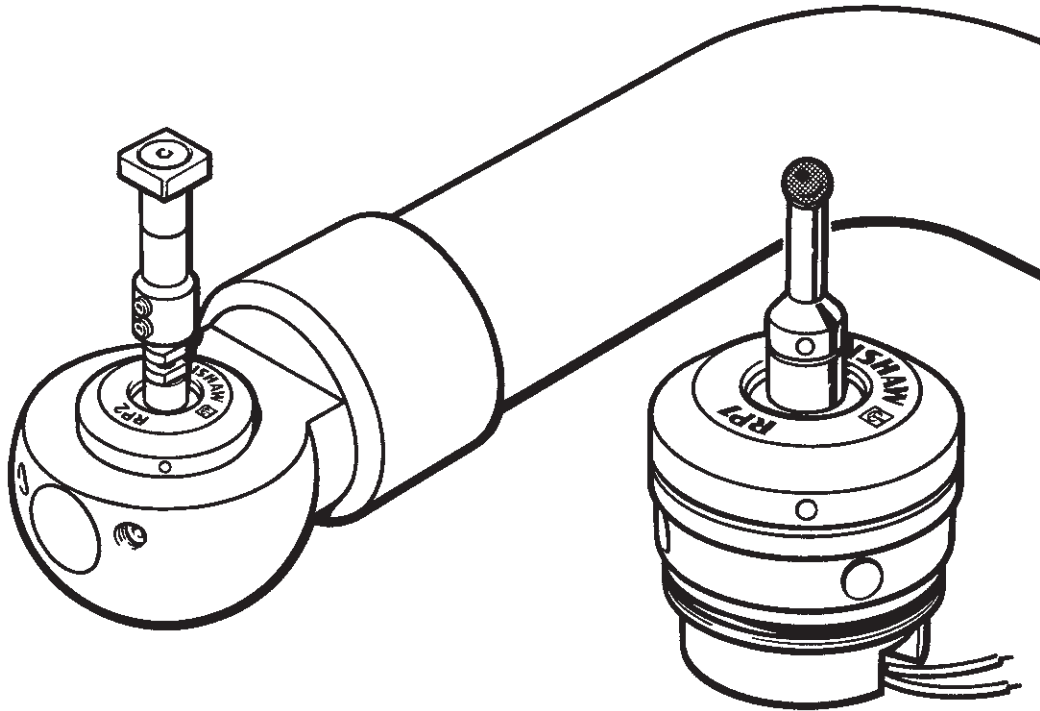


# RP1/RP2 probes



Compliance information for this product is available by scanning the QR code or visiting [www.renishaw.com/mtpdoc](http://www.renishaw.com/mtpdoc)



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# Before you begin

## Warranty

Unless you and Renishaw have agreed and signed a separate written agreement, the equipment and/or software are sold subject to the Renishaw Standard Terms and Conditions supplied with such equipment and/or software, or available on request from your local Renishaw office.

Renishaw warrants its equipment and software for a limited period (as set out in the Standard Terms and Conditions), provided that they are installed and used exactly as defined in associated Renishaw documentation. You should consult these Standard Terms and Conditions to find out the full details of your warranty.

Equipment and/or software purchased by you from a third-party supplier is subject to separate terms and conditions supplied with such equipment and/or software. You should contact your third-party supplier for details.

## 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 RP1 and RP2 tool setting probes and features of similar Renishaw products, are the subject of one or more of the following patents and/or patent applications:

None applicable

## **Intended use**

RP1 and RP2 are tool setting probes that can be used on CNC lathes and precision tool setting arms.

## Safety

### Information to the user

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

RP1 and RP2 probes must be installed by a competent person, observing relevant safety precautions. Before starting work, ensure that the machine tool is in a safe condition with the power switched OFF and the power supply to the MI 8-4 is disconnected.

Refer to the machine supplier's operating instructions.

### 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 output 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.

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# RP1/RP2 probes basics

## Introduction

The Renishaw RP1/RP2 probe is fitted into a purpose designed mount (for more information, see **page 3-1** “RP1/RP1 DD installation details” and **page 3-2**, “RP2/RP2 DD installation details”).

The RP1/RP2 probe is also available in a double diaphragm version (RP1 DD/RP2 DD).

The RP1 or RP2 probe may be fitted to the Renishaw high-precision arm (HPA). The RP2 probe is fitted to the Renishaw tool setting arm (TSA).

The RP1/RP1 DD is fitted with twin wire probe outputs. The RP2/RP2 DD is fitted with a connector assembly.

