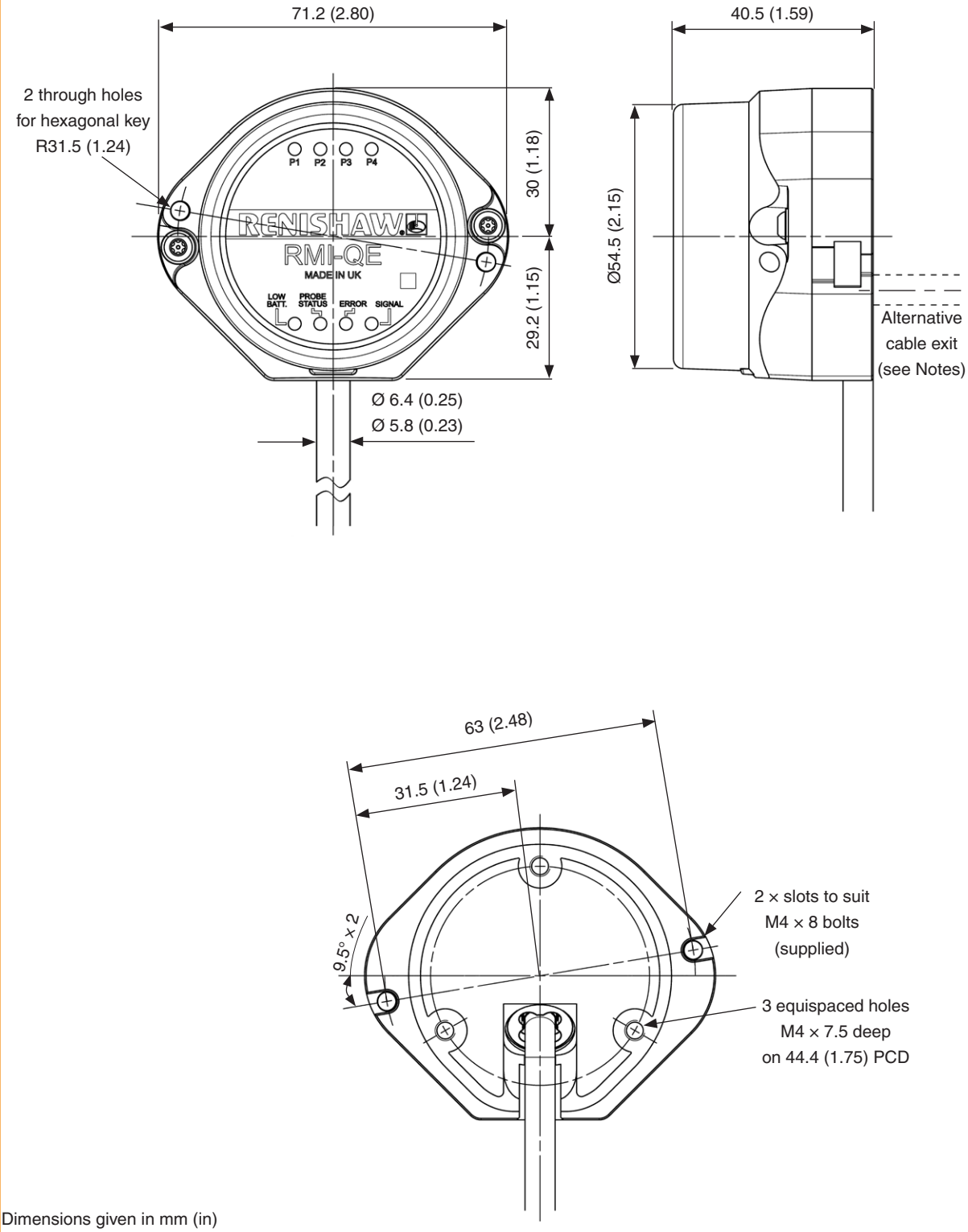
Only the probe start signal P1 will be pulsed and will change the probe status between on and off. The probe selection inputs P2 and P3 will be level.

Remote external audible output

Any output (set to pulsed) can be utilised to operate an external remote audible indicator.

The audible indicator must comply with the output specification, **for example**:
up to 50 mA
up to 30 V

RMI-QE dimensions



Dimensions given in mm (in)

NOTES:

When using rear exit cable, provide a Ø24 mm (Ø0.94 in) hole in the mounting for the cable to exit.

The cable may be moved to exit the RMI-QE body at either of the two alternative cable exit positions, as indicated on the above drawing.

RMI-QE specification

Principal application	All machining centres, 5-axis machines, twin spindle machines and vertical turret lathes.	
Dimensions	Height Width Depth	59.2 mm (2.33 in) 71.2 mm (2.80 in) 40.5 mm (1.59 in)
Weight	RMI-QE including 8 m (26.2 ft) of cable = 627 g (22.12 oz) RMI-QE including 15 m (49.2 ft) of cable = 1047 g (36.93 oz)	
Transmission type	Frequency hopping spread spectrum (FHSS) radio Radio frequency 2400 MHz to 2483.5 MHz	
Probes per system	Radio M-code on = up to four Spin/shank switch on = up to four	
Compatible probes[1]	Component setting/inspection: RMP40, RMP40M, RMP400, RMP60, RMP60M and RMP600 Lathe inspection: RLP40 and RLP40H Tool setting: RTS	
Operating range	Up to 15 m (49.2 ft)	
Supply voltage	12 Vdc to 30 Vdc	
Supply current	500 mA peak, < 200 mA typical from 12 V to 30 V	
Configurable M-code input	Pulsed or level	
Output signal	**Probe Status 1, Low Battery, Error** Voltage-free solid-state relay (SSR) outputs, configurable normally open or normally closed. **Probe Status 2a** 5 V isolated driven output, invertible. **Probe Status 2b** Power supply voltage driven output, invertible.	
Input / output protection	Electronically protected inputs. Outputs protected by over current protection circuit.	
Diagnostic LEDs	Start, low battery, probe status, error, signal condition and P1, P2, P3, P4 system status.	
Cable (to machine controller)	Specification	Ø6.1 mm (0.24 in), 16-core screened cable, each core 28 AWG.
	Length	8 m (26.2 ft) and 15 m (49.2 ft) standard lengths. Optional 30 m (98.4 ft) and 50 m (164.0 ft) cable assemblies are also available.
Mounting	Flush mounting. Sub mounting or directional mounting are also possible with optional mounting brackets (available separately).	
Environment	IP rating	IPX8, BS EN 60529:1992+A2:2013 (IEC 60529:1989+A1:1999+A2:2013)
	IK rating	IK03 (BS EN IEC 62262: 2002) [for glass window]
	Storage temperature	–25 °C to +70 °C (–13 °F to +158 °F)
	Operating temperature	+5 °C to +55 °C (+41 °F to +131 °F)

1 See page 2.2, **"Probe compatibility"**, for further information.

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System installation

RMI-Q to RMI-QE upgrade

To upgrade from an RMI-Q to an RMI-QE the following needs to be considered:

Mounting

The hole positions for mounting differ between the RMI-Q and RMI-QE.

The RMI-QE mounting bracket is different from RMI-Q mounting bracket. See page 3.2, **"Mounting bracket"**, for further information.

Cable

The cables for RMI-Q and RMI-QE are 16-core. See page 3.13, **"RMI-QE cable"**, for further information.

