

# PH10 motorised head series



## EXTENDED WARRANTY

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Renishaw part no: H-1000-5070-13-A

Issued: 04 2010

**PH10**  
**motorised probe head series**  
**user's guide**



## **FCC (U.S.A.)**

### **Information to user (FCC section 15.105)**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

### **Information to user (FCC section 15.21)**

The user is cautioned that any changes or modifications not expressly approved by Renishaw plc or its authorised representative could void the user's authority to operate the equipment.

### **Special accessories (FCC section 15.27)**

The user is also cautioned that any peripheral device installed with this equipment such as a computer, must be connected with a high-quality shielded cable to insure compliance with FCC limits.

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## EC DECLARATION OF CONFORMITY

Renishaw plc declares that the products: -

Name: PH10T, PH10M, PH10MQ

Description: Motorised probe heads

Part numbers: A-1025-0050  
A-1025-1520  
A-1036-0001

Serial numbers: As shown by the declaration sent with the product

have been manufactured in conformity with the following standards: -

BS EN 61326-1:2006/ Electrical equipment for measurement, control and laboratory use - EMC requirements.

BS EN ISO 12100-1:2003 Safety of machinery - Basic concepts, general  
BS EN ISO 12100-2:2003 principles for design.

Reports demonstrating compliance have been compiled and are available on request, in paper format, to market surveillance authorities.

Person authorised to compile the Renishaw technical file and issue the declaration of conformity is:

Mark Acres  
Compliance Manager  
Renishaw plc, New Mills, Wotton-under-Edge  
Gloucestershire, GL12 8JR, United Kingdom

This product must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive - 2006/42/EC.

## EN - Warnings

Pinch hazards exist between moving parts and between moving and static parts. Do not hold the probe head during movements, or when manually changing a probe.

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

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

There are normally no user-serviceable parts inside Renishaw mains-powered units. Return defective units to an authorised Renishaw Customer Service Centre.

Replace blown fuses with new components of the same type. Refer to the safety information in the relevant product documentation.

For instructions regarding the safe cleaning of Renishaw products, refer to the maintenance information in the relevant product documentation.

Remove power before performing any maintenance operations.

Refer to the machine supplier's operating instructions.

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

Under certain circumstances the probe signal may falsely indicate a probe-seated condition. Do not rely on probe signals to stop machine movement.

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

The expected method of providing an emergency stop for Renishaw products is to remove power.

## International safety instructions

- BG** **Предупреждения:** Моля, обърнете на приложение 1 и прочетете инструкциите за безопасност на вашия собствен език, преди за разопаковате и монтирате този продукт.
- CS** **UPOZORNĚNÍ:** Před rozbalením a instalací tohoto výrobku čtete bezpečnostní pokyny uvedené v Příloze 1.
- DA** **ADVARSLER:** Læs sikkerhedsinstrukserne i Appendix 1 FØR udpakning og installation af dette produkt!
- DE** **SICHERHEITSANWEISUNGEN:** Lesen Sie die Sicherheitsanweisungen in Ihrer Sprache im Anhang 1 vor dem Auspacken und Installieren des Produktes.
- EL** **ΠΡΟΕΙΔΟΠΟΙΉΣΕΙΣ:** Πρέπει τώρα να γυρίσετε στο Κεφάλαιο 1 και να διαβάσετε τις οδηγίες ασφαλείας στη δική σας γλώσσα προτού ανοίξετε αυτό το προϊόν για να το εγκαταστήσετε.
- ES** **AVISOS:** Debe volver al Apéndice 1 y leer las instrucciones de seguridad en su propio idioma antes de abrir e instalar este producto.
- ET** **HOIATUSED:** Nüüd peate vaatama 1. lisa ja enne selle toote lahtipakkimist ja paigaldamist lugema läbi ohutusjuhendi oma keeles.
- FI** **VAROITUS:** Ennen tämän tuotteen pakkauksen avaamista ja asentamista lue liitteessä 1 olevat omalla kielelläsi kirjoitetut turvaohjeet.
- FR** **SECURITE:** Vous devez à présent consulter l'annexe 1 et les instructions de sécurité dans votre propre langue avant de déballer et d'installer ce produit.
- GA** **RABHAIDH:** Téigh chuig aguisín 1 agus déan na treoracha sábháilteachta a léamh i do theanga féin le do thoil sula ndéantar an táirge seo a dhíphacáil agus a shuiteáil.
- HU** **FIGYELMEZTETÉSEK:** Lapozzon a 1. függelékhez és olvassa el a biztonsági előírásokat az Ön saját nyelvén mielőtt kicsomagolná és beüzemelné a terméket.
- IT** **SICUREZZA:** Prima di aprire ed installare questo prodotto dovete leggere le istruzioni di sicurezza nella Vostra Lingua riportate nell'Appendice 1.
- LT** **ĮSPĖJIMAI:** Prieš išpakuojant ir įdiegiant produktą jums reikia grįžti prie 1 priedo ir perskaityti nurodymus dėl saugos savo kalba.
- LV** **BRĪDINĀJUMS:** Pirms šī izstrādājuma izsaiņošanas un uzstādīšanas jums jāiepazīstas ar 1. pielikuma drošības instrukcijām savā valodā.
- MT** **TWISSIJJET:** Issa għandek tmur f'appendiċi 1 sabiex taqra l-istruzzjonijiet tas-sigurtà fil-lingwa tiegħek qabel ma tispakkja u tinstalla dan il-prodott.

- NL WAARSCHUWINGEN:** Ga nu naar Appendix 1 en lees de veiligheidsinstructies, in uw eigen taal, voordat u dit product uitpakt en installeert.
- PL OSTRZEŻENIA:** Przed rozpakowaniem i instalacją produktu należy przeczytać załącznik nr 1 i zapoznać się z zasadami bezpieczeństwa w języku użytkownika.
- PT ATENÇÃO:** Você deve retornar ao Apêndice 1 e ler as instruções de segurança em seu idioma antes de desembalar e instalar este produto.
- RO ATENȚIONĂRI:** Înainte de a desface ambalajul și a instala acest produs, vă rugăm să căutați Anexa 1 și să citiți cu atenție instrucțiunile de protecția muncii, în limba română.
- SK VÝSTRAHY:** Pred rozbalením a inštaláciou tohto produktu si musíte pozrieť prílohu 1 a prečítať bezpečnostné pokyny vo vašom jazyku.
- SL OPOZORILA:** Sedaj morate v prilogi 1 prebrati varnostne napotke v svojem jeziku, preden odpakirate in namestite produkt.
- SV VARNINGAR:** Du måste nu gå till bilaga 1 och läsa säkerhetsinstruktionerna på ditt eget språk innan du packar upp och installerar denna produkt.



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## Electrical requirements

The PHC10-2 is powered from the a.c. mains supply via an IEC 320 connector. The operating voltages of the unit are as follows:

100 - 240 V ac +10%, -15%      47 - 66 Hz      30 W maximum

## Fuse replacement

There are two 2 Amp (T) slow-blow fuses which are used for all voltages (one is a spare). Fuses are replaced as follows:

1. Disconnect the mains power.
2. Use a screwdriver to lever out the fuseholder to reveal the fuse.
3. Remove the fuse and replace it with a 2 Amp (T) HBC 20 mm x 5 mm fuse, rating as IEC 127.
4. Replace the fuseholder.
5. Reconnect the mains power.



**WARNING:** Make sure that only fuses of the specified type are used for replacement.

---

This equipment must be connected to a protective earth conductor via a three core mains (line) cable. The mains plug shall be inserted only into a socket outlet provided with a protective earth contact. The protective earth contact shall not be negated by the use of an extension cable without protective conductor.



**WARNING:** Any interruption of the protective conductor may make the equipment dangerous. Make sure that the grounding requirements are strictly observed.

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## Environmental requirements

The following environmental conditions comply with those defined in BS EN61010 - 1:2001:

<b>Indoor use</b>	IP30 (no protection against water)	
<b>Altitude</b>	Up to 2000 m	
<b>Operating temperature</b>	<b>PH10:</b>	+10 °C to +40 °C
	<b>PHC10-2:</b>	0 °C to +50 °C
<b>Storage temperature</b>	-10 °C to +70 °C	
<b>Relative humidity</b>	<b>PH10:</b>	80 % maximum for temperatures up to +31 °C. Linear decrease to 50 % at +40 °C
	<b>PHC10-2:</b>	80 % maximum for temperatures up to +31 °C. Linear decrease to 50 % at +50 °C
<b>Transient voltages</b>	Installation category II	
<b>Pollution degree</b>	2	

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# 1 Introduction

This user's guide will enable you to maximise the performance of your PH10 system and ensure, safe reliable operation.

Please fill in the user registration form at the end of this guide and return it to Renishaw plc to obtain further information on the PH10 system and accessories. This will enable Renishaw to keep you informed of the latest product information, special offers, upgrade news and new product developments.

You may find it useful to note below information about your system.

<b>CMM make</b>	
<b>CMM model</b>	
<b>Head serial number</b>	
<b>PHC10-2 serial number</b>	
<b>PHC10-2 version number</b>	

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**NOTE:** There may be variations in the installation and use of the PH10 range of motorised probe heads on different CMMs. This user's guide must be read in conjunction with the documentation provided by your CMM supplier.

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## 2 System description

### 2.1 Introduction

This user's guide describes an automated inspection system using the Renishaw PH10 series of motorised probe heads; the PH10T, PH10M and PH10MQ.

Information is given on the elements of the system and accessories.

A typical installation is shown, followed by a description of manual mode and automatic mode operation.

A list of possible operating errors is also given together with maintenance information.

The installation of the PH10 system is described in the PH10 series installation guide (Renishaw part number H-1000-5071) which is intended primarily for use by the CMM supplier for installation and commissioning purposes.



**WARNING:** The components of the PH10 system are not compatible with PH9 system components. No attempt should be made to connect PH10 system components to a PH9 system, as this will result in damage to the product.

---

### 2.2 PH10 motorised probe head range

Each of the heads in the PH10 range is a general-purpose, versatile unit designed specifically for use on direct computer controlled (DCC) CMMs.

The range consists of three heads:

- **PH10T** a shank-mounted head with two-wired probe capability and an M8 thread
- **PH10M** a shank-mounted head with multiwired probe capability and a Renishaw autojoint
- **PH10MQ** a quill-mounted head with multiwired probe capability and a Renishaw autojoint

## 2.3 Features

All the heads in the range incorporate the following features:

- 720 indexing positions
  - 0.4  $\mu\text{m}$  indexing repeatability \*
  - 7.5° indexing steps in both axes
  - 300 mm (maximum) extension bar capability\*
- \* See section 2.7 for specifications and test conditions.

## 2.4 PH10T

Figure 1 shows the PH10T motorised probe head fitted with a TP200 probe.

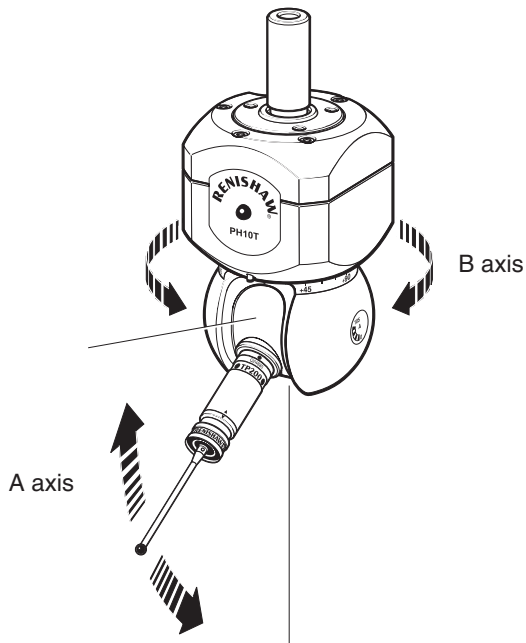


Figure 1 - PH10T

## 2.5 PH10M

Figure 2 shows the PH10M motorised probe head fitted with an AM1 adjustment module and an SP25M probe.