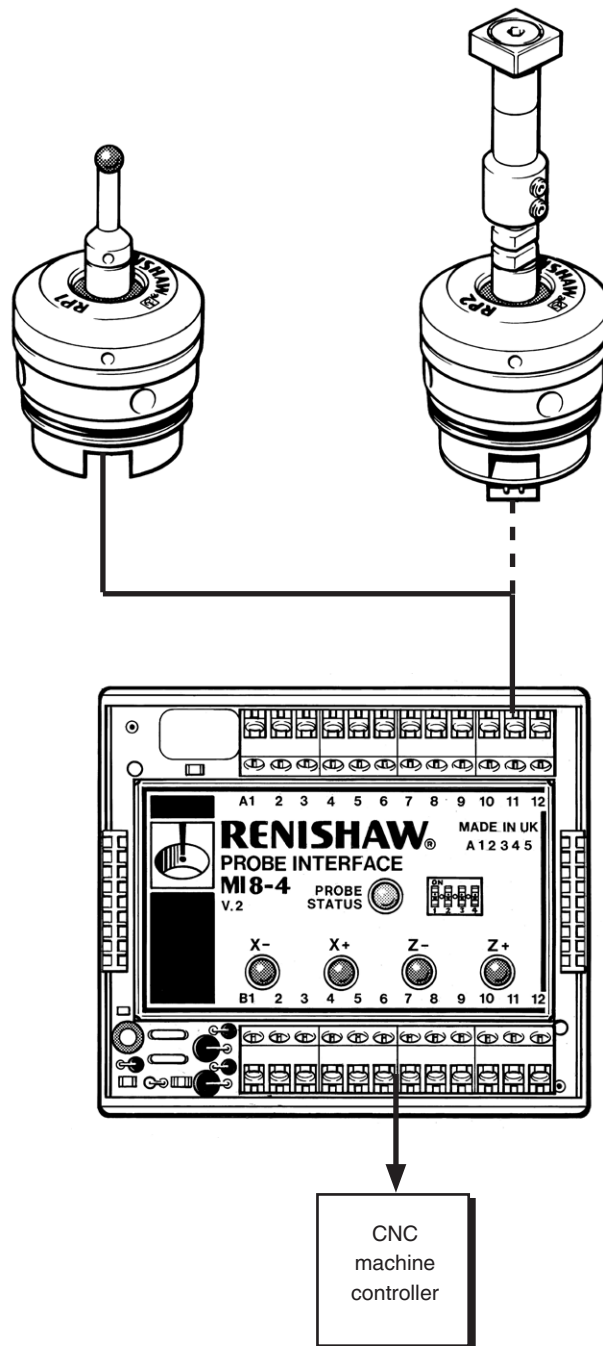
## Interface unit

Signals between the probe and the CNC controller are processed by an interface unit.

An MI 8-4 interface unit is recommended. The MI 8-4 interface unit provides voltage-free solid-state relay (SSR) output, configurable to be either normally open (NO) or normally closed (NC). An inhibit input enables an optical transmission type inspection probe and interface to be used on the same machine input as the RP1/RP2.

The MI 8-4 interface unit is fully described in the *MI 8-4 interface unit* installation guide (Renishaw part no. H-2000-5008).

