

# PH10 PLUS installation and user's guide

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# PH10 PLUS installation and user's guide

Documentation part number: H-1000-7592-04-C



## PH10 PLUS installation and user's guide

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# General information

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 ORIGINAL LANGUAGE VERSION

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

## 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.

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### Care of equipment

Renishaw probes and associated systems are precision tools used for obtaining precise measurements and must therefore be treated with care.

### Changes to Renishaw products

Renishaw reserves the right to improve, change or modify its hardware or software without incurring any obligations to make changes to Renishaw equipment previously sold.

### Company registration details

Renishaw plc. Registered in England and Wales. Company no: 1106260. Registered office: New Mills, Wotton-under-Edge, Gloucestershire, GL12 8JR, UK.

### Packaging

To aid end user recycling and disposal the materials used in the different components of the packaging are stated here:

Packaging component	Material	94/62/EC code	94/62/EC number
Outer box	Polypropylene	PP	5
Outer box	Corrugated fibreboard	PAP	20
Packing foam	Low density Polyethylene	LDPE	4
Packing foam	Polyurethane	PU	7
Bag	Low density Polyethylene	LDPE	4

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# Product compliance

## EU declaration of conformity

Contact Renishaw plc or visit [www.renishaw.com/EUCMM](http://www.renishaw.com/EUCMM) for the full EU declaration.

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## UK declaration of conformity

Contact Renishaw plc or visit [www.renishaw.com/UKCMM](http://www.renishaw.com/UKCMM) for the full UK declaration.

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## EMC conformity

This equipment must be installed and used in accordance with this installation guide. This product is intended for industrial use only and should not be used in a residential area or connected to a low voltage power supply network which supplies buildings used for residential purposes.

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## FCC (USA only)

### Information to user (47 CFR 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 (47 CFR 15.21)

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

### Equipment label (47 CFR 15.19)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
  2. This device must accept any interference received, including interference that may cause undesired operation.
-

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### ICES-001 (Canada only)

This ISM device complies with Canadian ICES-001(A) / NMB-001(A).

Cet appareil ISM est conforme à la norme ICES-001(A) / NMB-001(A) du Canada.

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### REACH regulation

Information required by Article 33(1) of Regulation (EC) No. 1907/2006 ("REACH") relating to products containing substances of very high concern (SVHCs) is available at:

[www.renishaw.com/REACH](http://www.renishaw.com/REACH)

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### China RoHS

Contact Renishaw plc or visit [www.renishaw.com/ChinaRoHSCMM](http://www.renishaw.com/ChinaRoHSCMM) for the full China RoHS tabulation.



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# International safety instructions

## BG - ПРЕДУПРЕЖДЕНИЕ

Моля, обърнете на приложение 1 и прочетете инструкциите за безопасност на вашия собствен език, преди за разопаковате и монтирате този продукт.

## CZ - VÝSTRAHA

Před rozbalením a instalací tohoto výrobku si přečtěte bezpečnostní pokyny ve vlastním jazyce uvedené v příloze 1.

## DA - ADVARSEL

Læs sikkerhedsinstrukserne i Appendix 1 FØR udpakning og installation af dette produkt.

## DE - WARNHINWEIS

Bevor Sie dieses Produkt auspacken und installieren, konsultieren Sie bitte Anhang 1 und lesen Sie die Sicherheitshinweise in Ihrer Sprache.

## EL - ΠΡΟΕΙΔΟΠΟΙΗΣΗ

Γυρίστε στο Κεφάλαιο 1 και διαβάστε τις οδηγίες ασφαλείας στη δική σας γλώσσα προτού ανοίξετε αυτό το προϊόν για να το εγκαταστήσετε.

## EN - WARNING

Before unpacking and installing this product, please consult Appendix 1 and read the safety instructions in your language.

## ES - ADVERTENCIA

Consulte el apéndice 1 y lea las instrucciones de seguridad en su idioma antes de desempaquetar e instalar este producto.

## ET - HOIATUS

Palun vaadake 1. lisa ning lugege enne selle toote lahtipakkimist ja paigaldamist ohutusjuhend läbi.

## FI - VAROITUKSIA

Lue liitteessä 1 olevat omalla kielelläsi kirjoitetut turvaohjeet ennen tämän tuotteen pakkauksen avaamista ja asentamista.

## FR - AVERTISSEMENT

Consulter l'annexe 1 et les instructions de sécurité dans votre propre langue avant de débiller et d'installer ce produit.

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### GA - RABHADH

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.

### HR - NAPOMENA

Prije nego što proizvod izvadite iz ambalaže i ugradite ga, otvorite Prilog 1 i pročitajte sigurnosne upute na svom jeziku.

### HU – FIGYELMEZTETÉS

A termék kicsomagolása és telepítése előtt olvassa el az 1. számú függelékben található, az Ön anyanyelvén hozzáférhető biztonsági utasításokat.

### IT - AVVISO

Prima di aprire ed installare questo prodotto, leggere le istruzioni di sicurezza nella vostra lingua riportate nell'Appendice 1.