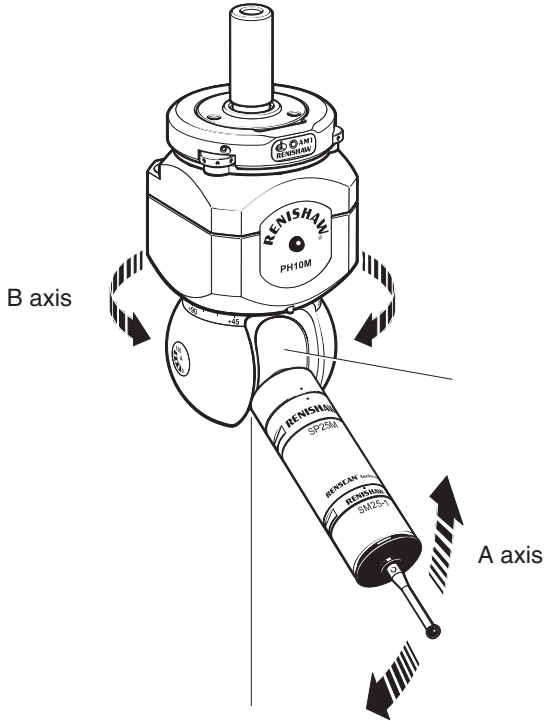


Figure 2 - PH10M



## 2.6 PH10MQ

Figure 3 shows the PH10MQ motorised probe head fitted with an AM2 adjustment module and a TP7M probe.

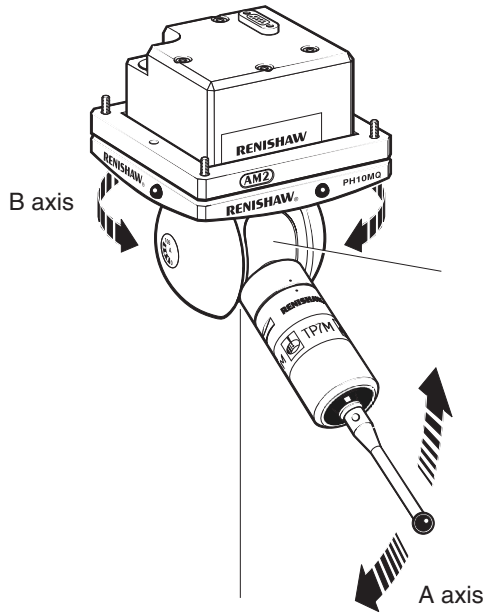
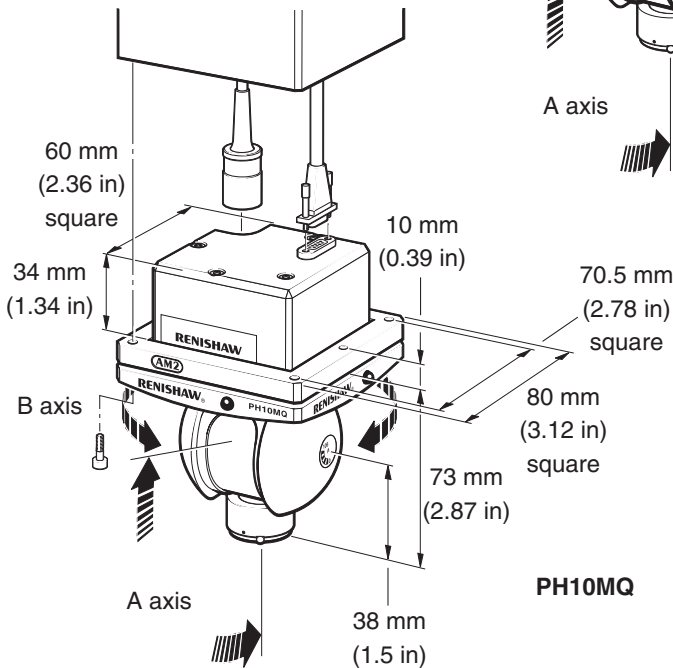
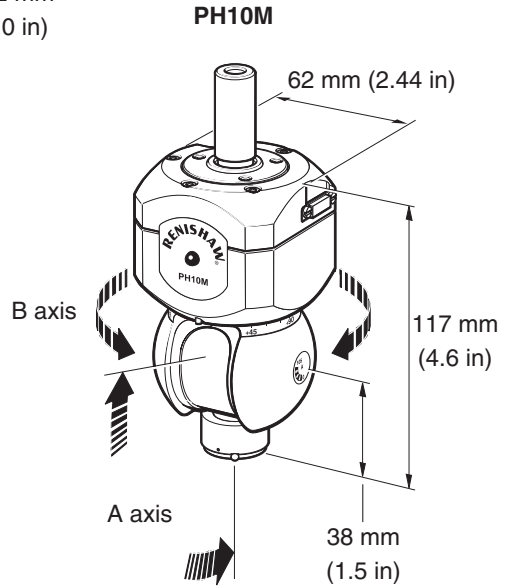
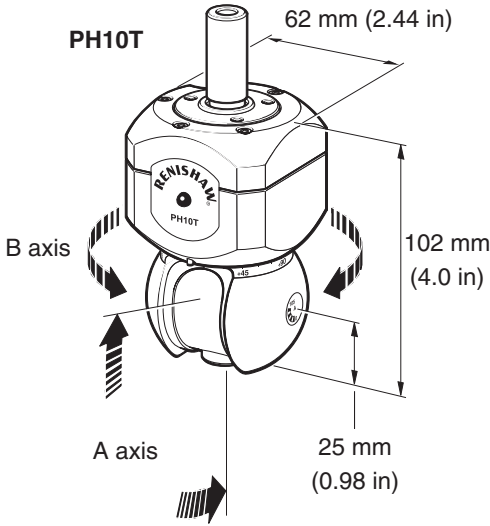


Figure 3 - PH10MQ

## 2.7 Probe head specification

Table 1 - Probe head specification

<b>Repeatability of position (<math>2\sigma</math>)</b>		PH10T	<0.4 $\mu\text{m}$ (0.00002 in) - equivalent to a TP20 and stylus (part number A-5000-3604)
		PH10M PH10MQ	<0.4 $\mu\text{m}$ (0.00002 in) - equivalent to a TP6A and stylus (part number A-5000-3553)
<b>Accuracy of step spacing from theoretical position</b>		PH10T	$\pm 0.24$ mm ( $\pm 0.012$ in) (using TP6 probe and stylus part number A-5000-3553)
		PH10M PH10MQ	$\pm 0.3$ mm ( $\pm 0.012$ in) (using TP6A probe and stylus part number A-5000-3553)
<b>Positioning</b>	Step		7.5°
	A axis 0° to 105°		15 positions
	B axis -180° to +180°		48 positions
	Total		720 positions
<b>Probe mounting</b>		PH10T	M8 thread, 18 mm (0.709 in) diameter bush face
		PH10M PH10MQ	Multiwired autojoint
<b>Dimensions from quill face</b>	XY		62 mm (2.44 in) square
	Z	PH10T	102 mm (4.09 in)
		PH10M	117 mm (4.6 in)
		PH10MQ	73 mm (4.6 in)
<b>Weight</b>		PH10T	595 g (20.9 oz)
		PH10M	620 g (21.8 oz)
		PH10MQ	730 g (25.7 oz)
<b>System operating temperature</b>			10 °C to 40 °C (50 °F to 104 °F)
<b>System storage temperature</b>			-10 °C to 70 °C (14 °F to 158 °F)



## 2.8 PHC10-2 probe head controller

The PH10 series of motorised probe heads can be used in conjunction with either the PHC10-2 controller or the UCC (universal CMM controller). The PHC10-2 incorporates an integral power supply for the head, manages all head functions and communicates via a suitable interface with the CMM computer. A separate probe interface is required for probe signal conditioning when using the PHC10-2. If using the UCC, the PHC1050 daughtercard takes its power from the host unit.

The PHC10-2 is available in two versions:

- PHC10-2 RS232
- PHC10-2 IEEE

Figure 4 shows the front panel.

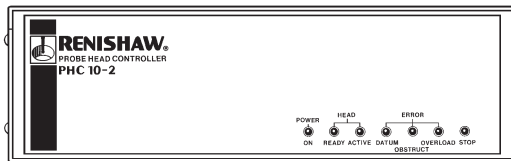


Figure 4 - PHC10-2 front panel

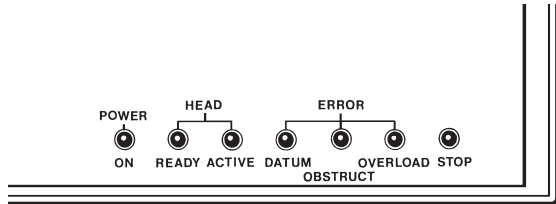
### 2.8.1 PHC10-2 specification

Table 2 - PHC10-2 probe head controller specification

<b>Data transmission</b>	RS232 serial or IEEE488 parallel
<b>Power supply</b>	Universal, autoselecting
<b>Voltage range</b>	85 - 364 V, 47 - 66 Hz
<b>Power connector</b>	IEC320
<b>Fuse</b>	2 A (T) HBC 20 mm x 5 mm
<b>Dimensions</b>	2/3 19 in rack, 2U high 290 mm x 80 mm x 220 mm (11.42 in x 3.46 in x 2.66 in)
<b>Mounting</b>	19 in rack mounting or stand-alone

## 2.8.2 PHC10-2 front panel

Figure 5 shows the LEDs on the front panel of the PHC10-2. The names, colours and functions of the LEDs are given in table 3.



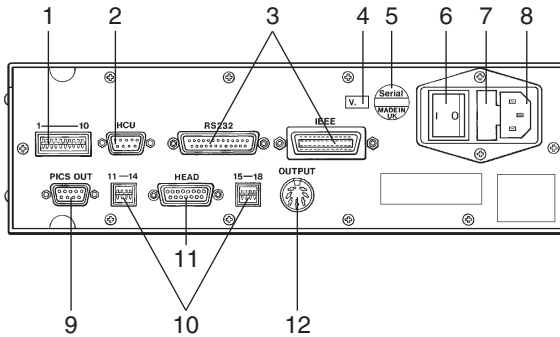
**Figure 5 - LEDs**

**Table 3 - LEDs**

LED name	Colour	Description
POWER ON	Green	Power on when lit
HEAD READY	Green	Head correctly locked up and waiting for a command
HEAD ACTIVE	Yellow	Head moving
DATUM ERROR	Red	Head not locked
OBSTRUCT ERROR	Red	Head obstructed
OVERLOAD ERROR	Red	Head overload
STOP	Red	PHC10-2 signal to CMM computer

### 2.8.3 PHC10-2 rear panel

Figure 6 shows the rear panel of the PHC10-2.



**Figure 6 - Rear panel**

#### Key

- 1 Switches 1-10, communications protocol selection
- 2 HCU1 connector
- 3 *Either* RS232 communications connector *or* IEEE488 communications connector
- 4 Version number
- 5 Serial number
- 6 Main power ON/OFF switch
- 7 Fuse holder
- 8 Mains power input
- 9 PICS output connector
- 10 Switches 11-14 and 15-18, probing system format selection
- 11 Probe head connector
- 12 Probe output connector

**The UCC daughtercard (PHC1050) has its own installation guide (H-1000-5226) which exists on the UCC CD (A-1333-0080).**

## 2.9 HCU1 hand control unit

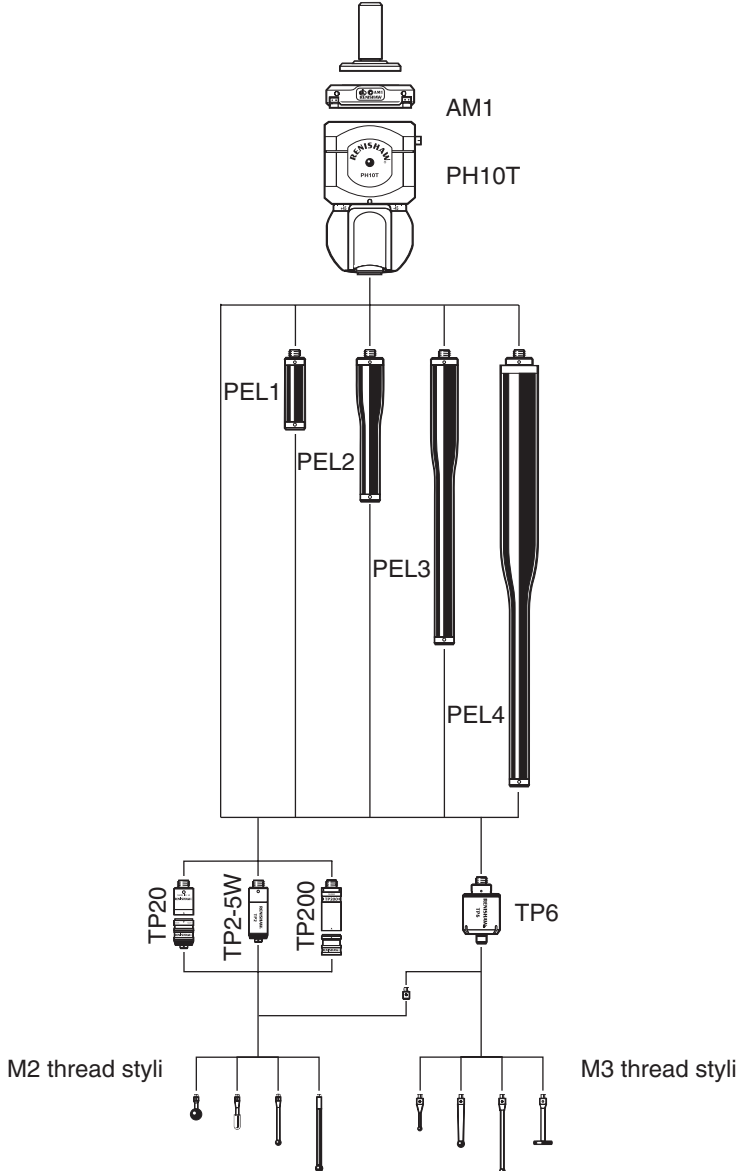
The HCU1 hand control unit shown in figure 7 is an optional control which enables the system to be used in manual mode or in a teach cycle. A LCD dot matrix display provides information on system status.