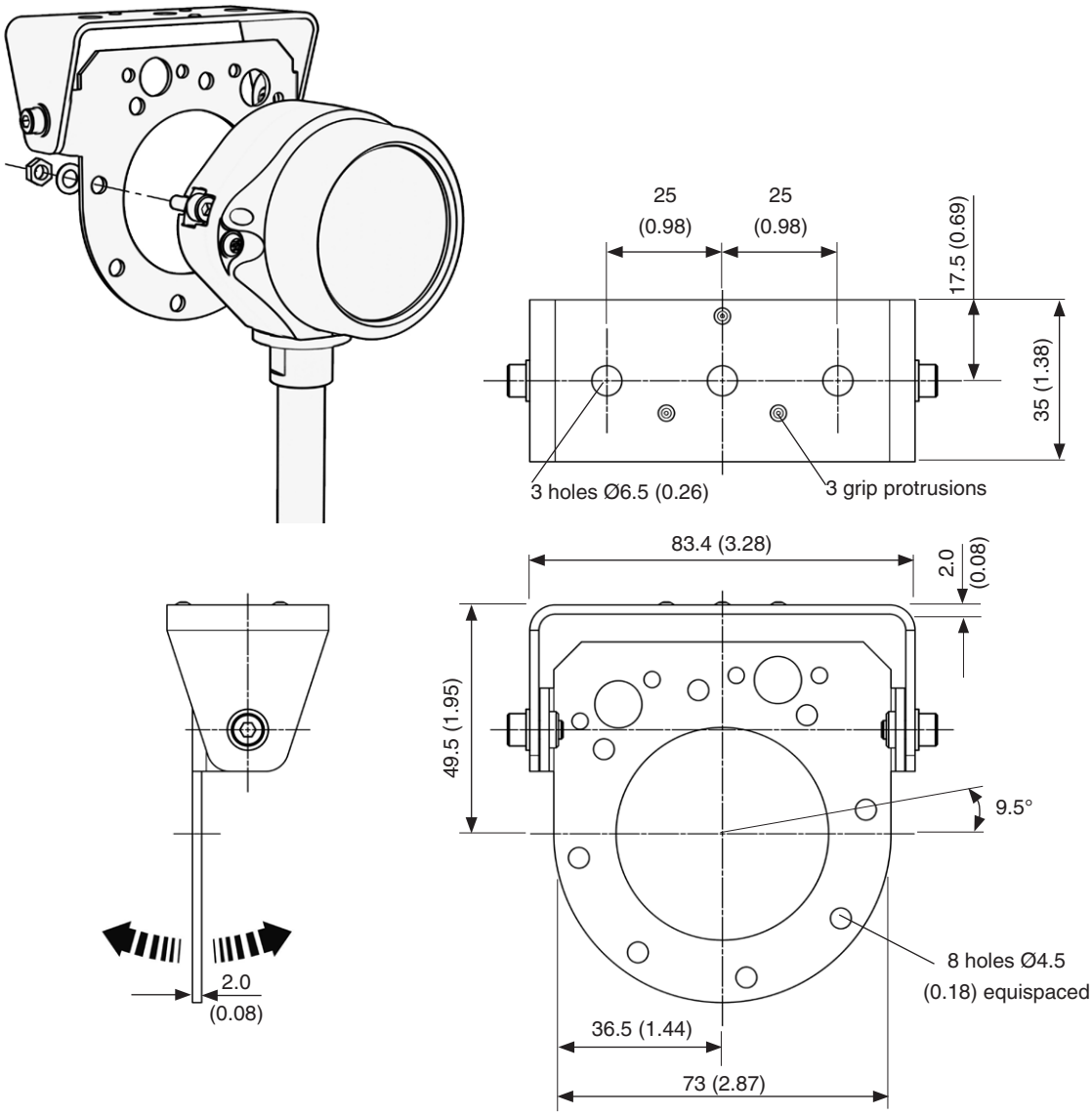
Wiring

The connections for RMI-Q and RMI-QE are identical. See page 3.7, **"Wiring diagram"**, for further information.

Partnering

The RMI-QE can be partnered using the same methods as RMI-Q. For instructions describing how to partner the RMI-QE, see **"To partner the radio probe with the RMI-QE"** on page 3.8. This section also details how to use the RMI-QE ReniKey.

Mounting bracket (optional)



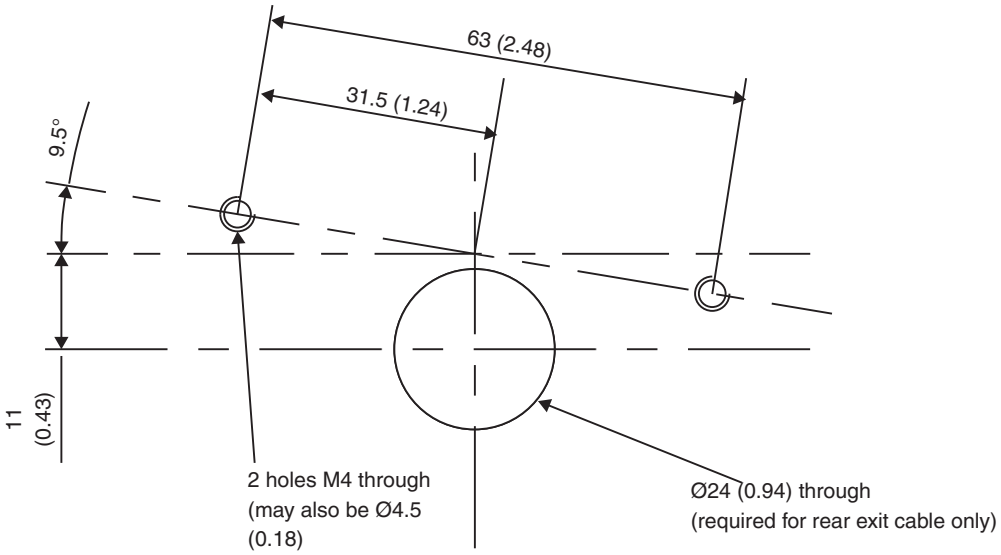
Dimensions given in mm (in)

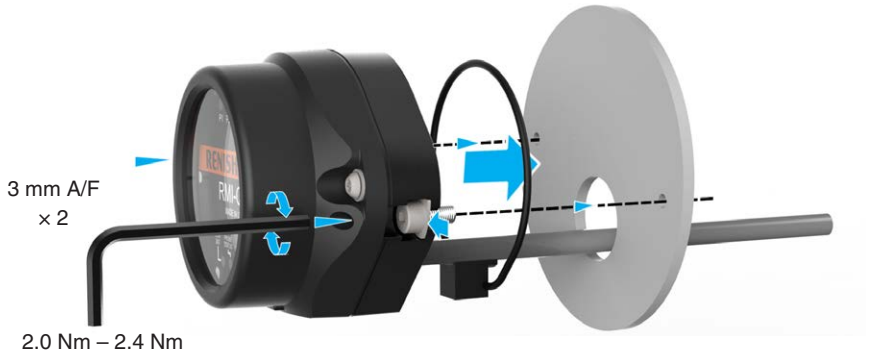
NOTE: Install the RMI-QE with cable exiting from lower side for good coolant run off.

Mounting options

The RMI-QE can be mounted to the machine controller using one of three options: front fixing, rear fixing or sub mounting. These options are described on pages 3.3, 3.4 and 3.5.