## RP1/RP2 probe system

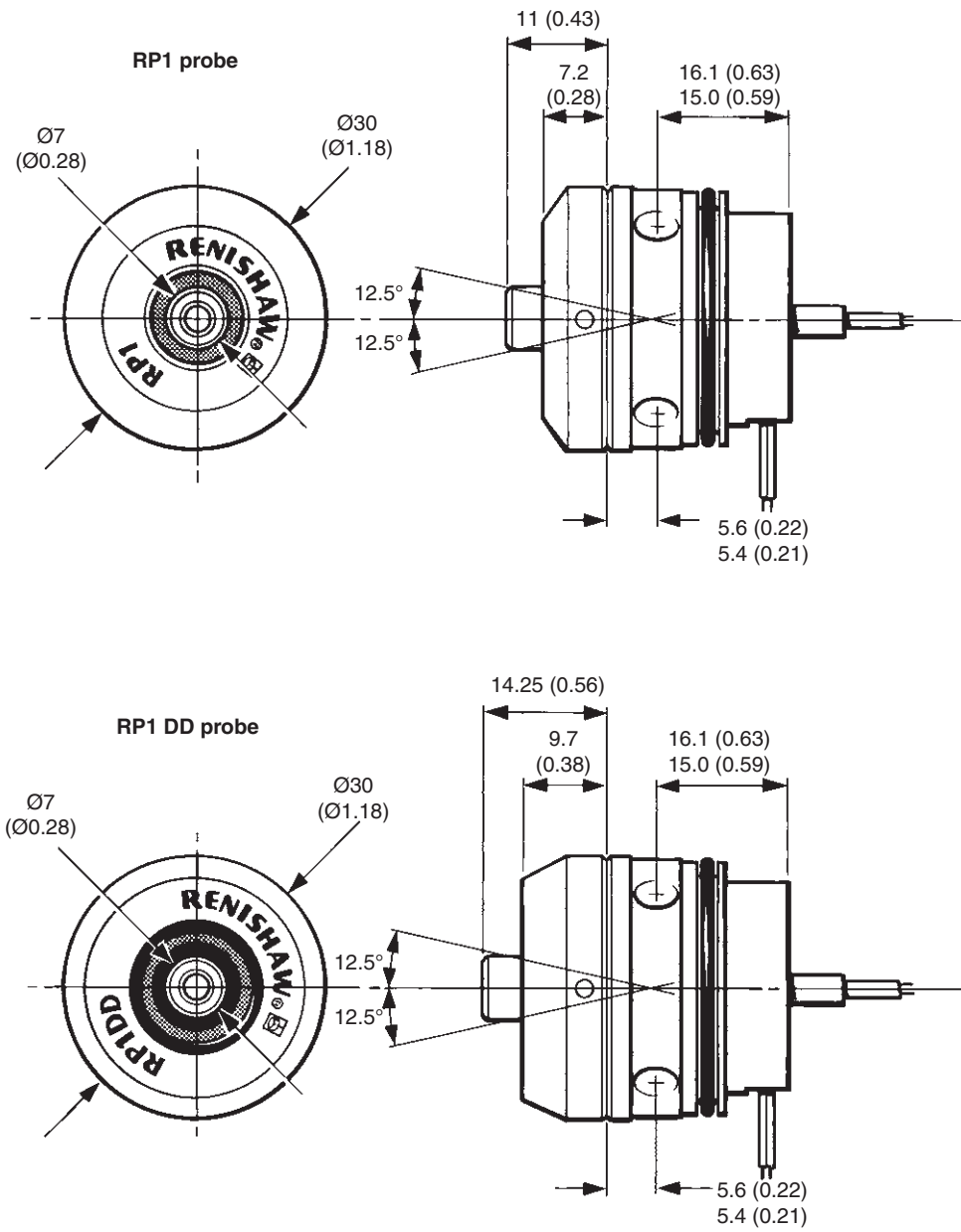


## Specification

<b>Principal application</b>	Tool setting	
<b>Transmission type</b>	Hard-wired, or in conjunction with optical or radio transceiver modules	
<b>Sense directions</b>	±X, ±Y, +Z	
<b>Repeatability</b>	1.00 µm (40 µin) 2σ <sup>1</sup>	
<b>Stylus trigger force</b> <sup>2</sup>		
XY low force	70 g (2.5 oz) minimum	
XY high force	125 g (4.4 oz) maximum	
+Z direction	610 g (21.5 oz)	
<b>Stylus overtravel limits</b>		
XY	12.5°	
+Z direction	4 mm (0.157 in)	
<b>Environment</b>	Storage temperature	-13 °C to +60 °C (+9 °F to +140 °F)
	Operating temperature	+5 °C to +60 °C (+9 °F to +140 °F)