Figure 7 - HCU1

## 2.10 PH10 probe carrying capability

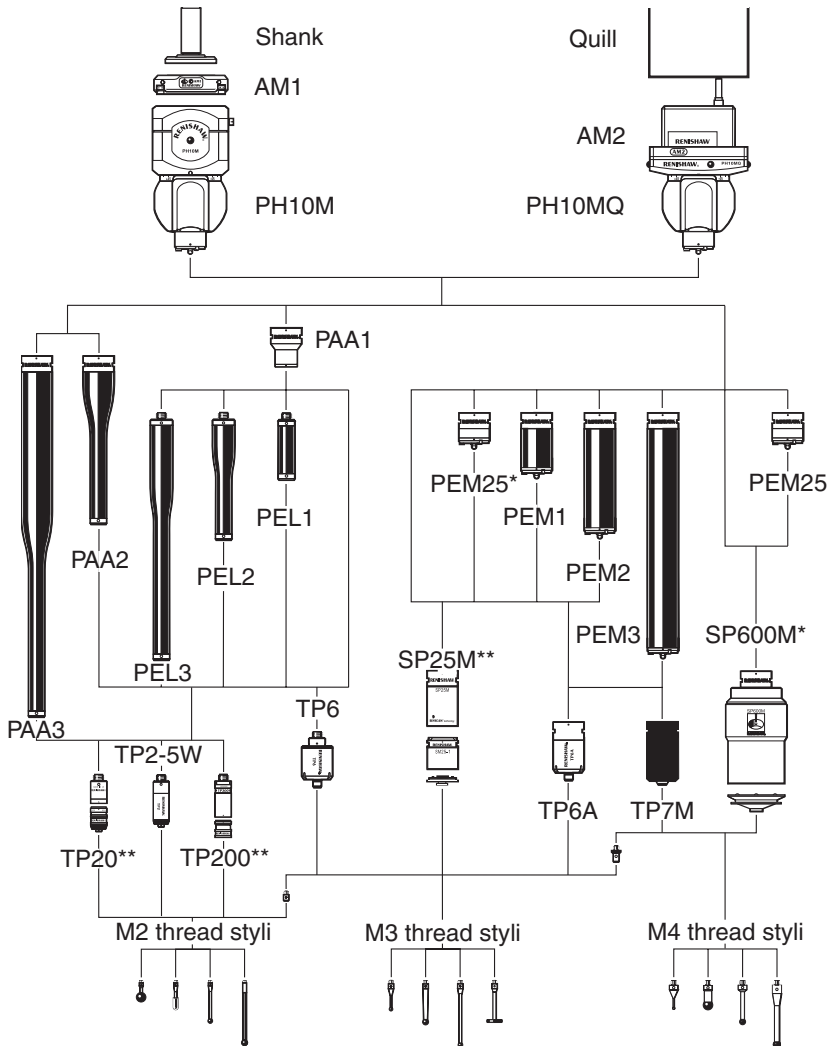
Figure 8 shows the range of extensions, probes and styli which can be used in conjunction with the PH10T head.



**Figure 8** - Extensions, probes and styli



Figure 9 shows the range of extensions, probes and styli which can be used in conjunction with the PH10M and PH10MQ heads.



**Figure 9 - Extensions, probes and styli**

\* When using a PH10MQ with SP600M a PEM25 extension bar is required to achieve  $A = 97.5^\circ$  or  $A = 105^\circ$  in all B-axis positions.

\*\* TP20, TP200 and SP25M are only shown with one module. Other modules are also available. For further details refer to the necessary user's guides, H-1000-5008, H-1000-5014 and H-1000-5104 respectively.

## 2.11 Connection of probes and extensions

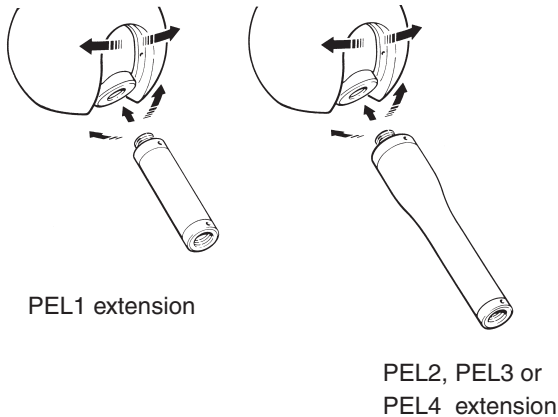
### 2.11.1 M8 connection

The PH10T is designed to carry Renishaw probes and extensions with an M8 screw thread (see figure 10).

Probes and extensions are screwed into the probe head's bush and tightened with the appropriate spanner.



**CAUTION:** Never use anything other than the Renishaw spanner provided and do not apply excessive force.

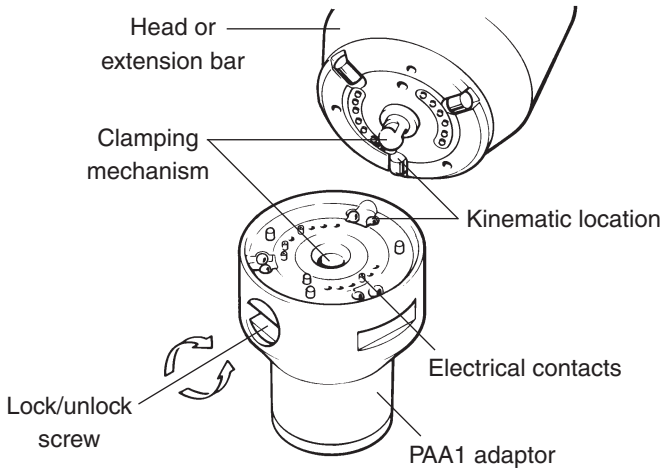


**Figure 10 - M8 connection**

### 2.11.2 Autojoint connection

PH10M and PH10MQ heads use a Renishaw autojoint (figure 11) which is a highly repeatable kinematic joint, one half of which forms part of the head. The other half forms part of the adaptor, extension bar or probe.

Locking and unlocking the autojoint is carried out either manually, using the autojoint key, or automatically using the Renishaw autochange rack system. In both cases, the connection's repeatability eliminates the need for probe requalification after exchange.



**Figure 11 - Autojoint connection**

## 2.12 Probes

### 2.12.1 M8 touch-trigger probes

This range of probes (see table 4) utilises the M8 bush as a mounting for the head. These can be fitted directly onto the PH10T head, but when used with the PH10M or PH10MQ heads, one of the autojoint to M8 bush extension bars or the PAA1 adaptor must be used (see figure 8 and 9).

**Table 4 - M8 touch trigger probes**

Probe	Diameter	Application	User's guide
TP2-5W	13 mm	Universal probe for DCC and manual CMMs	H-1000-5021
TP6*	25 mm	Universal probe for DCC and manual CMMs	H-1000-5021
TP20	13.2 mm	Universal probe for DCC and manual CMMs with module changing	H-1000-5008
TP200	13.2 mm	Universal probe with strain gauges for DCC CMMs. Up to 100 mm stylus carrying capability	H-1000-5014

\* An autojoint version (TP6A) is also available.

### 2.12.2 Multiwired probes

This range of probes (see table 5) is compatible with the PH10M and PH10MQ heads only and utilise the Renishaw multiwired autojoint connection to the head.

**Table 5 - Multiwire probe**

Probe	Application	Diameter	Weight	User's guide
SP25M	High speed scanning probe	25 mm	Body 65 g	H-1000-5104
			SM25-1 35 g	
			SM25-2 40 g	
			SM25-3 49 g	
			TM25-20 40 g	
			All without stylus	
TP7M	Universal probe with strain gauges for DCC CMMs.	25 mm	85 g (without stylus)	H-1000-5010
SP600M*	Analogue contact scanning probe	50 mm	216 g (without stylus)	H-1000-5175
OTP6M	Laser non-contact optical trigger probe	49 mm	253 g (fitted with PEM1)	H-1000-5007

Probes in this range require comprehensive integration with your CMM.

- \* When using a PH10MQ with SP600M, a PEM25 extension bar is required to achieve  $A = 97.5^\circ$  or  $A = 105^\circ$  in all B-axis positions.  
See figure 9.

### 2.13 Probe extension bars

Renishaw manufactures a comprehensive range of extension bars and adaptors to allow increased component penetration (see figures 8 and 9 for allowable combinations).

There are three types in the range:

- Autojoint to M8 bush (PAA series)
- Autojoint to autojoint (PEM series)
- M8 thread to M8 bush (PEL series)

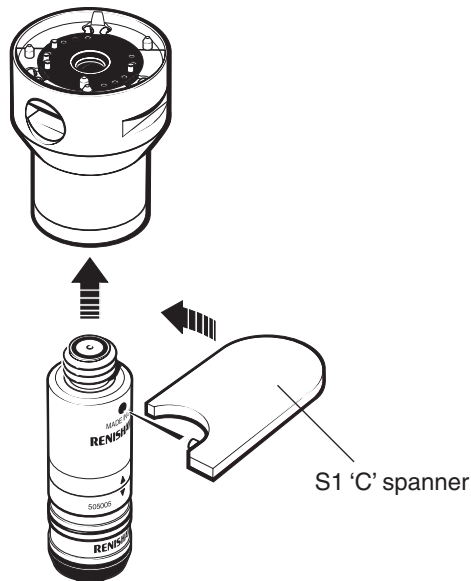
### 2.13.1 Autojoint to M8 bush

These extension bars connect directly to the autojoint of the PH10M or PH10MQ head and terminate in an M8 bush (see table 6). This permits the use of two-wire touch-trigger probes.

**Table 6 - Autojoint to M8 bush extensions**

Extensions	Length	Material	Weight
PAA1	32 mm (1.26 in)	Steel	57 g
PAA2	144 mm (5.67 in)	Aluminium	85 g
PAA3	300 mm (11.81 in)	Aluminium	144 g

The probe is fitted to the extension by hand and tightened by use of the S1 'C' spanner as shown in figure 12.



**Figure 12 - Fitting a TP20 to a PAA1 adaptor**

The S1 spanner is designed to fail before damage can occur to the mechanical joint between the two parts.

Using the S1 spanner, fully hand-tighten the probe body into the M8 bush (0.3 Nm to 0.5 Nm).

### 2.13.2 Autojoint to autojoint

These extension bars are compatible with the PH10M and PH10MQ heads. They allow direct connection to the head via the autojoint and terminate in an autojoint (see table 7). This permits use of a multiwired probe.

**Table 7 - Autojoint to autojoint extensions**

Extensions	Length	Material	Weight
PEM25	25 mm (0.98 in)	Aluminium	60 g
PEM1	50 mm (1.97 in)	Aluminium	64 g
PEM2	100 mm (3.94 in)	Aluminium	93 g
PEM3	200 mm (7.87 in)	Aluminium	147 g

### 2.13.3 M8 thread to M8 bush

These extension bars can be used directly with the PH10T head, and also with the PH10M and PH10MQ heads using the PAA1 adaptor.

**Table 8 - M8 thread to M8 bush extension bars**

Extensions	Length	Material	Weight
PEL1	50 mm (1.97 in)	Aluminium	24 g
PEL2	100 mm (3.94 in)	Aluminium	57 g
PEL3	200 mm (7.87 in)	Aluminium	86 g
PEL4	300 mm (11.81 in)	Aluminium	135 g

---

## 2.14 Styli

Renishaw manufactures an extensive range of precision styli and stylus accessories. They are available in M2, M3, M4 and M5 thread sizes with steel, tungsten carbide, graphite fibre and ceramic stems. Each is fitted with a precision industrial synthetic ball (ruby, zirconia or silicon nitride) available in diameters from 0.3 mm (0.012 in) to 10 mm (0.4 in).