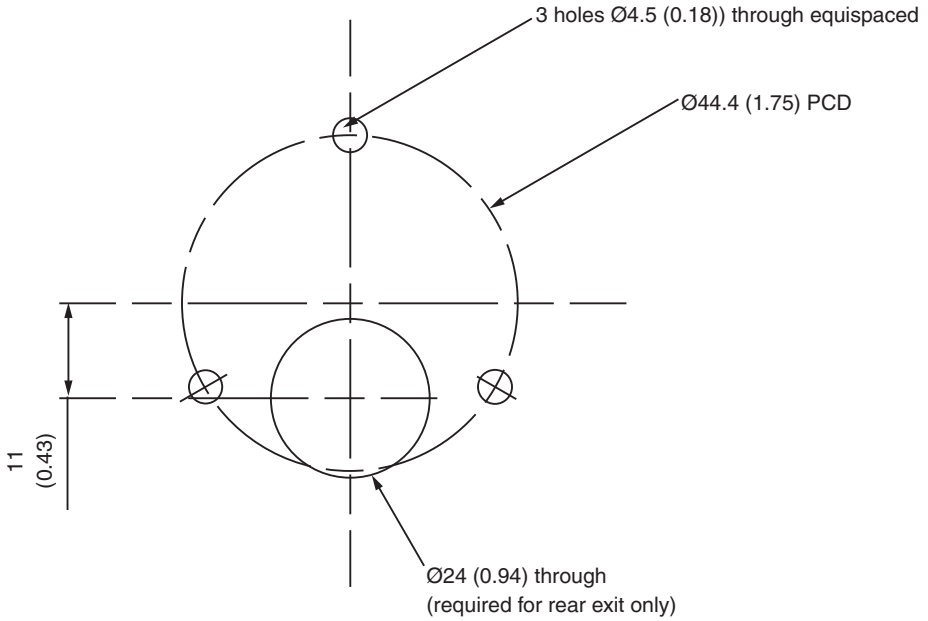
Front fixing option

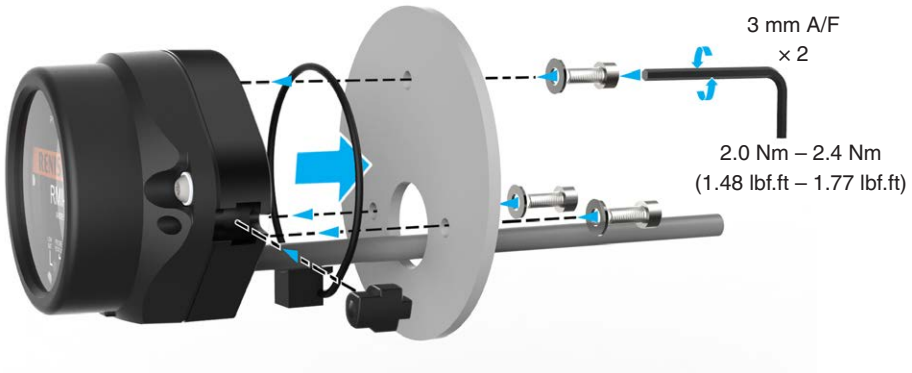




Dimensions given in mm (in)

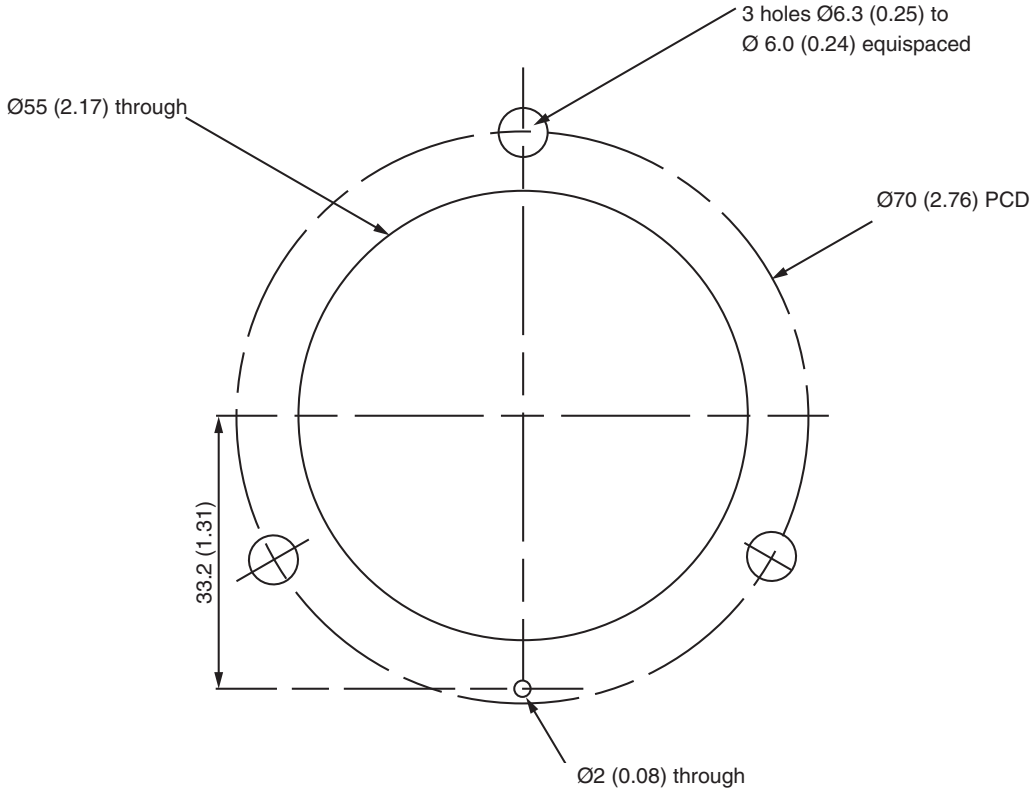
Rear fixing option

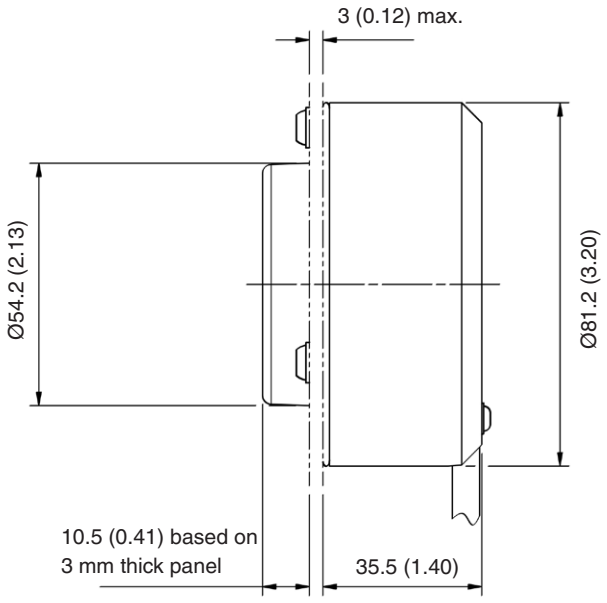




Dimensions given in mm (in)

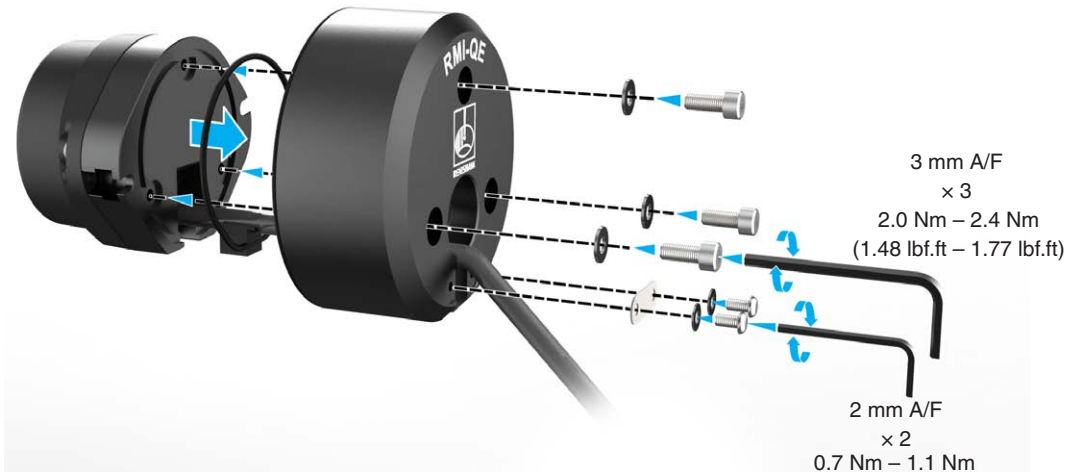
Sub mounting option (optional)