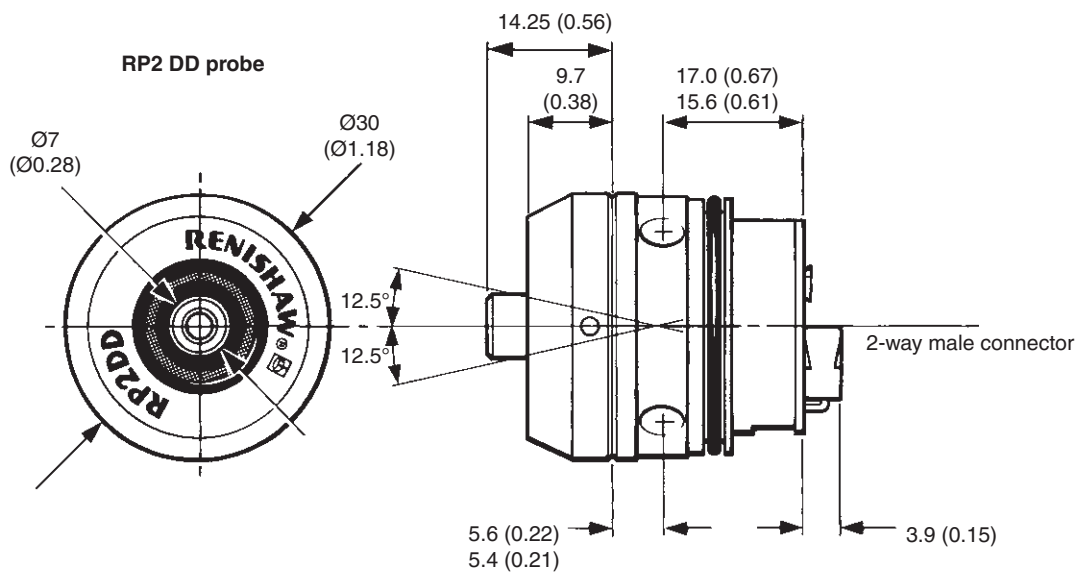
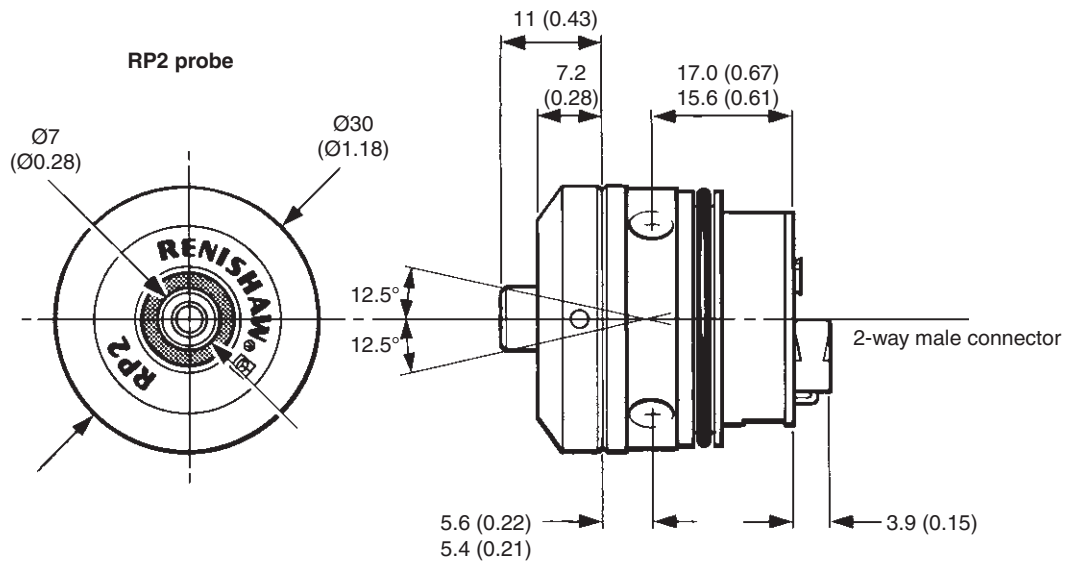
- 1 Performance specification is tested at a standard test velocity of 480 mm/min (18.9 in/min) with a 35 mm stylus. Significantly higher velocity is possible depending on application requirements.
- 2 Trigger force, which is critical in some applications, is the force exerted on the component by the 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 latency.

# RP1/RP1 DD dimensions



Dimensions in mm (in)