Special application styli including discs, cylinders, pointers, stars and large ceramic balls up to 30 mm (1.18 in) are available in M2 and M3 thread sizes.

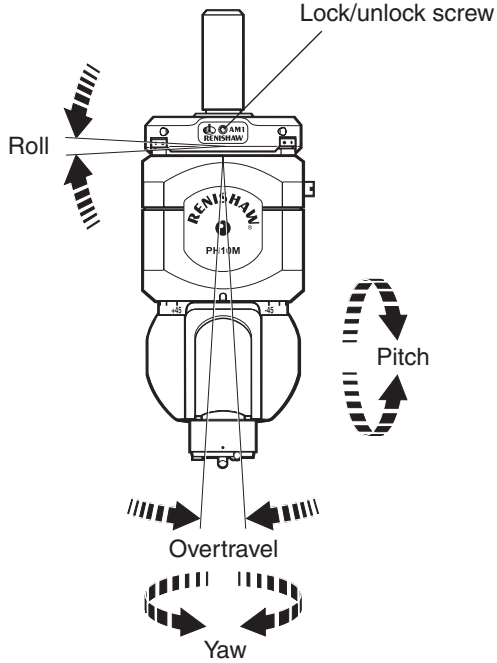
For further information on the Renishaw stylus range, please refer to the Renishaw stylus and accessories guide (Renishaw part number H-1000-3200).

Renishaw also offers a custom design service if your requirements are not met by the standard range. Please contact your Renishaw supplier for details.

## 3 Accessories

### 3.1 Adjustment modules

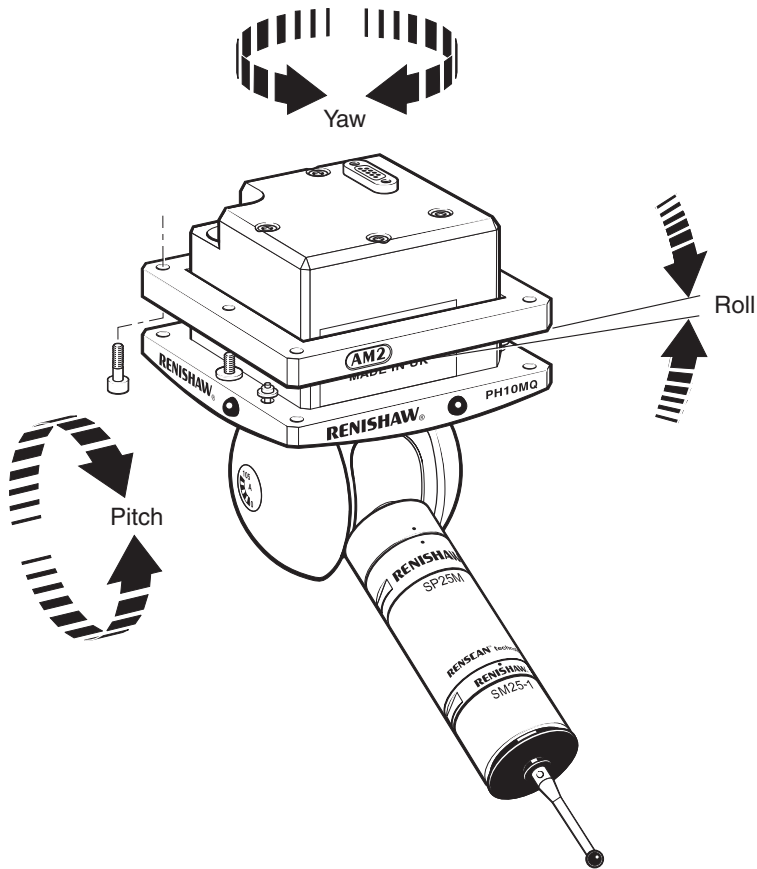
The AM1 adjustment module shown in figure 13 is designed for use on the PH10T and PH10M.



**Figure 13 - AM1 adjustment module**



The AM2 adjustment module shown in figure 14 is designed for use with the PH10MQ.



**Figure 14 - AM2 adjustment module**

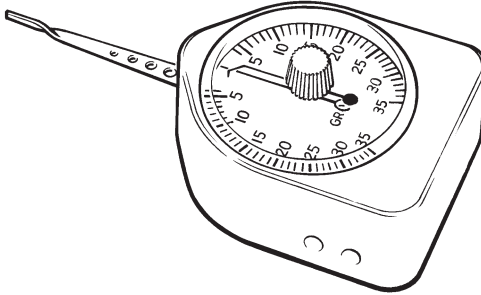
Both modules enable adjustment in pitch, roll and yaw and allow accurate alignment with machine quill or workpiece.

The AM1 offers a quick release mechanism for rapid head exchange, and features inbuilt overtravel protection.

For further information on the AM1, please refer to the AM1 user's guide (Renishaw part number H-1000-4010). For further information on the AM2, please refer to the AM2 product information sheet (Renishaw part number H-1000-2051).

## 3.2 Trigger force gauge (gram gauge)

Probe trigger force is critical to ensure accuracy and reliable operation, this can be easily measured and set using the gram gauge as shown in figure 15.



**Figure 15** - Trigger force gauge

It is strongly recommended that the gram gauge is used when adjustments are to be made to probe trigger force.

For further information on the trigger force gauge, please refer to the trigger force gauge guide (Renishaw part number H-1000-4054).

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**NOTE:** To convert mass in grams to trigger force in Newtons the following equation is used:

$$\text{Trigger force in Newtons} = \frac{\text{Mass in grams}}{100}$$

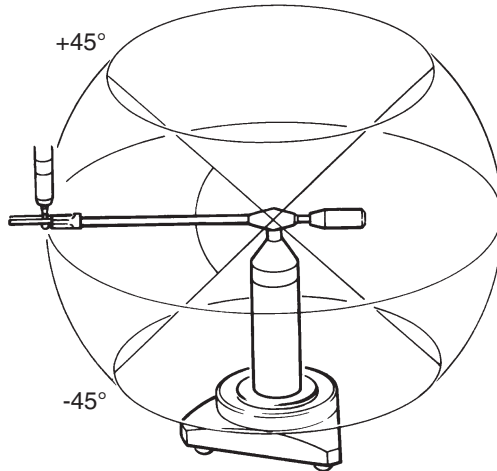
For example:

$$8 \text{ grams} = \frac{0.08 \text{ N}}{100}$$

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### 3.3 Machine checking gauge

The Renishaw machine checking gauge shown in figure 16 enables rapid and effective interim checking of CMM performance as recommended by many standards for CMM volumetric performance assessment.

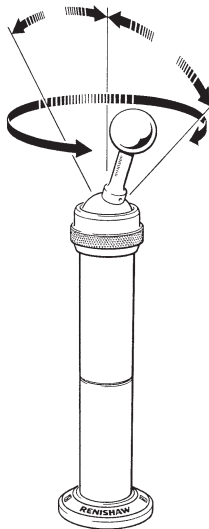


**Figure 16** - Machine checking gauge

Please contact your Renishaw representative to arrange a demonstration, or refer to the machine checking gauge user's guide (Renishaw part number H-1000-5080).

### 3.4 Universal datum sphere

The Renishaw universal datum sphere shown in figure 17 features quick and easy alignment of its ball stem over a wide range of angles, allowing clearance for probe qualification above, centrally and below the ball.

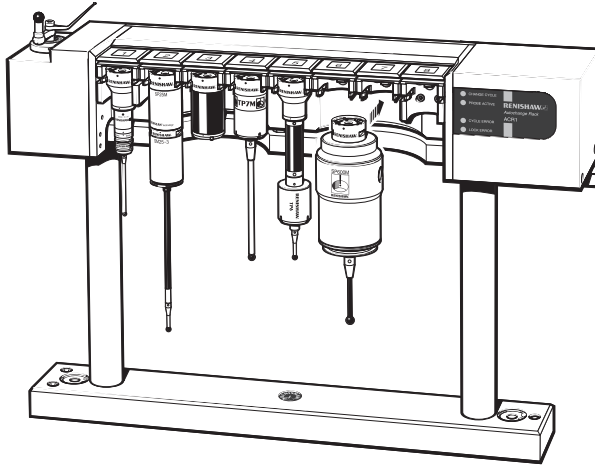


**Figure 17 - Universal datum sphere**

Each hard-wearing tungsten carbide sphere is supplied with a test certificate traceable to UK (National Physical Laboratory) standards. For further information on the sphere please refer to the universal datum sphere data sheet (Renishaw part number H-1000-2250).

### 3.5 Autochange rack

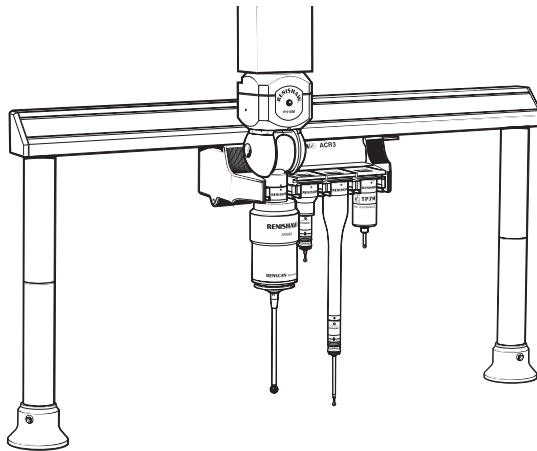
Renishaw's autochange racks shown in figures 18 and 19 are probe exchange systems available for use with the PH10M and PH10MQ probe heads. Mounted within the CMM's working envelope, the autochange system facilitates fast, automatic probe exchange without the need for requalification.



**Figure 18 - ACR1 autochange rack**

Fast 'probing to probing' cycles are achieved by the head docking one probe and selecting another. Once calibrated the highly repeatable autojoint removes the need to requalify after each exchange.

ACR1 is a fully integrated autochange system with eight ports. The ACR1 can be mounted vertically and has the ability to change probes from the end of extension bars.



**Figure 19 - ACR3 autochange rack**

ACR3 is a passive modular autochange rack with four ports and is driven by the motion of the CMM. Two ACR3s can be linked to provide an eight port system. The ACR3 is mounted on the horizontal Renishaw MRS (modular rail system).

## 4 System operation

### 4.1 Introduction

Figure 19 shows the basic installation configuration for the PH10 system.

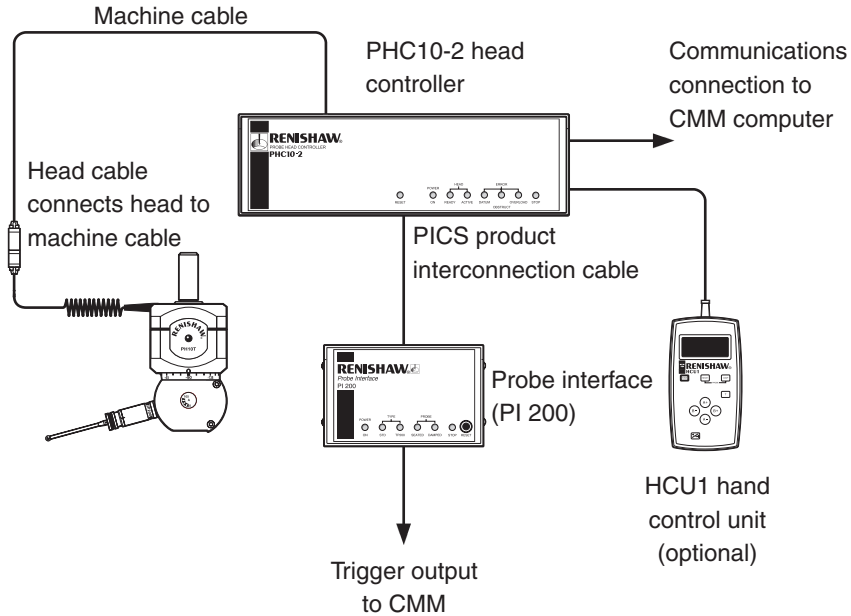


Figure 20 - System configuration

### 4.2 Operating modes

The PH10 system can operate in one of two modes:

- Manual mode
- Automatic mode

### 4.2.1 Manual mode

In manual mode the optional HCU1 hand control unit is used to control head and probe functions.

If the HCU1 is connected to the PHC10-2 controller when power is applied to the system, the system will enter manual mode.