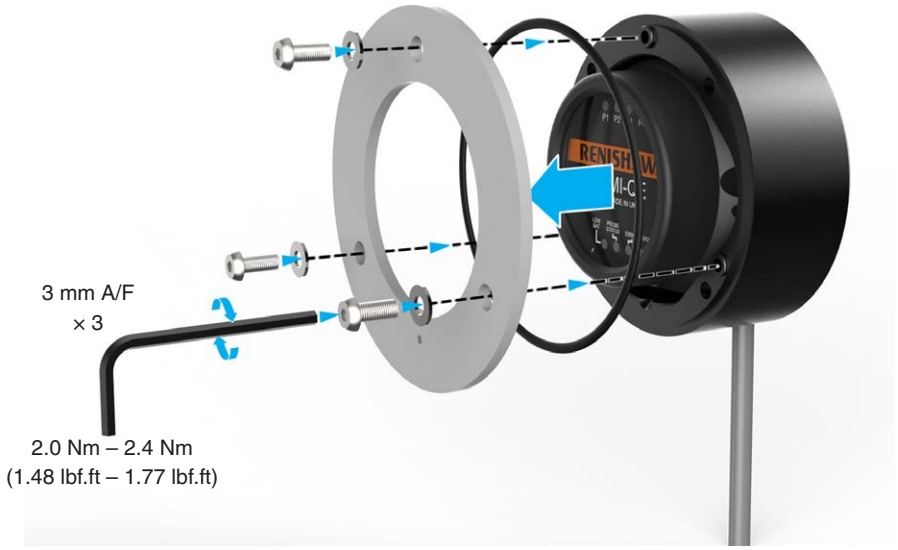




Dimensions given in mm (in)

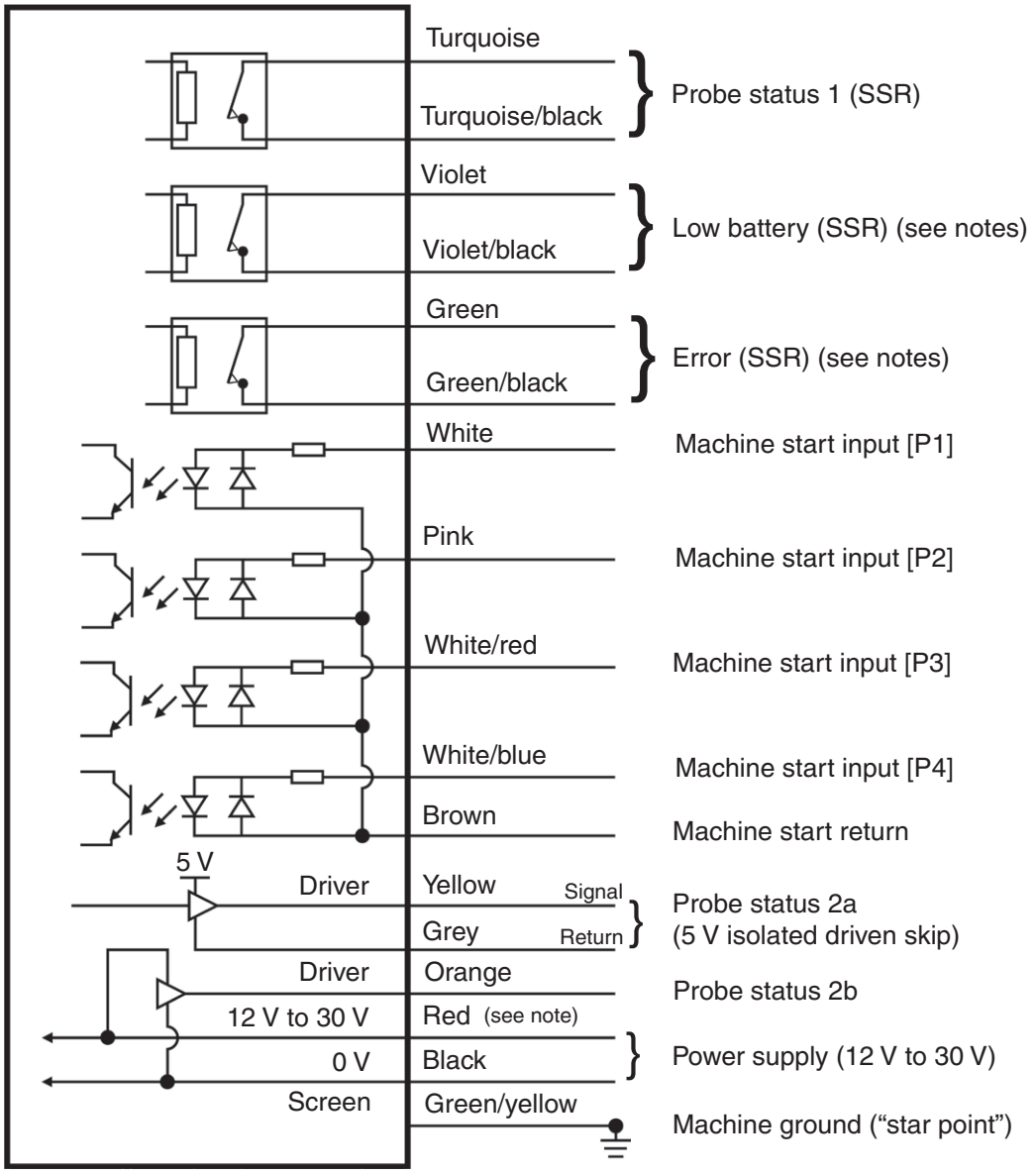
Sub mounting option (optional) (continued)





Wiring diagram (with output groupings shown)

RMI-QE with hard-wired cable



CAUTION: The power supply 0 V should be terminated at the machine ground (“star point”). A negative supply can be used when wired appropriately.

NOTES:

A switch can be fitted between the machine power supply and the red wire, to aid powering up the RMI-QE when partnering.

It is recommended that both the low battery (SSR) and error (SSR) are connected to provide full system information.

Radio probe – RMI-QE partnership

The radio probe and RMI-QE must be placed into **“Partnering mode”**.

On the RMI-QE, **“Partnering mode”** is achieved either by manually power cycling the RMI-QE, or via application of ReniKey which is a Renishaw machine macro cycle.

The radio probe can be placed into **”Partnering mode”** using either probe partnering function with the Trigger Logic™ technique or Opti-logic™ technique.

Trigger Logic™

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. **“Partnering mode”** is activated by battery insertion then, whilst the **“Battery status”** is being displayed, deflect and immediately release the stylus to enter **“Partnering mode”**.

Opti-Logic™

Opti-Logic enables the user to review the settings, partner the probe and configure the probe via a smartphone or tablet.

The Renishaw Probe Setup app uses Opti-Logic to partner the probe and guides the user through the partnering process based on the compatibility of the probe. The Probe Setup app simplifies this process with clear interactive instructions and informative videos. The Probe Setup app is available for download on the App Store and Google Play and also from several app stores in China.

Download on the App Store

or

GET IT ON Google Play

To partner the radio probe with the RMI-QE

Partnering is required during initial system set-up. Further partnering will be required if either the radio probe or RMI-QE are changed.

When any radio probe is partnered with an RMI-QE, but then used with another system, it is recommended that it is cleared first from the RMI-QE before being partnered with the new system. The radio probe will also need to be partnered again should it be brought back to the RMI-QE.