## RP2/RP2 DD dimensions

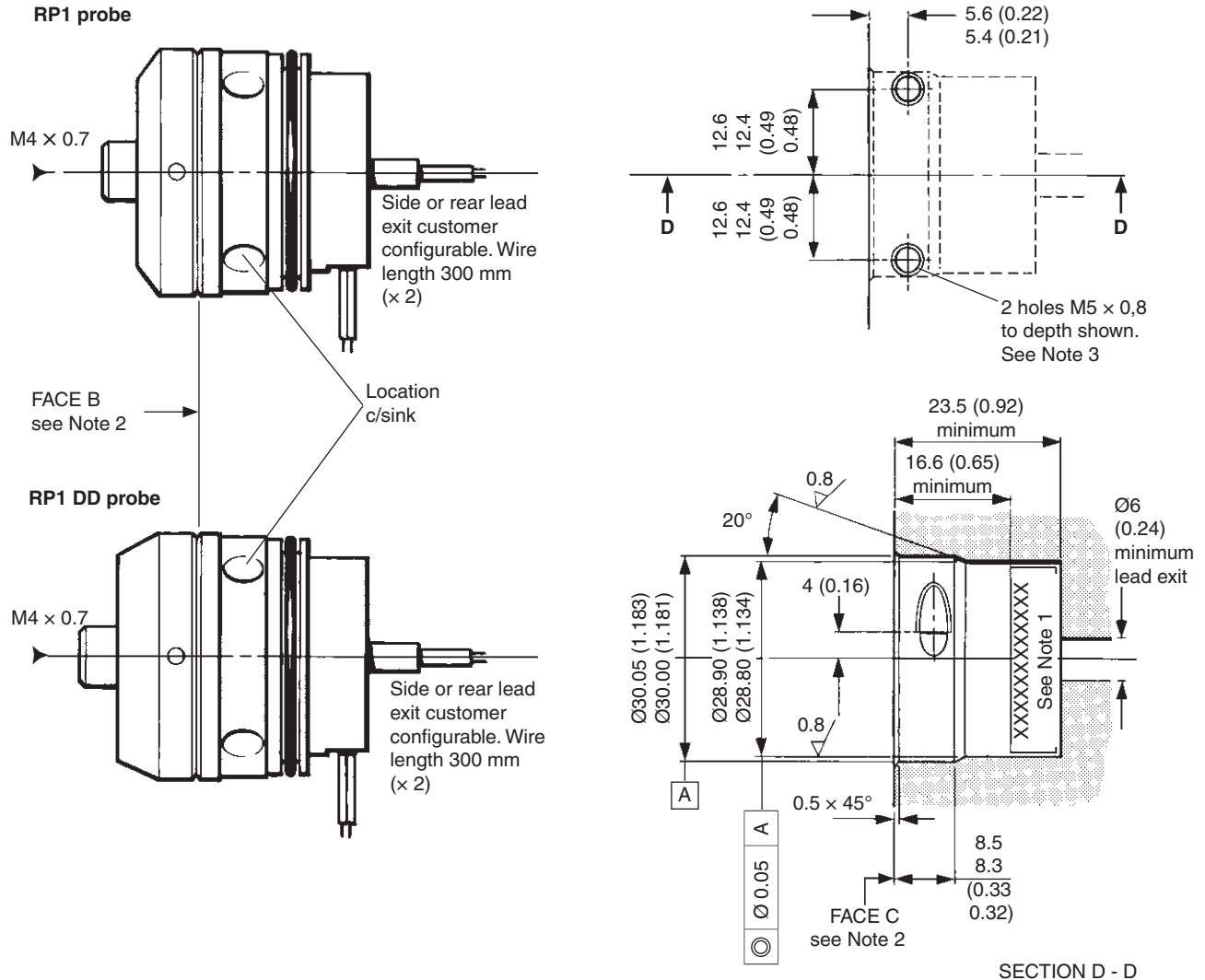


Dimensions in mm (in)

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# System installation

## RP1/RP1 DD installation details



Dimensions in mm (in)