For further information refer to the HCU1 user's guide (Renishaw part number H-1000-5016).

### 4.2.2 Automatic mode

In automatic mode the system is under the control of the CMM computer. The HCU1 cannot be used to control head or probe functions in automatic mode.

With no HCU1 fitted when power is applied to the system, the system will enter automatic mode. The system must be switched to manual mode under CMM control (and an HCU1 connected) for operation under manual mode.

Please refer to the documentation provided by your CMM supplier for further details on controlling the PH10 series of heads using the CMM computer.

## 4.3 Caution

**DO** ensure that the head is mounted as rigidly as possible in the CMM's quill.

**DO** take care to avoid collisions between the head and workpiece or CMM bed.

**DO** ensure that the head is moved clear of any obstruction before requesting a position change.

**DO NOT** apply force to any moving parts of the head.

**DO NOT** move the head axes by hand when locked or unlocked.

## 5 Troubleshooting

### 5.1 Introduction

Table 9 will help you to identify problems you may be experiencing with your system.

**Table 9 - Troubleshooting**

Observation	Section
Poor measurement performance	5.2
No probe signal	5.3
No head movement	5.4
Datum error	5.5
Obstruct error	5.6
Overload error	5.7

If you experience problems which you are not able to identify or solve satisfactorily, please contact your Renishaw representative for further advice.

The optional HCU1 is also able to diagnose certain error conditions. Please refer to the HCU1 user's guide (Renishaw part number H-1000-5016) for further information.

**NOTE:** Before seeking technical assistance please make a note of the following information:

- Your CMM manufacturer and model
- The probe head model (PH10T/PH10M/PH10MQ)
- The probe head serial number
- The PHC10-2 serial number
- The PHC10-2 version number
- The LED sequence on the PHC10-2
- The stylus configuration fitted

You may already have recorded some of this information in section 1.



## 5.2 Poor measurement performance

**Table 10 - Poor measurement performance**

Possible cause	Checks/remedies
Loose head mounting	Ensure all mounting screws are tight and mounting to the CMM is secure.
Probe incorrectly installed	Remove probe and refit.
Force applied to head during lock up	Unlock and relock.
Incorrect lock up position or position not qualified	Reposition head correctly. Check qualification information.

## 5.3 No probe signal

**Table 11 - No probe signal**

Possible cause	Checks/remedies
Probe incorrectly installed	Remove probe and refit.
Cable/connections faulty	Check conditions and integrity of cabling from head to controller.
Probe failure	Contact your CMM's supplier or Renishaw representative for further assistance.
Probe output disabled by CMM	Check probe output.

## 5.4 No head movement

**Table 12 - No head movement**

Possible cause	Checks/remedies
Power loss	<p>Check controller POWER ON LED is lit.</p> <p>Check mains cable connections and integrity, observing electrical safety precautions (see page 7).</p> <p>Check controller fuse, observing electrical safety precautions (see page 7).</p> <p>Check CMM emergency stop condition - power may have been removed from the system by the CMM.</p>
Cable/connections faulty	Check conditions and integrity of cabling from head to controller.

## 5.5 Datum error

The DATUM ERROR LED is lit on the controller. The head has rotated to the required position but locked in a non-repeatable condition (a maximum of four attempts to lock will be made before the error is reported).

**Table 13 - Datum error**

Possible cause	Checks/remedies
Cable/connections faulty	Check conditions and integrity of cabling from head to controller.
Head/stylus configuration obstructed	Remove obstruction and update head using the HCU1 or under CMM control.
Probe extension combination too long	Use shorter/lighter styli combination.
Internal head fault	Contact your Renishaw representative, CMM manufacturer or distributor.

## 5.6 Obstruct error

**Table 14 - Obstruct error**

Possible cause	Checks/remedies
Head/stylus configuration obstructed	Check head for damage. Remove obstruction and repeat head move.
Probe extension combination too long	Use shorter/lighter styli combination.
Internal head fault	Contact your Renishaw representative, CMM manufacturer or distributor.

## 5.7 Overload error

The OVERLOAD ERROR and STOP LEDs are lit on the controller. The head has been overloaded while locked.

**Table 15 - Overload error**

Possible cause	Checks/remedies
Head lock up holding force exceeded during CMM acceleration	Reduce mass of probe combination. Reduce acceleration.
Collision with work piece or CMM	Check head for damage. Remove obstruction and repeat move.

## **6 Maintenance**

### **6.1 Maintenance**

There are no user serviceable parts inside any PH10 system units. The only maintenance required is fuse replacement. See page 7 for instructions on fuse replacement.

Units requiring attention must be returned to an authorised Renishaw customer service centre.

### **6.2 Cleaning**

The probe head, controller and hand control unit should be cleaned with a soft, dry, lint-free cloth.

## 7 Appendix 1 - International safety statements

### BG - ПРЕДУПРЕЖДЕНИЯ

Съществуват рискове от притискане между движещи се части и между движещи се и неподвижни части. Да не се държи пробникът или главата на пробника по време на работните движения, или при ръчна смяна на пробника.

Пазете се от неочаквано движение. Потребителят трябва да остава извън пъления работен обсег на комбинациите глава на пробника / удължител / пробник.

Препоръчва се защита на очите във всички приложения, включващи използване на машини или СММ.

Обикновено в приборите Renishaw с мрежово захранване няма части, които да се обслужват от потребителя. Дефектиралите прибори да се връщат в сервизния център за обслужване на клиенти на Renishaw.

Заменяйте изгорелите предпазители с нови от същия тип. Вж. информацията по безопасност в съответната документация за продукта.

За инструкции по отношение безопасното почистване на продуктите Renishaw вж. информацията за поддръжка в съответната документация на продукта.

Преди извършване на всякакви операции по поддръжката да се изключва захранването.

Вж. инструкциите за работа на доставчика на машината.

Отговорност на доставчика на машината е да гарантира, че на потребителя са обяснени всякакви рискове по време на работа, включително онези, упоменати в документацията на продуктите Renishaw и да гарантира осигуряване на съответни предпазители и обезопасителни блокировки.

При определени обстоятелства сигналът от пробника може да посочва фалшиво състояние на опрян пробник. Да не се разчита на сигналите от пробника за спиране движението на машината.

Ако оборудването се използва по начин, който не е указан от производителя, осигуряваната от оборудването защита може да се влоши.

Очакваният метод за осигуряване на аварийно спиране за продуктите Renishaw е да се изключи захранването.

## CS - UPOZORNĚNÍ

Mezi pohyblivými součástmi a mezi pohyblivými a statickými součástmi hrozí nebezpečí přiskřípnutí. Při přesunování nebo ručním nastavování sondy nedržte snímací hlavici.

Dejte pozor na nečekaný pohyb stroje. Uživatel by měl setrvávat mimo pracovní rozsah stroje, zejména mimo místa pohybu snímací hlavy, prodloužení a sondy.

Při jakékoli práci s obráběcími stroji nebo souřadnicovými měřicími stroji (CMM) je doporučeno používat ochranu očí.

Sítově napájené produkty Renishaw obvykle neobsahují žádné části opravitelné uživatelem. Vadné jednotky zašlete do centra autorizovaného servisu společnosti Renishaw.

Spálené pojistky nahradte novými pojistkami stejného typu. Pokyny naleznete v informacích o bezpečném provozu uvedených v příslušné dokumentaci k produktu.

Pokyny týkající se bezpečného čištění produktů společnosti Renishaw naleznete v části věnované informacím o údržbě v příslušné dokumentaci k produktu.

Před započetím jakékoliv údržby zařízení odpojte napájení.

Přečtěte si provozní pokyny dodavatele příslušného stroje.

Povinností dodavatele stroje je informovat uživatele o nebezpečích spojených s provozem i o nebezpečích zmiňovaných v dokumentaci k produktům společnosti Renishaw a zajistit dostatečné ochranné a bezpečnostní systémy.

Za určitých okolností může signál sondy nesprávně označovat klidový stav sondy. Nevyužívejte signály sondy jako hlavní impuls pro zastavování stroje.

Používá-li se zařízení způsobem, který není výrobcem specifikován, může dojít ke snížení ochrany zajištěné zařízením.

Předpokládaným způsobem nouzového zastavení produktů společnosti Renishaw je odpojení napájení.

## DA - ADVARSLER

Der er risiko for at blive klemt mellem bevægelige dele og mellem bevægelige og statiske dele. Hold ikke sondehovedet under bevægelse eller ved manuelle sondeskift.

Pas på uventede bevægelser. Brugeren bør holde sig uden for hele probehovedets/forlængerens/probekombinationernes arbejdsområde.

I alle tilfælde, hvor der anvendes værktøjs- og koordinatmålemaskiner, anbefales det at bære beskyttelsesbriller.

Der er normalt ingen dele inde i Renishaw-enhederne, som sluttes til lysnettet, der kan efterses eller repareres af brugeren. Send alle defekte enheder til Renishaws kundeservicecenter.

Udskift sikringer, der er sprunget, med nye komponenter af samme type. Se i under sikkerhed i produktdokumentationen.

Se under vedligeholdelse i produktdokumentationen for at få instruktioner til sikker rengøring af Renishaw-produkter.

Afbryd strømforsyningen, før der foretages vedligeholdelse.

Se maskinleverandørens brugervejledning

Det er maskinleverandørens ansvar at sikre, at brugeren er bekendt med eventuelle risici i forbindelse med driften, herunder de risici, som er nævnt i Renishaws produktdokumentation, og at sikre, at der er tilstrækkelig afskærmning af sikkerhedsblokeringer.

Under visse omstændigheder kan sondesignalet ved en fejl angive, at sonden står stille. Stol ikke på, at probesignaler vil stoppe maskinens bevægelse.

Hvis udstyret anvendes på en måde, som ikke er specificeret af producenten, kan udstyrets beskyttelse blive påvirket.

Den forventede metode til nødstop af Renishaw-produkter er afbrydelse af strømforsyningen.

## DE - SICHERHEITSANWEISUNGEN

Zwischen beweglichen sowie zwischen beweglichen und statischen Bauteilen besteht Einklemmgefahr. Der Dreh-/Schwenkkopf darf während des Betriebs oder einem Messtasterwechsel nicht berührt oder festgehalten werden.

Nehmen Sie sich vor unerwarteten Bewegungen in Acht. Der Anwender darf sich nur außerhalb des Messtaster-Arbeitsbereiches aufhalten.

Bei Arbeiten an Werkzeugmaschinen oder Koordinatenmessgeräten wird Augenschutz empfohlen.

Die mit Netzstrom versorgten Renishaw-Einheiten enthalten im Normalfall keine Bauteile, die durch den Anwender gewartet werden können. Senden Sie defekte Geräte an Ihren Renishaw Kundendienst zurück.

Durchgebrannte Sicherungen dürfen nur mit gleichwertigen ersetzt werden. Beachten Sie die Sicherheitshinweise der zugehörigen Dokumentation.

Anweisungen zur sicheren Reinigung von Renishaw-Produkten finden Sie in den Wartungsinformationen der zugehörigen Produktdokumentation.

Bevor Wartungsarbeiten begonnen werden, muss die Stromversorgung getrennt werden.

Beachten Sie die Bedienungsanleitungen des Maschinenherstellers.

Es obliegt dem Maschinenlieferanten, den Anwender über alle Gefahren, die sich aus dem Betrieb der Ausrüstung, einschließlich der, die in der Renishaw Produktdokumentation erwähnt sind, zu unterrichten und sicherzustellen, dass ausreichende Schutzvorrichtungen und Sicherheitsverriegelungen eingebaut sind.

Es kann passieren, dass der Messtaster fälschlicherweise eine Ruhestellung signalisiert. Verlassen Sie sich nicht alleine auf das Signal des Mess-Systems, um Maschinenbewegungen zu stoppen.

Wird das Gerät für einen nicht vom Hersteller spezifizierten Zweck benutzt, kann dies zu einer Beeinträchtigung des vom Gerät bereitgestellten Schutzes führen.

Renishaw-Produkte im Notfall durch Ausschalten der Stromversorgung stoppen.



## ΕΛ - ΠΡΟΕΙΔΟΠΟΙΪΗΣΕΙΣ

Υπάρχει κίνδυνος πιασίματος μεταξύ των κινούμενων μερών όπως και μεταξύ των κινούμενων και στατικών μερών. Μη συγκρατείτε την κεφαλή ανιχνευτή κατά τη διάρκεια των κινήσεων ούτε και κατά τη διάρκεια χειροκίνητων αλλαγών του ανιχνευτή.