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

NOTES:

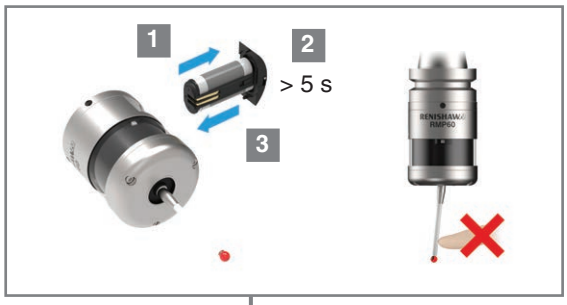
Do not attempt to partner the RMI-QE to a probe if there is another RMI-QE and probe within the transmission range being partnered at the same time.

The RMI-QE is not compatible with **“Multiple probe mode”**, used on previous generation probes.

The probe partnering function enables the radio probe to be partnered with the RMI-QE independently of the configuration process for other probe settings. Refer to your relevant radio probe installation guide.

To manually partner a single probe or tool setter with the RMI-QE proceed as follows:

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
RMI-QE
●●●●●●

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 occured 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

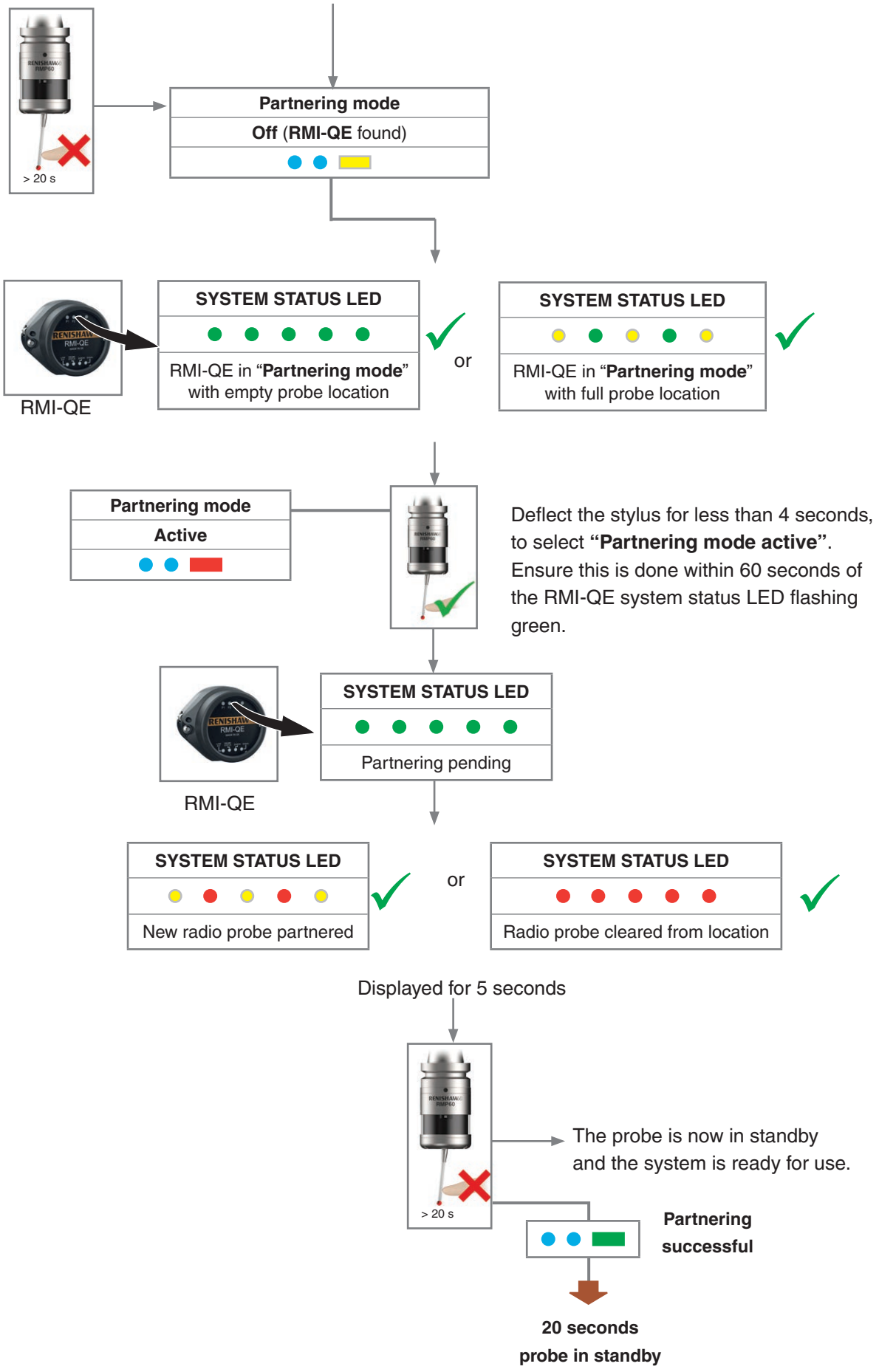
Battery good	or	Battery low
●●●●●●●●		●●●●●●●●●●●●●●●●

At this point turn on the RMI-QE.

Partnering mode
Off
● ● ▬

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

Switch on the RMI-QE



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.

Partnering radio probes using ReniKey

ReniKey is a Renishaw machine macro cycle. It enables up to four radio probes to be partnered with the RMI-QE without the need to power the RMI-QE off and then back on for each of the probes being partnered.

The radio probe can be placed in **"Partnering mode"** using Trigger Logic™.

Refer to the *ReniKey* programming manual (see Section 6, **"Parts list"**, for the part number of the relevant *ReniKey* programming manual for your controller). For more information, or to download ReniKey, visit: **www.renishaw.com/mtpsupport/renikey**

NOTES:

ReniKey can be applied to any of the four machine start inputs.

ReniKey cannot be used with "smart" M-codes; for example, those M-codes which are associated with the machine's PLC which, when activated, prompt the checking of the ERROR or PROBE STATUS outputs.

When holding the radio probe do not wrap a hand, or anything else, around the glass window.

To partner up to four radio probes with the RMI-QE without ReniKey

The RMI-QE has four machine start inputs (P1–P4) that enable partnering of four radio probes (see page 3.7,**"Wiring diagram"**, for further information).

The partnering procedure is dependent on the start method that has been selected (see Section 2, **"RMI-QE Basics"**, for further information).

Partnering with dedicated start (Level mode)

If the RMI-QE is powered with all start inputs held low, the RMI-QE will complete its start-up procedure and partner the radio probe as Probe 1.

When the RMI-QE is powered with a single machine start input held high, the RMI-QE will complete its start-up procedure and partner the radio probe to the probe number represented by the selected machine start input.

Level mode				
Probe to be partnered	Machine start input			
	P1	P2	P3	P4
Probe 1				
Probe 2		✶		
Probe 3			✶	
Probe 4				✶

The system status LED for the selected probe number will repeatedly flash on and off green whilst in partnering mode.

Partnering with common start

When the RMI-QE is powered, specific machine start inputs need to be held high when partnering the radio probe to a specific probe number.

Pulsed mode			
Probe to be partnered	Machine start input		
	P1	P2	P3
Probe 1			
Probe 2		✶	
Probe 3			✶
Probe 4		✶	✶

Level mode			
Probe to be partnered	Machine start input		
	P1	P2	P3
Probe 1			
Probe 2	✶	✶	
Probe 3	✶		✶
Probe 4	✶	✶	✶

NOTES:

Activation of machine start input (P4) is not required when common start is selected.

To aid partnering, an on/off switch can be fitted between the machine power supply and the RMI-QE (red wire). This enables the RMI-QE to be momentarily powered off and then back on, for each of the probes being partnered, without having to power off the machine.