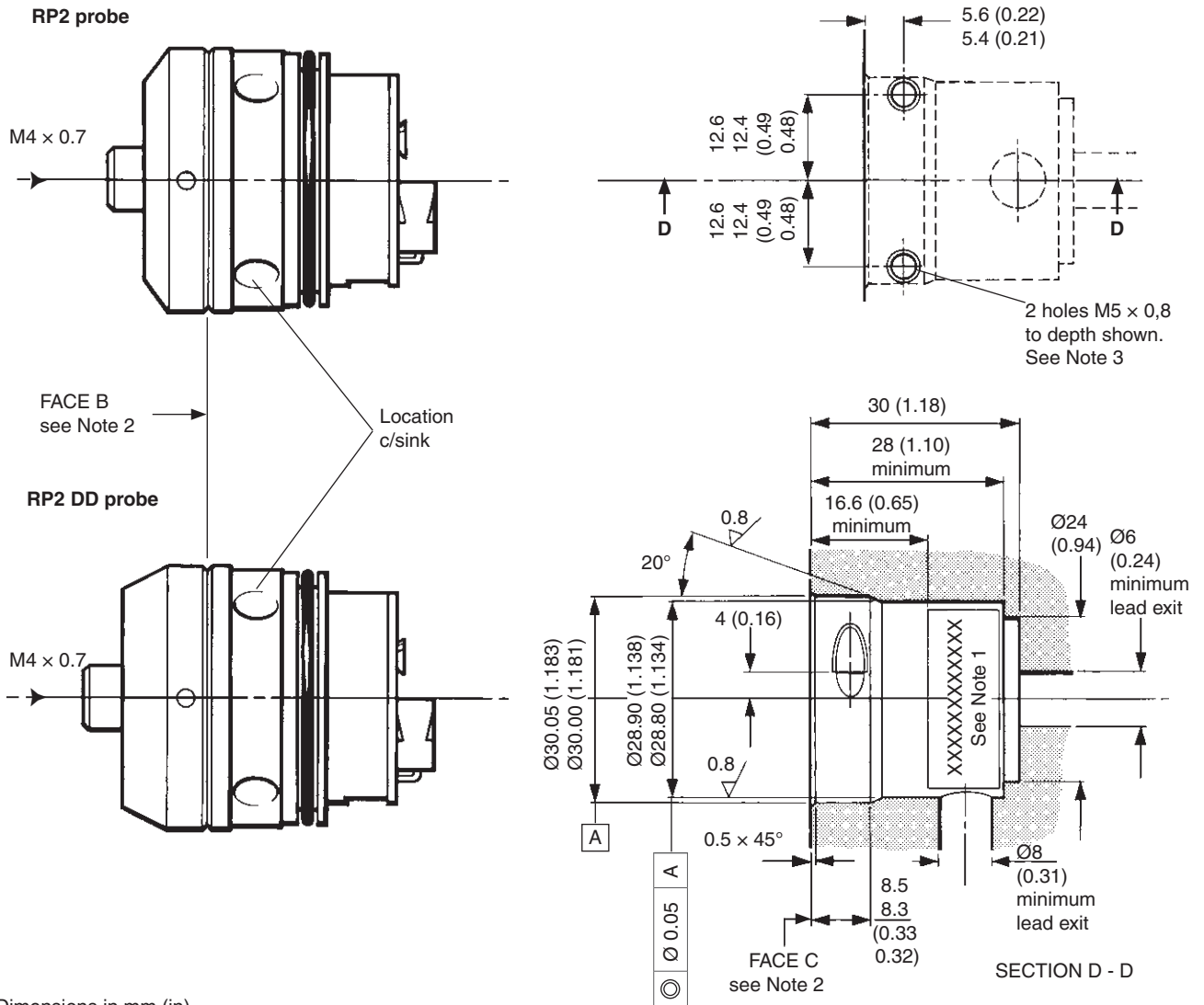
Note 1 Side lead exit may be in any position on diameter marked XXXXXXXXXX.

Note 2 Ensure FACE B of module body is flush within 0.2 mm (0.008 in) of FACE C of housing on installation.

Note 3 To secure the probe during installation, lock the two M5 flat end grub screws (supplied by user) into the location c/sinks in the probe body.

**CAUTION:** It is essential that design of the probe installation prevents coolant from contacting the rear of the probe.

# RP2/RP2 DD installation details



Dimensions in mm (in)

Note 1 Side lead exit may be in any position on diameter marked XXXXXXXXXX.

Note 2 Ensure FACE B of module body is flush within 0.2 mm (0.008 in) of FACE C of housing on installation.

Note 3 To secure the probe during installation, lock the two M5 flat end grub screws (supplied by user) into the location c/sinks in the probe body.

**CAUTION:** It is essential that design of the probe installation prevents coolant from contacting the rear of the probe.



## RP2/RP2DD connection assembly

Connection is made to the RP2 via a 2-way female connector (supplied). This is available as a Renishaw spare part, or sourced directly from Harwin Connectors.

<u>Female connector</u>	<u>Part number</u>
Renishaw	P-CN23-020A
or	
Harwin	M80-8980205

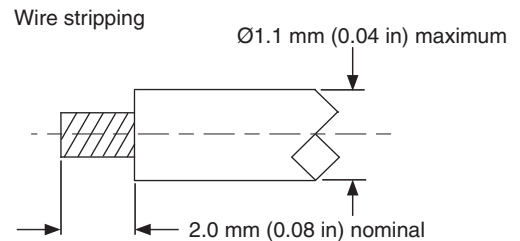
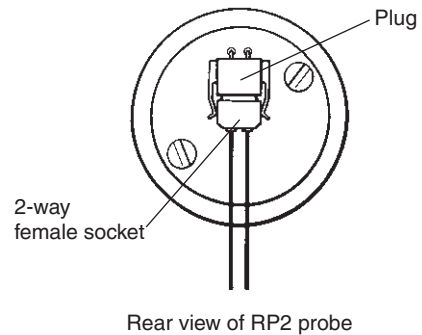
The following tools are required to assemble the wires and crimp sockets into the female connector:

<u>Crimp tool</u>	<u>Part number</u>
Used to crimp wire in crimp socket.	
Renishaw	P-TL04-0005
or	
Harwin	M22520/2-01
Crimp tool setting:	6

<u>Positioner</u>	<u>Part number</u>
Used to locate crimp socket in crimp socket.	
Renishaw	P-TL04-0006
or	
Harwin	T5747

<u>Insertion/removal tool</u>	<u>Part number</u>
Used to insert/remove crimp socket in/from the connector shell.	
Renishaw	P-TL04-0007
or	
Harwin	T5748-19

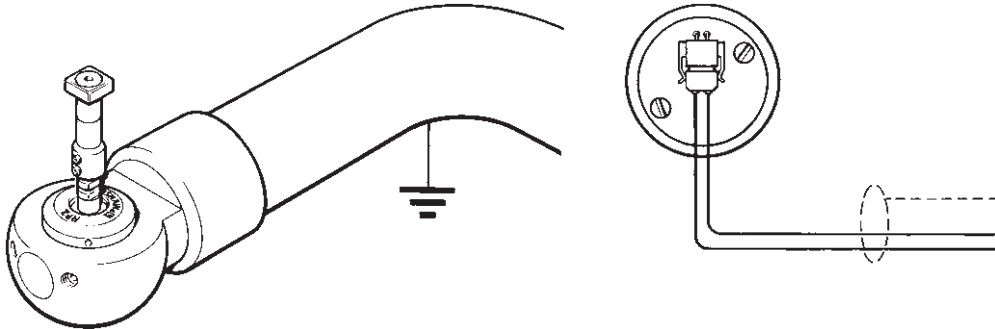
Wire sizes:	26 (AWG) 19 × 0.1
(Supplied by user)	24 (AWG) 7 × 0.2



## RP2/RP2DD electrical grounding

Two methods of EMI protection are possible with the RP1/RP2 probe. The method of protection chosen will depend on the machine wiring with due consideration to ground loops.

1. Grounding via the probe housing (for example by the OEM mounting arrangement), where the probe housings electrically bonded to the machine earth.



Grounding is achieved through the probe mounting screws. The screen should not be terminated at the probe.

2. Grounding via a cable shield supplied by the installer, where the probe housing is not electrically bonded to the machine earth.



Grounding is achieved by terminating the screen at the M2 tapped hole in the rear of the RP1, or by terminating the screen at the M2 countersunk screw of the RP2.

# RP1/RP2 service and maintenance

## Service

The user may undertake the maintenance routines described in this handbook. Further dismantling and repair of Renishaw equipment is a highly specialised operation, which must be carried out only at authorised Renishaw Service Centres.

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

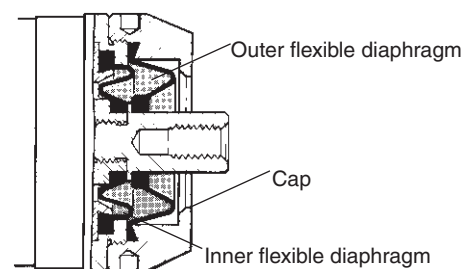
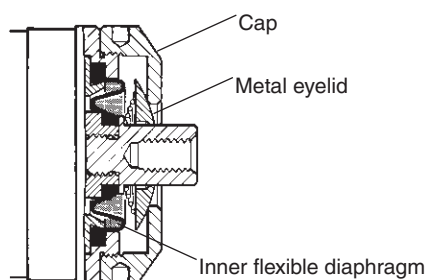
## Maintenance

The probe is a precision tool; handle with care. Ensure the probe is firmly secured to its mounting. The probe requires minimal maintenance as it is designed to operate as a permanent fixture on CNC machining centres, where it is subject to a hot chip and coolant environment.

1. Do not allow excessive waste material to build up around the probe.
2. Keep all electrical connections clean.
3. The RP1/RP2 probe mechanism is protected by an outer metal eyelid and an inner flexible diaphragm.
4. The RP1 DD/RP2 DD probe mechanism is protected by an inner and an outer flexible diaphragm. The outer diaphragm can be cleaned by removal of the probe cap and washed with clean coolant. The inner diaphragm should be inspected if the outer diaphragm is found to be damaged.