Προσέξτε τις απροσδόκητες κινήσεις. Ο χρήστης πρέπει να παραμένει εκτός του χώρου στον οποίο διεξάγονται όλοι οι συνδυασμοί λειτουργίας της κεφαλής ανιχνευτή, της προέκτασης και του ανιχνευτή.

Σε όλες τις εφαρμογές που συνεπάγονται τη χρήση εργαλείων μηχανημάτων και εξαρτημάτων CMM, συνιστάται η χρήση συσκευής προστασίας των ματιών.

Στο εσωτερικό μονάδων της Renishaw που συνδέονται με την κεντρική παροχή ρεύματος δεν υπάρχουν εξαρτήματα που χρειάζονται συντήρηση από το χρήστη. Επιστρέψτε τις ελαττωματικές μονάδες σε εξουσιοδοτημένο κέντρο εξυπηρέτησης πελατών της Renishaw.

Αντικαταστήστε τις καμένες ασφάλειες με νέες ασφάλειες του ίδιου τύπου. Ανατρέξτε στις πληροφορίες σχετικά με την ασφάλεια του έντυπου συνοδευτικού υλικού του αντίστοιχου προϊόντος.

Για οδηγίες σχετικά με τον ασφαλή καθαρισμό των προϊόντων Renishaw, ανατρέξτε στις πληροφορίες σχετικά με τη συντήρηση του έντυπου συνοδευτικού υλικού του αντίστοιχου προϊόντος.

Αποσυνδέστε το μηχάνημα από το ηλεκτρικό ρεύμα πριν επιχειρήσετε οποιοσδήποτε εργασίες συντήρησης.

Συμβουλευτείτε τις οδηγίες λειτουργίας του προμηθευτή του μηχανήματος.

Αποτελεί ευθύνη του προμηθευτή του μηχανήματος να εξασφαλίσει ότι ο χρήστης είναι ενήμερος για τυχόν κινδύνους που συνεπάγεται η λειτουργία, συμπεριλαμβανομένων όσων αναφέρονται στα εγχειρίδια του προϊόντος της Renishaw. Είναι επίσης ευθύνη του να εξασφαλίσει ότι υπάρχουν τα απαιτούμενα προστατευτικά καλύμματα και οι συνδέσεις ασφαλείας.

Υπό ορισμένες συνθήκες το σήμα του ανιχνευτή μπορεί να υποδεικνύει λανθασμένη ένδειξη τοποθέτησης του ανιχνευτή. Μη βασίζεστε στα σήματα ανιχνευτή για τη διακοπή της κίνησης του μηχανήματος.

Εάν ο εξοπλισμός χρησιμοποιείται με τρόπο μη προδιαγεγραμμένο από τον κατασκευαστή, η παρεχόμενη προστασία του εξοπλισμού πιθανώς να παρεμποδίζεται.

Η αναμενόμενη μέθοδος διακοπής έκτακτης ανάγκης για τα προϊόντα Renishaw είναι η αποσύνδεσή τους από το ηλεκτρικό ρεύμα.

## ES - AVISOS

Existe el peligro de atraparse los dedos entre las distintas partes móviles y entre partes móviles y fijas. No sujetar la cabeza de la sonda mientras se mueve, ni durante los cambios manuales de la sonda.

Preste atención a los movimientos imprevistos. El usuario debe quedarse fuera del grupo operativo completo compuesto por la cabeza de sonda/extensión/sonda o cualquier combinación de las mismas.

Se recomienda usar gafas de protección en todas las aplicaciones que implican el uso de Máquinas-Herramienta y máquinas de medición de coordenadas.

Dentro de las unidades Renishaw que se enchufan a la red, normalmente no existen piezas que puedan ser mantenidas por el usuario. Las unidades defectuosas deben ser devueltas a un Centro de Servicio al Cliente Renishaw.

ustituir los fusibles fundidos con componentes nuevos del mismo tipo. Remitirse a la sección titulada SEGURIDAD (SAFETY) en la documentación sobre el producto.

Para instrucciones sobre seguridad a la hora de limpiar los productos Renishaw, remitirse a la sección titulada MANTENIMIENTO (MAINTENANCE) en la documentación sobre el producto.

Quitar la corriente antes de emprender cualquier operación de mantenimiento.

Consulte las instrucciones de manejo del proveedor de la máquina.

Es responsabilidad del proveedor de la máquina garantizar que el operario sea informado sobre los peligros relacionados con el funcionamiento, incluidos los peligros mencionados en la documentación de los productos Renishaw, y garantizar que se suministran los dispositivos de protección y seguridad adecuados.

Bajo determinadas circunstancias la señal de la sonda puede indicar erróneamente que la sonda está asentada. No espere a las señales de la sonda para detener el movimiento de la máquina.

Si no se cumplen las indicaciones especificadas por el fabricante para la utilización del equipo, la protección del equipo puede verse dañada.

El método previsto para efectuar una parada de emergencia de los productos Renishaw es el de quitar la corriente.

## ET - HOIATUSED

Masina liikuvad osad võivad põhjustada muljumisohtu. Ärge hoidke masina liikumise ajal või sondi vahetamise ajal kinni sondipeast.

Olge ettevaatlik ootamatute liikumiste suhtes. Kasutaja peab jääma väljapoole sondipea ja sondipikendi tööulatust.

Kõikide rakenduste puhul, mis kasutavad tööpinke või koordinaatmõõtemasinaid, on soovitatav kasutada silmakaitseid.

Tavaliselt ei ole Renishaw elektritoitel üksuste sees kasutajale kasutuskõlblikke osasid. Tagastage defektsed seadmed volitatud Renishaw klienditeeninduskeskusesse.

Asendage läbipõlenud kaitsmed uute sama tüüpi kaitsmetega. Täpsemad juhised leiате vastava toote dokumentide ohutusjuhiste alaost.

Täpsemad juhised Renishaw toodete ohutuks puhastamiseks leiате vastava toote dokumentide hooldusjuhiste alaost.

Enne hooldustööde teostamist eemaldage toide.

Vaadake masina tarnija kasutusjuhendit.

Masina tarnija vastutuseks on tagada, et kasutajat teavitatakse masina tööga kaasnevatest ohtudest, kaasa arvatud need ohud, mida on mainitud Renishaw toote dokumentides, ning samuti tagada, et masinaga oleks kaasas korrektsed kaitsepiirded ja turvalukud.

Teatud tingimustel võib sondi signaal valesi viidata sondiga seotud olukorrale. Ärge lootke masina liikumise peatamiseks sondi signaalile.

Kui seadet kasutatakse viisil, mis ei ole tootja poolt ette nähtud, võib seadme pakutav kaitse väheneda.

Esmaseks masina hädaseiskamise meetodiks Renishaw toodete puhul on elektritoite katkestamine.

## FI - VAROITUS

Liikkuvien osien sekä liikkuvien ja staattisten osien välillä on olemassa puristusvaara. Älä pidä kiinni anturin päästä sen liikkuessa tai vaihtaessasi anturia käsin.

Varo odottamatonta liikettä. Käyttäjän tulee pysyä mittapää/jatke/anturi-yhdistelmien toiminta-alueen ulkopuolella.

Silmäsuojainten käyttö on suositeltavaa kaikkia työstökoneita ja koordinaattimittauskoneita (CMM) käytettäessä.

Sähköverkkoon kytkettävät Renishaw-tuotteet eivät tavallisesti sisällä käyttäjän huollettavissa olevia osia. Vialliset osat tulee palauttaa valtuutetulle Renishaw-asiakaspalvelukeskukselle.

Korvaa palaneet sulakkeet samantyyppisillä uusilla sulakkeilla. Lue tuoteselosteen TURVALLISUUTTA (SAFETY) koskeva osa.

Renishaw-tuotteiden turvalliset puhdistusohjeet löytyvät kunkin tuotteen dokumenttien kunnossapito-kohdasta.

Katkaise virta ennen huoltotoimenpiteiden suorittamista.

Tutustu laitteen toimittajan käyttöohjeisiin.

Laitteen toimittajan vastuulla on varmistaa, että käyttäjä on tietoinen laitteen käyttöön liittyvistä vaaratekijöistä, mukaan lukien Renishaw'n tuotedokumenteissa mainitut vaaratekijät, ja varmistaa, että asiakas saa asianmukaiset suojalaitteet ja varmistimet.

Tietyissä olosuhteissa anturilta tuleva signaali saattaa virheellisesti osoittaa, että mitta-anturi on lepotilassa (=ei-kosketuksessa). Älä luota koneen pysähtyvän probin signaaleista.

Jos laitetta käytetään valmistajan ohjeista poikkeavalla tavalla, sen suojavaikutus voi olla puutteellinen.

Renishaw-tuotteiden hätäpysäytys tehdään tavallisesti kytkemällä virta pois päältä.

## FR - SECURITE

L'effet de pincement dû au mouvement des pièces mobiles entre elles ou avec des pièces fixes présente des dangers. Ne pas tenir la tête du palpeur lorsqu'elle se déplace ou que le palpeur est changé à la main

Attention aux mouvements brusques. L'utilisateur doit toujours rester en dehors de la zone de sécurité des installations multiples Tête/Rallonge/Palpeur.

Le port de lunettes de protection est recommandé pour toute application sur machine-outil et MMT.

Normalement, aucune pièce des produits Renishaw alimentées sur secteur ne peut être réparée par l'utilisateur. Renvoyer toute matériel défectueux à un Centre Après Vente Renishaw agréé.

Remplacer les fusibles grillés par des composants neufs du même type. Consulter les consignes de sécurité de votre documentation.

Les conseils de nettoyage en toute sécurité des produits Renishaw figurent dans les consignes de maintenance de votre documentation.

Mettre la machine hors tension avant d'entreprendre toute opération de maintenance.

Consulter le mode d'emploi du fournisseur de la machine.

Il incombe au fournisseur de la machine d'assurer que l'utilisateur prenne connaissance des dangers d'exploitation, y compris ceux décrits dans la documentation du produit Renishaw, et d'assurer que des protections et verrouillages de sûreté adéquats soient prévus.

Dans certains cas, il est possible que le signal du palpeur indique à tort l'état que le palpeur est au repos. Il ne faut pas se fier aux signaux venant du palpeur car ils ne garantissent pas toujours l'arrêt de la machine.

Toute utilisation de ce matériel d'une manière non spécifiée par le constructeur peut compromettre la protection dont est pourvu cet équipement.

La procédure habituelle d'arrêt d'urgence des produits Renishaw est la mise hors tension.

## GA - RABHAIDH

Tá guaiseacha cúngúcháin ann idir páirteanna atá ag gluaiseacht agus idir páirteanna atá ag gluaiseacht agus páirteanna statacha. Ná coinnigh greim ar cheann an tóireadóra le linn gluaiseachtaí, nó nuair atá tóireadóir á athrú de láimh.

Fainic an chorraíl gan choinne. Ba chóir don úsáideoir fanacht lasmuigh d'imchlúdach iomlán oibre an chinn tóireadóra/bhreisithe/na dteaghlaimí tóireadóra.

Moltar cosaint do na súile i ngach aon fheidhmiú lena mbaineann úsáid uirlisí meaisín nó CMM.

Maidir le haonaid Renishaw a fhaigheann cumhacht ón bpríomhlíne, is iondúil nach mbíonn aon chodanna laistigh díobh a d'fhéadfadh an t-úsáideoir a shocrú. Seoltar aonaid fhabhtacha ar ais chuig Ionad údaraithe Renishaw um Sheirbhís do Chustaiméirí.

Déan fiúsanna séidte a athsholáthar le comhpháirteanna den chineál céanna. Tagair don fhaisnéis shábhailteachta i gcáipéisíocht ábhartha an táirge

Atsholáthair fiúsanna séidte le comhpháirteanna den chineál céanna. Tagair don fhaisnéis sábhailteachta i gcáipéisíocht ábhartha an táirge.

Féach an fhaisnéis chothabhála sa cháipéisíocht a théann leis an táirge bainteach chun teoracha a fháil faoi tháirgí Renishaw a ghlanadh go sábháilte.

Baintear an chumhacht de sula ndéantar aon oibríochtaí cothabhála.

Féach na teoracha oibriúcháin ó sholáthraí an mheaisín.

Tá sé de dhualgas ar sholáthraí an mheaisín a chinntiú go dtugtar le fios don úsáideoir na guaiseacha a bhaineann leis an oibriú, lena n-áirítear iad sin a luaitear i gcáipéisíocht Renishaw faoina dtáirgí féin, agus a chinntiú go soláthraítear comhghlasáil agus cibé cosaint leordhóthanach eile atá riachtanach.