Removing the radio probe from the RMI-QE

It is recommended that a radio probe should be cleared from the RMI-QE when it is removed from the system. The probe number is cleared from the RMI-QE by repeating the partnering procedure whilst the corresponding machine start input is held high. The RMI-QE will then display that the probe number was cleared. Alternatively, the radio probe can be cleared via application of the ReniKey machine macro cycle.

Refer to the *ReniKey* programming manual (see Section 6, **"Parts list"**, for the part number of the relevant *ReniKey* programming manual for your controller). For more information, or to download ReniKey free of charge visit, **www.renishaw.com/mtpsupport/renikey**. ReniKey can also be used to clear all probe numbers at the same time. If the cleared radio probe is to be used again with the RMI-QE, it must be re-partnered.

Changing radio probe position

If, during partnering with all procedures, the RMI-QE acquires a radio probe that is already stored under a different probe number, the radio probe will be cleared from its current location and stored under the new probe number selected for partnering.

RMI-QE cable

Cable termination

A ferrule should be crimped onto each cable wire for a more positive connection at the terminal box.

Standard cable variants

The RMI-QE standard cables are 8 m (26.2 ft) and 15 m (49.2 ft) long.

Cable specification

Ø6.1 mm (0.24 in), 16-core screened cable, each core 28 AWG.

NOTE:

Maximum cable length:

30 m (98.42 ft) at 12 V

50 m (164.04 ft) at 24 V

Cable sealing

Coolant and dirt are prevented from entering the RMI-QE by the cable sealing gland. The RMI-QE cable can be protected against physical damage by fitting a flexible conduit if required.

Recommended flexible conduit is Anamet™ SLI-CAP (5/16 in).

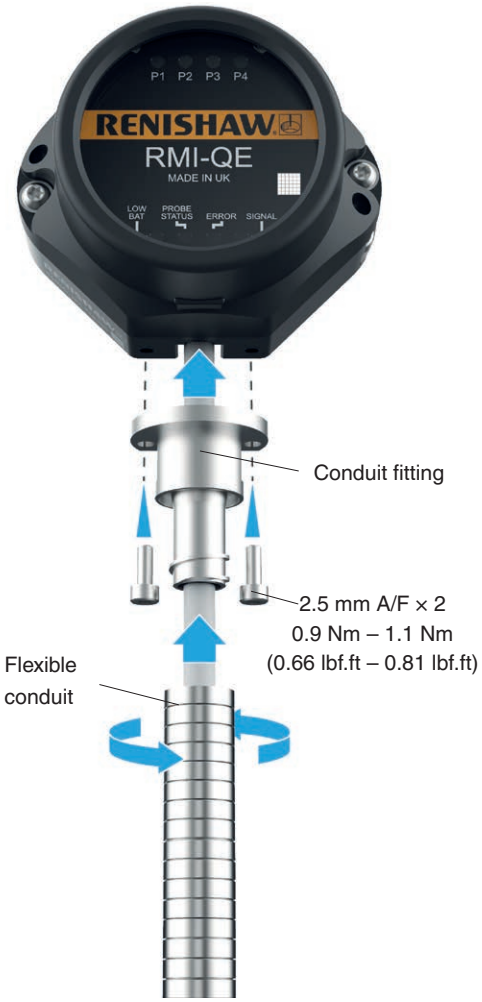
A conduit set is available – see Section 6, **"Parts list"**, for further information.

CAUTIONS:

Failure to adequately protect the cable can result in system failure due to either cable damage or coolant ingress through cores into the RMI-QE.

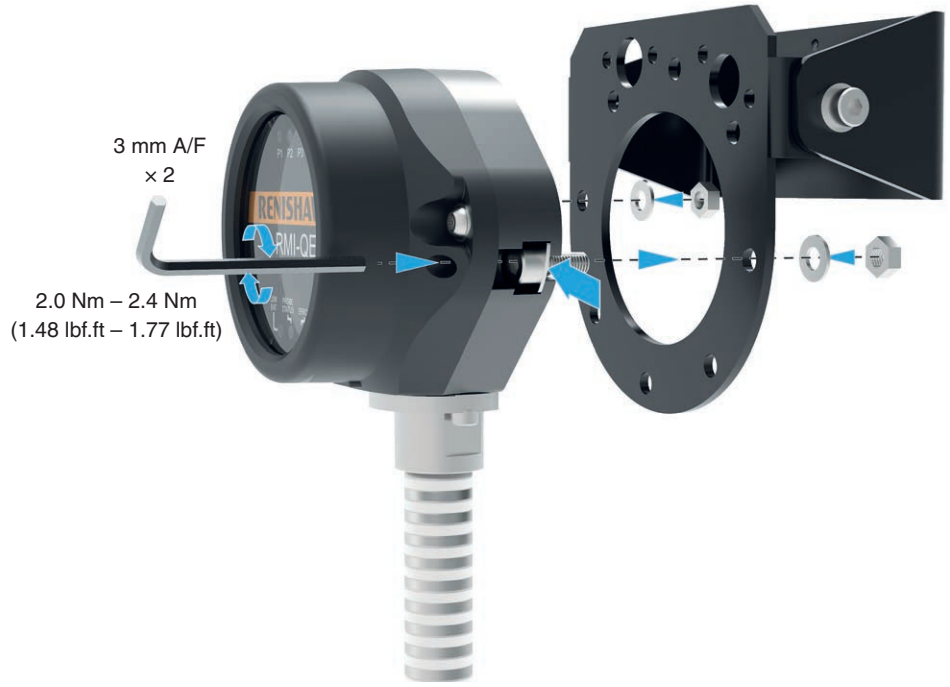
Failure due to inadequate cable protection will invalidate the warranty.

Fitting flexible conduit



1. Slide the flexible conduit onto the conduit fitting and screw into place.
2. Fit the conduit fitting onto the RMI-QE and secure with the two M3 screws. Torque tighten the screws to 0.9 Nm to 1.1 Nm (0.66 lbf.ft to 0.81 lbf.ft).