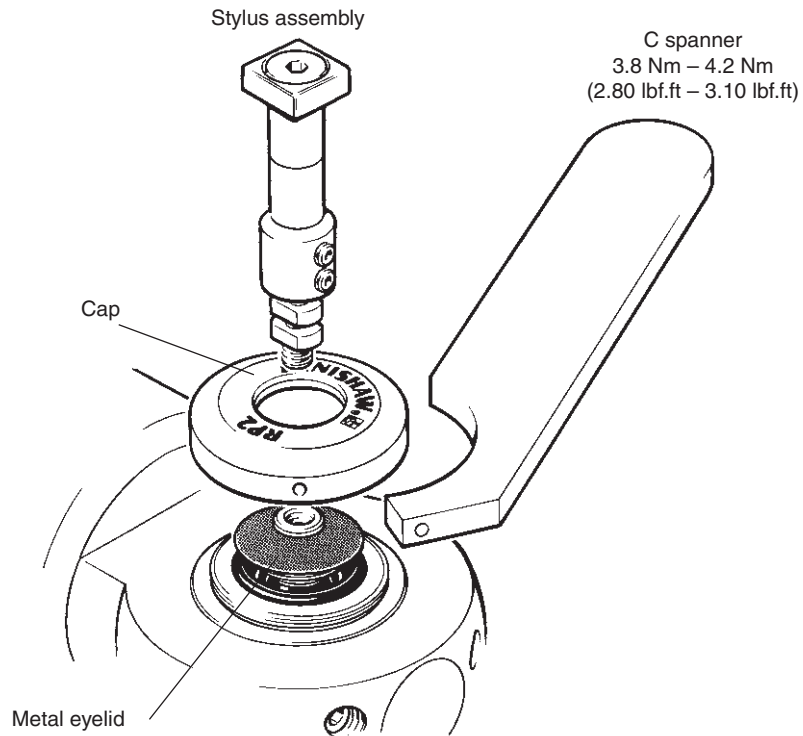
Approximately once a month, inspect the inner diaphragm. If it is pierced or damaged, return the probe to your supplier for repair.

The inspection interval may be extended or reduced dependent on experience.



# Diaphragm maintenance

## Inner flexible diaphragm inspection



1. Remove the stylus.
2. Use a C spanner to remove the probe cap.
3. For RP1/RP2: Remove the metal eyelid and spring. This will expose the inner flexible diaphragm.

For RP1 DD/RP2 DD: Remove the outer flexible diaphragm by lifting away from the probe body to expose the inner flexible diaphragm.

4. Wash the probe using clean coolant.

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**CAUTION:** Do not use sharp metal objects to clean out debris.

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5. Inspect the inner diaphragm for signs of piercing or damage. In the event of damage, return the probe to your supplier for repair.

## Reassembling the probe module

1. For RP1/RP2: Refit the spring and the metal eyelid.  
For RP1 DD/RP2 DD: Refit the outer flexible diaphragm.
2. Refit the probe cap. Tighten using the C spanner.
3. Refit the stylus.

## Parts list


Item	Part number	Description
RP1 probe kit	A-2154-0007	RP1 probe with C spanner and tools (TK1).
RP1 DD probe kit	A-2154-0008	RP1 DD probe with C spanner and tools (TK1).
RP2 probe kit	A-2116-0149	RP2 probe with 2-way female connector, C spanner and tools (TK1).
RP2 DD probe kit	A-2116-0150	RP2 DD probe with 2-way female connector, C spanner and tools (TK1).
Outer diaphragm	M-2063-7606	Replacement diaphragm for RP1 DD/RP2 DD probe.
2-way female connector	P-CN23-020A	Replacement connector for RP2/RP2 DD.
C spanner	A-2116-0153	Replacement spanner for removing probe cap.
Crimp tool	P-TL04-0005	Tooling required to assemble female connector P-CN23-020A.
Positioner	P-TL04-0006	Tooling required to assemble female connector P-CN23-020A.
Insertion/removal tool	P-TL04-0007	Tooling required to assemble female connector P-CN23-020A.
MI 8-4 interface	A-2157-0001	MI 8-4 interface unit with dual lock pads and DIN rail mounting, installation and user's guide and packaging.
<b>Publications.</b> These can be downloaded from our website at <a href="http://www.renishaw.com">www.renishaw.com</a> .		
MI 8-4	H-2000-5008	Installation guide: for set-up of the MI 8-4 interface unit.
Styli	H-1000-3200	Technical specifications: Styli and accessories – or visit our Online store at <a href="http://www.renishaw.com/shop">www.renishaw.com/shop</a> .
Probe software	H-2000-2298	Data sheet: Probe software for machine tools – programs and features.



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