D'fhéadfadh an tóireadóir comhartha a thabhairt, ar chúinsí áirithe, go bhfuil rud éigin cearr leis go bréagach. Ná braithe ar chomharthaí tóireadóra le gluaiseacht an mheaisín a stopadh.

Má úsáidtear an trealamh ar bhealach nach bhfuil sonraithe ag an déantúsóir, tharlódh go ndéanfaí dochar don chosaint a sholáthraíonn an trealamh.

## HU - FIGYELMEZTETÉSEK

A mozgó alkatrészek között és a mozgó és statikus alkatrészek között beszorulás veszélye áll fenn. Ne fogja meg a tapintót, vagy a tapintófejet mozgás közben.

Vigyázzon, mert a gép váratlanul elindulhat. Tartózkodjon a tapintófej és hosszabbítójának teljes mozgáskörzetén kívül!

Szerszámgépek és koordináta-mérőgépek használata során mindig javasolt a szemvédő viselése.

Normális esetben a Renishaw hálózati egységeiben nincsenek felhasználó által javítható alkatrészek. A meghibásodott egységeket juttassa el valamelyik hivatalos Renishaw Vevőszolgálati Központhoz vagy Képviselőhöz.

A kiégett biztosítékokat ugyanolyan típusú, új alkatrészszel cserélje ki. Olvassa el a megfelelő termékismertető BIZTONSÁG-gal kapcsolatos fejezetét.

A Renishaw szerszámgépek biztonságos tisztítására vonatkozó előírásokat megtalálja a megfelelő termékismertető, karbantartás fejezetében.

Bármilyen karbantartási művelet kivitelezése előtt áramtalanítsa a gépet.

További tudnivalók a gép szállítójának használati utasításában találhatóak.

A gép szállítója azért felelős, hogy felhívja a felhasználó figyelmét az üzemeltetéssel kapcsolatos veszélyforrásokra, beleértve a Renishaw termékdokumentációjában ismertetetteket is. Továbbá gondoskodnia kell a megfelelő védőburkolatok és biztonsági reteszelések meglétéről is.

Bizonyos körülmények között, a tapintófej tévesen is jelezhet mechanikus érintkezést. Ezért nem szabad a tapintófejre bízni a gép leállítását.

Ha a felszerelést a gyártó által előírt módtól eltérő módon használják, a felszerelés által nyújtott védelem érvénytelenné válik.

A Renishaw termékek vészleállításának elvárt módszere a berendezés kikapcsolása.

## IT - SICUREZZA

Esiste pericolo di danno da schiacciamento tra le parti in moto o tra le parti in moto e quelle ferme. Evitare di afferrare la testa della sonda quando è in moto, oppure quando la sonda viene cambiata manualmente.

Fare attenzione ai movimenti improvvisi. Si raccomanda all'utente di tenersi al di fuori dello spazio operativo della testa della sonda, delle prolunghe e di altri accessori della sonda.

Si raccomanda di indossare occhiali di protezione in applicazioni che comportano l'utilizzo di macchine utensili e macchine CMM.

Di solito, gli apparecchi Renishaw alimentati da rete elettrica non contengono componenti su cui si possano eseguire interventi di manutenzione da parte dell'utente. In caso di guasto, inviare l'apparecchio a uno dei Centri di Assistenza Renishaw.

I fusibili bruciati dovranno essere sostituiti con altri dello stesso tipo. Consultare le informazioni di sicurezza nella documentazione dello specifico prodotto.

Per le istruzioni relative alla pulizia dei prodotti Renishaw, fare riferimento alle informazioni sulla manutenzione della documentazione del prodotto.

Prima di effettuare qualsiasi intervento di manutenzione, disconnettersi dalla rete di alimentazione.

Consultare le istruzioni d'uso fornite dal fabbricante della macchina.

Il fornitore della macchina ha la responsabilità di avvertire l'utente dei pericoli inerenti al funzionamento della stessa, compresi quelli riportati nelle istruzioni di Renishaw, e di fornire dispositivi di protezione e interruttori di esclusione adeguati.

È possibile che in certe situazioni venga erroneamente prodotto un segnale che indica che la sonda è in posizione. Non fare affidamento sui segnali di stato sonda per arrestare il movimento della macchina.

Se utilizzato in modo non conforme a quanto specificato dal produttore, il dispositivo potrebbe non fornire il livello di protezione previsto.

Il metodo corretto di eseguire un arresto di emergenza per i prodotti Renishaw è l'interruzione dell'alimentazione elettrica.



## LT - ĮSPĖJIMAI

Tarp judančių detalių bei tarp judančių ir statiškų detalių pakliuvę daiktai gali būti suspausti. Nelaikykite zondo galvutės veikiant įrenginiui ar keisdami zondą rankiniu būdu.

Saugokitės netikėtų judesių. Naudotojui nerekomenduojama atidaryti veikiančios zondo galvutės / ilgintuvo / zondų junginio gaubto.

Dirbant visus darbus, naudojant įrenginio įrankius ar valant ir prižiūrint įrenginį, rekomenduojama užsidėti apsauginius akinius.

Paprastai „Renishaw” prietaisuose, maitinamuose iš elektros tinklo, nėra detalių, kurias galėtų remontuoti pats naudotojas. Gražinkite sugedusius prietaisus „Renishaw” klientų aptarnavimo centrui.

Pakeiskite perdegusius saugiklius to paties tipo saugikliais. Laikykitės atitinkamos techninės gaminio dokumentacijos saugos nurodymų.

„Renishaw” gaminių saugaus valymo instrukcijas rasite priežiūros nurodymuose, pateikiamuose kartu su gaminiu.

Prieš atlikdami techninę priežiūrą, išjunkite elektros srovės tiekimą.

Laikykitės įrenginio tiekėjo naudojimo nurodymų.

Įrenginio tiekėjas atsako už tai, kad naudotojas būtų įspėtas apie pavojus, susijusius su įrenginio naudojimu, taip pat pavojus, minimus „Renishaw” prietaiso techninėje dokumentacijoje, ir kad būtų sumontuoti atitinkami apsauginiai įrenginiai bei blokatoriai.

Susiklosčius tam tikroms aplinkybėms, zondo signalas gali neteisingai informuoti, kad jo reikšmės nustatytos į pradinę būseną. Nepasikliaukite zondo signalais ir iš karto nestabdykite įrenginio.

Jei įranga naudojama ne taip, kaip nurodo gamintojas, gali sumažėti įrangos teikiama apsauga.

Tinkamiausias būdas sustabdyti Renishaw prietaisą yra nutraukti elektros srovės tiekimą.

## LV - BRĪDINĀJUMS

Pastāv risks tikt saspiestam starp kustīgajām daļām, ka arī kustīgajām un nekustīgajām daļām. Nepieskarieties ar rokām zondei kustības laikā vai mainot zondi.

Uzmanieties no negaidītas kustības. Lietotājam jāpaliek ārpus zondes/uzgaļa/kontaktmērgalviņas pilna darbības rādiusa.

Aizsargājiet acis, strādājot ar darbgaldiem vai koordinātu mērīšanas ierīcēm.

Parasti Renishaw strāvai pievienotajās ierīcēs nav daļu, kuras apkalpo lietotājs. Nosūtiet bojātās ierīces atpakaļ uz pilnvarotu Renishaw klientu apkalpošanas centru.

Aizvietojiet izdegušus drošinātājus ar tā paša veida jauniem komponentiem. Skatiet drošības tehnikas informāciju attiecīgā izstrādājuma dokumentācijā.

Instrukcijas drošai Renishaw izstrādājumu tīrīšanai ir iekļautas apkalpošanas informācijā atbilstošā izstrādājuma dokumentācijā.

Atvienojiet no strāvas pirms jebkuru apkalpošanas darbu veikšanas.

Skatiet iekārtas piegādātāja ekspluatācijas instrukcijas.

Iekārtas piegādātājs atbild par to, lai lietotājs būtu iepazīstināts ar jebkuriem draudiem, kas saistīti ar tās darbību (ieskaitot tos, kas minēti Renishaw izstrādājuma dokumentācijā), un lai būtu nodrošinātas atbilstošas aizsargierīces un aizsargbloķētāji.

Noteiktos apstākļos zondes signāls var nepareizi norādīt zondes stāvokli.

Nepaļaujieties uz zondes signālu, lai apturētu iekārtas kustību.

Ja aparatūra tiek lietota veidā, kas neatbilst ražotāja norādītajam, tas var ietekmēt iekārtas drošību.

Tiek pieņemts, ka Renishaw izstrādājumu avārijas apturēšanai lietotājs to atvienos no strāvas.

## MT - TWISSIJET

Hemm il-periklu li wieġed jinqaras bejn partijiet li jiċċaqilqu u bejn biċċiet li jiċċaqilqu u biċċiet partijiet. Iżżommx ir-ras tas-sonda waqt il-moviment, jew meta tkun qiegħed/ qiegħda tibdel sonda.

Oqgħod attenta/a għal moviment mhux mistenni. L-utent għandu jibqa' barra ż-zona kollha tal-operat tal-kombinazzjonijiet tar-ras tas-sonda/estensjoni/sonda.

Fix-xogħol kollu li jinvolvu l-użu ta' għodda tal-magni jew CMMs, il-protezzjoni tal-għajnejn hija rrakkommandata.

Normalment m'hemm l-ebda partijiet li tista' tingħatalhom manutenzjoni mill-utent gewwa l-unitajiet li jaħdmu bl-elettriku ta' Renishaw. Irritorna unitajiet difettużi lil Ċentru għas-Servizz tal-Klijenti ta' Renishaw awtorizzat.

Ibdel f'usijiet li taru b'komponenti ġodda ta' l-istess tip. Irreferi għall-informazzjoni tas-sigurtà fid-dokumentazzjoni rilevanti tal-prodott.

Għal struzzjonijiet dwar it-tindif bla periklu tal-prodotti ta' Renishaw, irreferi għall-informazzjoni dwar il-manutenzjoni fid-dokumentazzjoni rilevanti tal-prodott rilevanti.

Itfi d-dawl qabel ma tagħmel xi xogħol ta' manutenzjoni.

Irreferi għall-istruzzjonijiet tal-operat tal-fornitur tal-magna.

Hija r-responsabbiltà tal-fornitur tal-magna li jiżgura li l-utent ikun konxju ta' kwalunkwe perikli involuti fit-tħaddim, inklużi dawk imsemmija fid-dokumentazzjoni tal-prodotti Renishaw, u li jiżgura li hemm protezzjoni u l-interlocks tas-sigurtà adegwati pprovduti.

Taħt ċerti ċirkustanzi, s-sinjali tas-sonda jista' jindika b'mod falz kundizzjoni ta' sonda mhux attiva. Tiddependix fuq is-sinjali tas-sonda sabiex twaqqaf il-moviment tal-magna.

Jekk dan it-tagħmir jintuża b'mod li ma jkunx speċifikat mill-manifattur, il-protezzjoni pprovduta mit-tagħmir tista' titnaqqas.

Il-metodu mistenni ta' li jiġi provdut waqfien ta' emerġenza għal prodotti ta' Renishaw huwa li jintefa' d-dawl.

## NL - WAARSCHUWINGEN

Er is risico op inklemming tussen de bewegende onderdelen onderling en tussen bewegende en niet-bewegende onderdelen. Houd de tasterkop niet vast als de machine in werking is of bij het handmatig verwisselen van een taster.

Wees bedacht op onverwachte bewegingen. De gebruiker dient buiten het bereik van de werkende tasterkop/verlengstuk/taster combinaties te blijven.

Voor alle toepassingen met bewerkingsmachines of CMM's wordt aanbevolen een veiligheidsbril te dragen.

De onderdelen van Renishaw units met netvoeding kunnen meestal niet door de gebruiker worden onderhouden of gerepareerd. Defecte producten kunt u naar een erkend Renishaw servicecentrum sturen.

Vervang doorgebrande zekeringen door nieuwe van hetzelfde type. Lees de veiligheidsinstructies in de bijbehorende productdocumentatie.

Raadpleeg voor het veilig reinigen van Renishaw producten de onderhoudsinstructies in de betreffende productdocumentatie.

Verbreek de stroomtoevoer voordat u onderhoudswerk gaat verrichten.

Raadpleeg de bedieningshandleiding van de machineleverancier.

De leverancier van de machine dient te zorgen dat de gebruiker op de hoogte is van de risico's die zijn verbonden aan het gebruik van de machine, met inbegrip van de risico's vermeld in de productdocumentatie van Renishaw, en dat de machine is voorzien van voldoende beveiligingen en veiligheidsvergrendelingen.