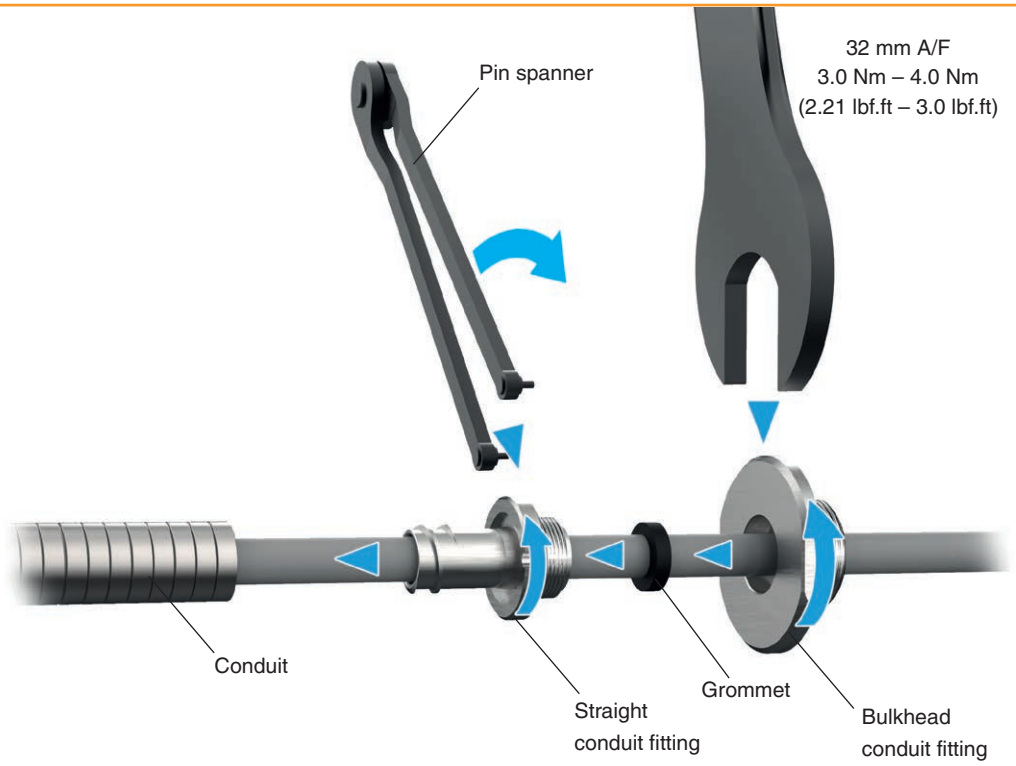
Screw torque values



Fitting the cable and conduit to the bulkhead

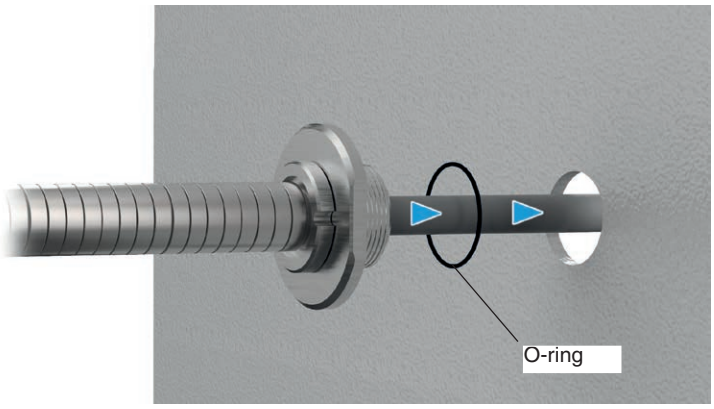
CAUTION: The cable and conduit must be fitted to the bulkhead in the correct sequence, as described below, as the conduit cannot rotate.

1



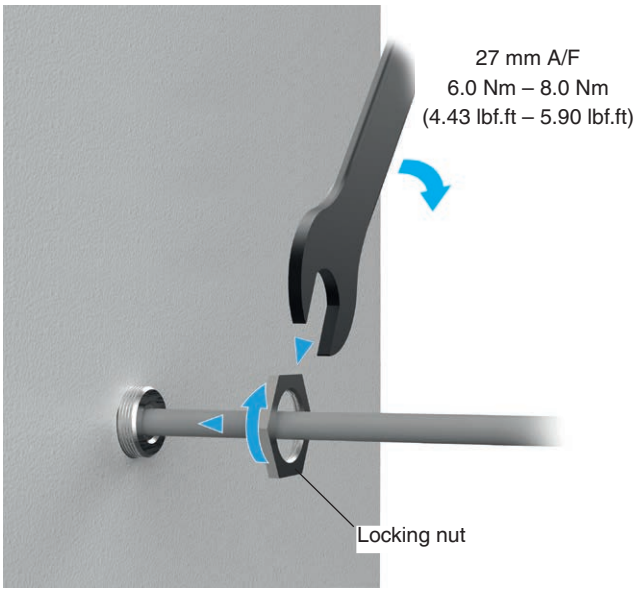
1. Screw the straight conduit fitting into the conduit until finger-tight.
2. Fit the grommet over the cable in between the straight conduit fitting and the bulkhead conduit fitting.
3. Screw the bulkhead conduit fitting onto the straight conduit fitting using the pin spanner provided to hold the straight conduit fitting and a 32 mm A/F spanner to tighten, making sure that the grommet is fitted to the cable, in the position as shown in Figure 1. Torque to between 3.0 Nm and 4.0 Nm (2.21 lbf.ft. and 3.0 lbf.ft.).

2



4. Fit the O-ring into the recess in the bulkhead conduit fitting.

3



5. Torque the M20 × 1.5 lock nut between 6.0 Nm and 8.0 Nm (4.43 lbf. ft and 5.90 lbf.ft.).

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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 window

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

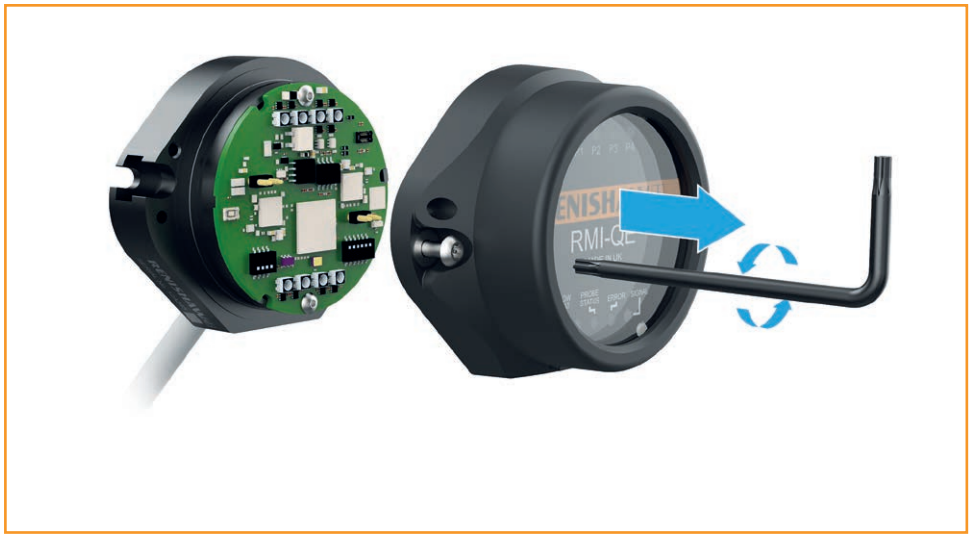
CAUTION: The RMI-QE has a glass window; handle with care if broken to avoid injury.

Removing the RMI-QE front cover

It is not necessary to remove the RMI-QE from the machine when adjusting the switch or installing replacement parts.

The front cover may be removed and replaced as described below to change the switch settings.

To remove the RMI-QE front cover

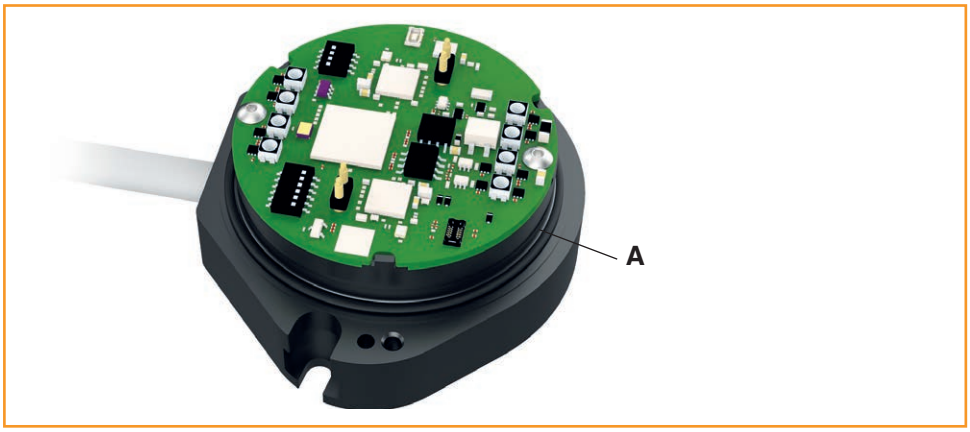


1. Clean the RMI-QE thoroughly to ensure no debris or coolant enters the unit.
2. Undo, but do not remove the two front cover screws, enough to remove the front cover, using a T10 tamperproof key (provided).

CAUTION: When removing the front cover, do not twist or rotate by hand.

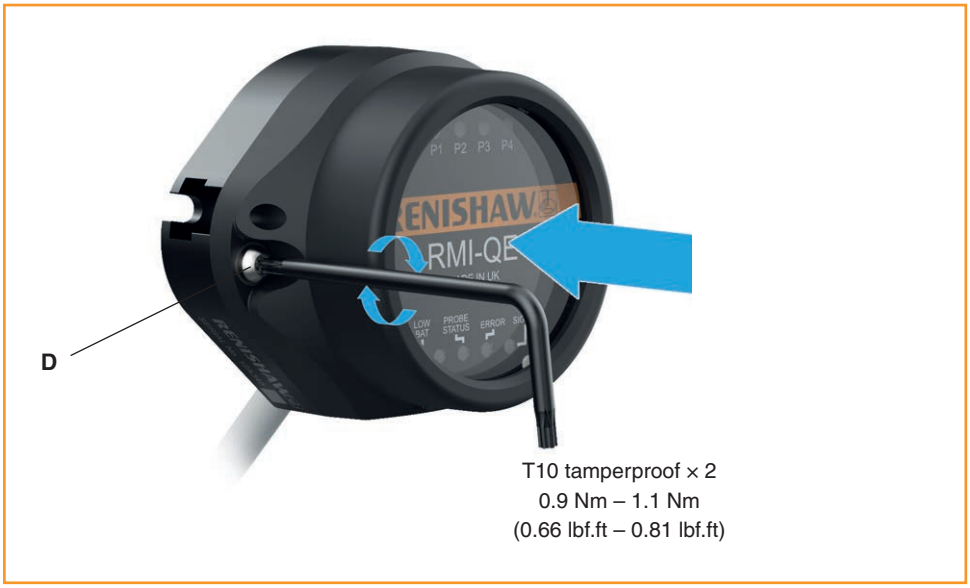
Fitting the RMI-QE front cover

1. Before fitting the front cover, check for any damage to screws or scratch marks which could prevent sealing.
2. Ensure the O-ring **A** in the RMI-QE body is clean.



3. Ensure that the O-ring seating **B** and front cover **C** are clean.

4. Place the front cover onto the RMI-QE body.
5. Insert the two screws into front cover holes **D**, and tighten to 0.9 Nm to 1.1 Nm (0.66 lbf.ft – 0.81 lbf.ft).



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Fault-finding

Symptom	Cause	Action
No LEDs lit on RMI-QE.	Overvoltage, undervoltage or no power.	Check voltage supply.
	Damaged cable.	Check wiring.
RMI-QE status LEDs do not correspond to radio "PROBE STATUS" LEDs.	Radio link failure – radio probe out of RMI-QE range.	Check position of RMI-QE, refer to the operating envelope in the relevant radio probe installation guide. For further information, see Section 6, **"Parts list"**.
	Radio probe has been enclosed/ shielded by metal.	Review installation.
	Radio probe and RMI-QE are not partnered.	Partner radio probe and RMI-QE.
RMI-QE "ERROR" LED illuminated. For more information, see page 2.4, "ERROR" LED.	Radio probe and RMI-QE are not partnered.	Partner radio probe and RMI-QE.
	Exhausted radio probe batteries.	Change radio probe batteries.
	Probe not switched on.	Check configuration and alter as required.
	Probe out of range.	Check position of RMI-QE, refer to the operating envelope in the relevant radio probe installation guide. For further information, see Section 6, **"Parts list"**.
	Probe selection error.	Verify that one radio probe is working and is correctly selected.
All four lower LEDs flashing.	Wiring fault.	Check wiring.
	Output overcurrent.	Check wiring, turn power to RMI-QE off and on again to reset.

Symptom	Cause	Action
RMI-QE "LOW BATTERY" LED lit.	Low radio probe batteries.	Change radio probe batteries soon.
Reduced range.	Local radio interference.	Identify and remove.
	Radio probe has been enclosed/ shielded by metal.	Review installation.
RMI-QE "SYSTEM STATUS" LED is continually lit red.	Radio probe is not compatible with RMI-QE.	Use a radio probe with a 'QE' marking.
RMI-QE "SYSTEM STATUS" LED does not show the active probe's status. RMI-QE "LOW BATTERY/ START" LED is lit green and radio probe LEDs are lit.	RMI-QE machine start input is active, but radio probe is set to spin on / shank on and is operating.	Remove RMI-QE machine start input.

Parts list

Type	Part number	Description
RMI-QE	A-6551-0049	RMI-QE with 8 m (26.2 ft) cable, tools and support card.
RMI-QE	A-6551-0050	RMI-QE with 15 m (49.2 ft) cable, tools and support card.
PCB	A-6551-0301	PCB replacement kit.
Mounting bracket	A-6551-0120	RMI-QE mounting bracket with fixing screws, washers and nuts.
Sub mount bracket	A-6551-0307	Comprising: sub mount bracket, cable strap, 2 × M3 screws 2 × M3 washers, 3 × M4 screws, 3 × M4 washers, 1 × O-ring (Ø72 mm [Ø2.83 in]).
RMI-QE to RMI-Q adaptor plate	A-6551-0308	RMI-QE to RMI-Q adaptor plate with 2 × M5 fixing screws, 2 × M5 washers and O-ring (Ø34.5 mm [Ø1.36 in] × 3 mm).
Conduit	A-6551-0306	Conduit set with 1 m (3.28 ft) of metal conduit.
Cover assembly	A-6551-0305	Cover/antenna assembly: including cover screws, torx key and O-ring.
Tools	A-6551-0300	Comprising: 1 × T10 tamperproof key, 1 × 3 mm hex key, 17 × ferrules, 5 × M4 screws, 2 × M4 nut, 3 × M4 washers, 1 × body seal, 2 x slot bungs, 2 x mounting washers, 3 × O-rings.
RMI-QE support software	A-5687-5000	ReniKey machine macro cycles with programming manual and macro software for multiple RTS.
Publications. These can be downloaded from our website at **www.renishaw.com**		
RMI-QE QSG	H-6551-8500	Quick-start guide: for rapid set-up of the RMI-QE radio machine interface.
RMP60 QSG	H-6587-8500	Quick-start guide: for rapid set-up of the RMP60 probe.
RMP60 IG	H-6587-8520	Installation guide: for set-up of the RMP60 probe.
RMP600 QSG	H-6554-8500	Quick-start guide: for rapid set-up of the RMP600 probe.
RMP600 IG	H-6554-8520	Installation guide: for set-up of the RMP600 probe.
RMP40 QSG	H-6588-8500	Quick-start guide: for rapid set-up of the RMP40 probe.
RMP40 IG	H-6588-8520	Installation guide: for set-up of the RMP40 probe.
RLP40 QSG	H-6717-8500	Quick-start guide: for rapid set-up of the RLP40 probe.
RLP40 IG	H-6717-8520	Installation guide: for set-up of the RLP40 probe.
RMP400 QSG	H-6586-8500	Quick-start guide: for rapid set-up of the RMP400 probe.
RMP400 IG	H-6586-8520	Installation guide: for set-up of the RMP400 probe.
RTS QSG	H-6589-8500	Quick-start guide: for rapid set-up of the RTS probe.
RTS IG	H-6589-8520	Installation guide: for set-up of the RTS tool setting probe.
ReniKey (generic)	H-5687-8601	ReniKey (generic) programming guide.
ReniKey (Heidenhain)	H-5687-8602	ReniKey (Heidenhain) programming guide.

NOTE: The serial number of each RMI-QE is found on the top of the housing.

Type	Part number	Description
ReniKey (Siemens)	H-5687-8603	Renikey (Siemens) programming guide.
Styli	H-1000-3200	Technical specifications guide: 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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