Onder bepaalde omstandigheden kan het tastersignaal een onjuiste tastertoestand aangeven. Vertrouw niet op de tastersignalen om de machine tot stilstand te brengen.

Gebruik van de apparatuur op een manier die de fabrikant niet voorgeschreven heeft, kan het apparaat beschadigen of de bescherming beperken.

U kunt in geval van nood de Renishaw apparatuur stopzetten door de stroom uit te schakelen.

## PL - OSTRZEŻENIA

Występuje niebezpieczeństwo zakleszczenia pomiędzy częściami ruchomymi oraz częściami ruchomymi i nieruchomymi. Nie wolno trzymać głowicy sondy podczas wykonywania przemieszczeń ani podczas ręcznej zmiany sondy.

Należy uważać na nieoczekiwane przemieszczenia maszyny. Użytkownik powinien pozostawać poza pełnym zasięgiem roboczym zespołu głowicy sondy/tłacznik przedłużający/sonda.

Podczas obsługi obrabiarek lub maszyn współrzędnościowych zaleca się używanie osłon na oczy.

Zazwyczaj wewnątrz zespołów Renishaw zasilanych z sieci elektrycznej nie ma części podlegających obsłudze wykonywanej przez użytkownika. Niesprawne zespoły należy przekazywać do autoryzowanego centrum serwisowego firmy Renishaw.

Spalone bezpieczniki topikowe zastępować nowymi elementami tego samego typu. W dokumentacji odpowiedniego produktu zapoznaj się z informacjami dotyczącymi bezpieczeństwa.

Aby zapoznać się z instrukcjami dotyczącymi bezpiecznego czyszczenia produktów firmy Renishaw, należy przejść do rozdziału z informacjami dotyczącymi konserwacji w dokumentacji odpowiedniego produktu.

Przed przystąpieniem do jakichkolwiek czynności konserwacyjnych należy odłączyć zasilanie energią elektryczną.

Należy zapoznać się z instrukcjami obsługi dostarczonymi przez dostawcę urządzeń.

Na dostawcy maszyny współrzędnościowej spoczywa odpowiedzialność za uprzedzenie użytkownika o wszelkich zagrożeniach związanych z eksploatacją łącznie z tymi, o jakich wspomina się w dokumentacji produktu Renishaw oraz za zapewnienie stosownych osłon i blokad zabezpieczających.

W określonych warunkach sygnał sondy może fałszywie wskazywać stan gotowości sondy. Nie należy zatrzymywać pracy maszyny tylko z powodu fałszywego sygnału sondy.

Jeżeli wyposażenie jest użytkowane w inny sposób niż określił to producent, zabezpieczenie zapewniane przez to wyposażenie może być osłabione.

Zalecaną metodą zapewnienia awaryjnego zatrzymania działania produktów firmy Renishaw jest odłączenie zasilania energią elektryczną.

## PT - ATENÇÃO

Existe perigo de esmagamento entre as peças móveis/estáticas do equipamento. Não segure o apalpador ou o cabeçote do apalpador durante os movimentos.

Tome cuidado com movimentos inesperados. O usuário deve permanecer fora da área de trabalho das combinações do cabeçote/extensão/apalpador.

Em todas as aplicações que envolvam a utilização de Máquinas-Ferramenta e CMMs, recomenda-se a utilização proteção para os olhos.

Normalmente, não existem peças reparáveis pelo usuário no interior dos equipamentos Renishaw alimentados por corrente externa. Enviar o equipamento defeituoso para um Centro de Assistência Autorizado Renishaw.

Substituir os fusíveis danificados por fusíveis novos do mesmo tipo. Consultar a seção SEGURANÇA (SAFETY) na documentação do produto.

Para instruções relativas à limpeza dos produtos Renishaw em segurança, consultar a seção MAINTENANCE (MANUTENÇÃO) da documentação do produto.

Desligar a alimentação de energia antes de efetuar qualquer operação de manutenção.

Consultar as instruções de operação do fornecedor da máquina.

É responsabilidade do fornecedor da máquina garantir que o usuário está ciente dos perigos envolvidos na operação, incluindo os mencionados na documentação dos produtos Renishaw, e assegurar que foram fornecidas todas as proteções apropriadas e bloqueios de segurança.

Sob certas circunstâncias, o sinal do apalpador pode falsamente indicar uma condição de contato do apalpador. Não se basear em sinais de apalpador para interromper o movimento da máquina.

Se o equipamento for utilizado de modo não especificado pelo fabricante, a proteção oferecida pelo equipamento poderá ser prejudicada.

O método sugerido para uma parada de emergência de produtos Renishaw é desligar a alimentação de energia.

## RO - ATENȚIONĂRI

Există riscul prinderii pielii atât între piesele în mișcare cât și între piesele în mișcare și cele fixe. Nu țineți de capul palpatorului în timpul deplasării acestuia sau în timpul schimbării manuale a palpatorului propriu-zis.

Atenție la deplasările neașteptate. Operatorul trebuie să rămână complet în afara zonei de acțiune a ansamblului cap palpator/prelungitor/palpator propriu-zis.

În toate aplicațiile care presupun utilizarea mașinilor unelte sau a MMC, se recomandă protejarea ochilor.

Nu există elemente care pot fi reparate de utilizator în interiorul surselor de alimentare Renishaw. Sursele defecte trebuie transmise Centrului de Service Renishaw pentru Clienți.

Înlocuiți siguranțele arse numai cu componente noi de aceeași valoare. Vezi capitolul SIGURANȚĂ al documentației fiecărui produs implicat.

Pentru instrucțiuni referitoare la curățirea în siguranță a produselor Renishaw, vezi capitolul Întreținere al documentației fiecărui produs implicat.

Înainte de executarea oricăror operații de întreținere, scoateți echipamentul de sub tensiune.

Vezi și instrucțiunile de operare ale furnizorului echipamentului.

Este responsabilitatea furnizorului să se asigure că utilizatorul a fost înștiințat asupra oricărui pericol implicat de utilizarea echipamentului, inclusiv asupra pericolelor menționate în documentația produsului Renishaw, și de asemenea să se asigure că au fost prevăzute protecții și interblocări adecvate.

În anumite circumstanțe, palpatorul poate indica o atingere, în mod eronat. Nu vă bazați pe semnalele primite de la palpator pentru a opri deplasarea mașinii.

Dacă echipamentul este folosit în alt fel decât cel specificat de producător protecția oferită de acesta poate fi diminuată.

Metoda recomandată pentru efectuarea unei opriri de urgență în cazul produselor Renishaw este scoaterea echipamentului de sub tensiune.

## SK - VÝSTRAHY

Medzi pohyblivými časťami a medzi pohyblivými a statickými časťami vzniká riziko pomliaždenia. Snímaciu hlavicu počas pohybu alebo pri ručnej výmene sondy nechytajte.

Dávajte si pozor na neočakávaný pohyb. Používateľ by mal zostať mimo celej pracovnej dráhy zostavy snímačej hlavice, ramena a sondy.

Vo všetkých aplikáciách zahŕňajúcich používanie obrábacích strojov alebo súradnicových meracích prístrojov sa odporúča ochrana očí.

Vo vnútri zariadení Renishaw napájaných zo siete nie sú zvyčajne žiadne súčasti, ktoré by mohol opraviť používateľ. Vadné zariadenia vráťte do autorizovaného strediska služieb zákazníckom spoločnosti Renishaw.

Prepálené poistky vymeňte za nové rovnakého typu. Pozrite si bezpečnostné informácie v dokumentácii k príslušnému produktu.

Pokyny týkajúce sa bezpečného čistenia produktov spoločnosti Renishaw získate v informáciách o údržbe uvedených v dokumentácii k príslušnému produktu.

Pred každým vykonávaním údržby odpojte napájanie.

Pozrite si prevádzkové pokyny dodávateľa stroja.

Zodpovednosťou dodávateľa stroja je zaručiť oboznámenie používateľa so všetkými rizikami súvisiacimi s prevádzkou, vrátane tých, ktoré sú uvedené v dokumentácii k produktu spoločnosti Renishaw, a zaručiť poskytnutie adekvátnych zábran a bezpečnostných blokování.

Signál sondy môže za určitých okolností nesprávne indikovať parkovaciu polohu sondy. Pri zastavovaní pohybov stroja sa nespoliehajte na signály sondy.

Ak sa zariadenie používa spôsobom iným ako špecifikovaným výrobcom, môže to eliminovať ochranu poskytovanú zariadením.

Predpokladaný spôsob núdzového zastavenia zariadení spoločnosti Renishaw spočíva v odpojení napájania.



## SL - OPOZORILA

Ob gibanju delov obstaja nevarnost uščipa, zato med ročno menjavo sonde ne držite merilne glave.

Bodite pozorni na nepričakovane premike. Zadržujte se zunaj delovnega območja sonde/podaljška/merilne glave.

Ob uporabi obdelovalnih strojev ali koordinatnih merilnih strojev priporočamo uporabo zaščitnih očal.

Ker običajno Renishaw-jevih enot, napajanih iz omrežja, ne morete servisirati sami, poškodovane dele vrnite pooblaščenemu servisnemu centru Renishaw.

Pregorele varovalke zamenjajte z novimi komponentami istega tipa. Glejte varnostne napotke v ustrezni produktni dokumentaciji.

O varnem načinu čiščenja izdelkov Renishaw si preberite razdelek Vzdrževanje v odgovarjajoči dokumentaciji.

Pred začetkom vzdrževanja stroj izklopite iz električnega omrežja.

Držite se navodil dobavitelja stroja.

Odgovornost dobavitelja stroja je, da uporabnika opozori na vse nevarnosti pri delovanju, tudi na tiste, ki so navedene v Renishaw-jevi dokumentaciji, in da zagotovi vsa potrebna varovala in varnostne zapore.

Signal glave lahko v določenih pogojih lažno javlja, da je sonda spravljena, zato se pri zaustavitvi stroja ne zanašajte nanje.

Uporaba opreme na način, ki odstopa od predpisanega, lahko poslabša varnost izdelka.

Pričakovana metoda za zaustavitev v sili za Renishaw-ove izdelke je odvzem napajanja.

## SV - VARNINGAR

Det finns risk för klämning mellan rörliga delar och mellan rörliga och stillastående delar. Håll inte i probhuvudet under rörelse eller vid manuellt probbyte.

Se upp för plötsliga rörelser. Operatören ska hålla sig utanför arbetsområdet för probhuvud/förlängning/probkombinationer.

Ögonskydd rekommenderas för alla tillämpningar, där verktygsmaskiner eller koordinatmätmaskiner används.

Det finns vanligen inga delar som användaren kan utföra underhåll på inuti Renishaws nätströmsdrivna enheter. Returnera defekta delar till ett auktoriserat Renishaw kundcenter.

Byt trasiga säkringar mot nya av samma typ. Se säkerhetsavsnittet i produktdokumentationen.

Se underhållsinformationen i relevant produktdokumentation för instruktioner angående säker rengöring av Renishaws produkter.

Koppla bort strömmen innan underhåll utförs.

Se maskintillverkarens bruksanvisning.

Maskinleverantören ansvarar för att användaren informeras om de risker som drift innebär, inklusive de som nämns i Renishaws produktdokumentation, samt att tillräckliga skydd och säkerhetsförelagningar tillhandahålls.

Under vissa omständigheter kan probsignalen felaktigt ange att en prob är monterad. Lita inte på probsignaler för att stoppa maskinens rörelse.

Om utrustningen används på ett sätt som inte tillverkaren har avsett kanske skyddet fungerar sämre.

Metoden för nödstopp för Renishaws produkter förutsätter att strömmen kopplas bort.

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## 8 Appendix 2 - User registration

To obtain further information on your PH10 system, and to enable Renishaw to keep you informed with the latest product news, please complete the user registration form overleaf and send it to:

Renishaw plc  
UK Sales Department  
Wotton-under-Edge  
Gloucestershire  
GL12 8JR  
United Kingdom

---

**NOTE:** This information will be treated as strictly confidential and will be used by Renishaw only for internal purposes as described above.

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Please register me as a PH10 system user

Name \_\_\_\_\_

Position \_\_\_\_\_

Company name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone/fax \_\_\_\_\_

e-mail \_\_\_\_\_

CMM make and model \_\_\_\_\_

Please send me:

- PH10 series installation guide
- Basic command set for indexing heads programmer's guide
- HCU1 user's guide
- Styli and accessories technical specifications
- Probing systems for CMMs, technical specifications
- Please arrange for my nearest Renishaw representative to contact me



**Renishaw plc**

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