### JA - 警告

この製品を箱から取り出し設置する前に、付録 1 に記載された安全性に関する注意書きをお読みください。

### LT – ĮSPĖJIMAS

Prieš išpakuodami ir įdiegdami produktą, turite grįžti prie 1 priedo ir perskaityti nurodymus dėl saugos savo kalba.

### LV – BRĪDINĀJUMS

Pirms šī izstrādājuma izsaiņošanas un uzstādīšanas izskatiet 1. pielikumā sniegtās drošības instrukcijas savā valodā.

### MT - TWISSIJA

Jekk jogħġbok mur f'appendiċi 1 u aqra l-istruzzjonijiet tas-sigurtà fil-lingwa tiegħek qabel ma toħroġ dan il-prodott mill-ippakkjar u tinstallah.

### NL - WAARSCHUWING

Ga naar appendix 1 en lees de veiligheidsinstructies in uw eigen taal, voordat u dit product uitpakt en installeert.

### PL - OSTRZEŻENIE

Przed rozpakowaniem i zainstalowaniem tego produktu prosimy o zapoznanie się z Dodatkiem 1 i przeczytanie zaleceń dotyczących bezpieczeństwa w danym języku.

### PT - ADVERTÊNCIA

Você deve retornar ao Anexo 1 e ler as instruções de segurança em seu idioma antes de desembalar e instalar este produto.

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### RO - AVERTISMENT

Înainte de a desface ambalajul și a instala acest produs, vă rugăm să căutați Anexa 1 și să citiți cu atenție instrucțiunile de siguranță, în limba română.

### SK - VÝSTRAHA

Pred rozbalením a inštaláciou tohto produktu si pozrite prílohu 1 a prečítajte si bezpečnostné pokyny vo vašom jazyku.

### SL - OPOZORILO

Preden izdelek vzamete iz embalaže in ga vgradite, odprite Prilogo 1 in preberite varnostna navodila v svojem jeziku.

### SV - VARNING

Gå till bilaga 1 och läs säkerhetsinstruktionerna på ditt eget språk innan du packar upp och installerar denna produkt.

### TW - 警告

在拆開和安裝本產品之前，請翻頁至附錄 1 閱讀母語的安全指示。

### 中文 — 警告

在拆包和安裝本產品之前，請翻到附錄1，閱讀中文版安全說明。



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# 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.

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.

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# Environmental conditions

The following environmental conditions exceed those as defined in BS EN 61010-1:2010:

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

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# References and associated documents

Title	Document number
User's guide: Touch-trigger probes	H-1000-5021
User's guide: SP25M	H-1000-5104
User's guide: HCU2	H-1000-5361
User's guide: AM1	H-1000-4010
Data sheet: AM2	H-1000-2051
Technical specification: Styli and accessories	H-1000-3200
Installation and user's guide: PHC10-3 PLUS	H-1000-0077
User's guide: PICS	H-1000-5000
Installation guide: UCC T3 PLUS and UCC S3 CMM controller	H-1000-2118

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# Introduction

This guide describes the installation and product usage of the PH10 PLUS series of motorised probe heads. This guide gives information on physical installation as well as assistance in fault-finding during the installation of a system.



**CAUTION:** The components of the PH10 PLUS system are not compatible with PH9 and PH20 system components. No attempt should be made to connect the PH10 PLUS system components to a PH9 or PH20 system as this will result in damage to the product.



**CAUTION:** PH10 PLUS heads must be used in conjunction with the Renishaw PHC10-3 PLUS when part of an OEM installation not using Renishaw UCC controllers.

This guide should be read in conjunction with the PHC10-3 PLUS installation guide (part number H-1000-0077) in order to fully understand the system connections, features, capabilities and operation.

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# System description


Product	Description
PH10T PLUS	A shank-mounted head with two-wired probe capability and an M8 thread.
PH10M PLUS	A shank-mounted head with multiwired probe capability and a Renishaw autojoint.
PH10MQ PLUS	A quill-mounted head with multiwired probe capability and a Renishaw autojoint.
HCU2	A hand control unit for use with PH10 measurement systems.
PHC10-3 PLUS	A controller for use with PH10 measurement systems.
UCC T3 PLUS	Renishaw CMM controller with integrated PH10 PLUS controller
UCC S3	Renishaw CMM controller with integrated PH10 PLUS controller

The PH10 PLUS range of motorised heads consists of three different models.

Each head in the PH10 PLUS range is a general purpose, versatile unit designed specifically for use on direct computer controlled (DCC) CMMs and incorporates the following features:

- 720 indexing positions
- 0.4 µm indexing repeatability
- 7.5° indexing steps in both axes
- 300 mm (maximum) extension bar capability \*

 \* **NOTE:** 450 mm is possible for PH10M PLUS / PH10MQ PLUS with special order carbon fibre extensions.

 **WARNING:** No attempt should be made to connect the PH10 PLUS system to any other any other system components as incompatibility will result in damage to the product.

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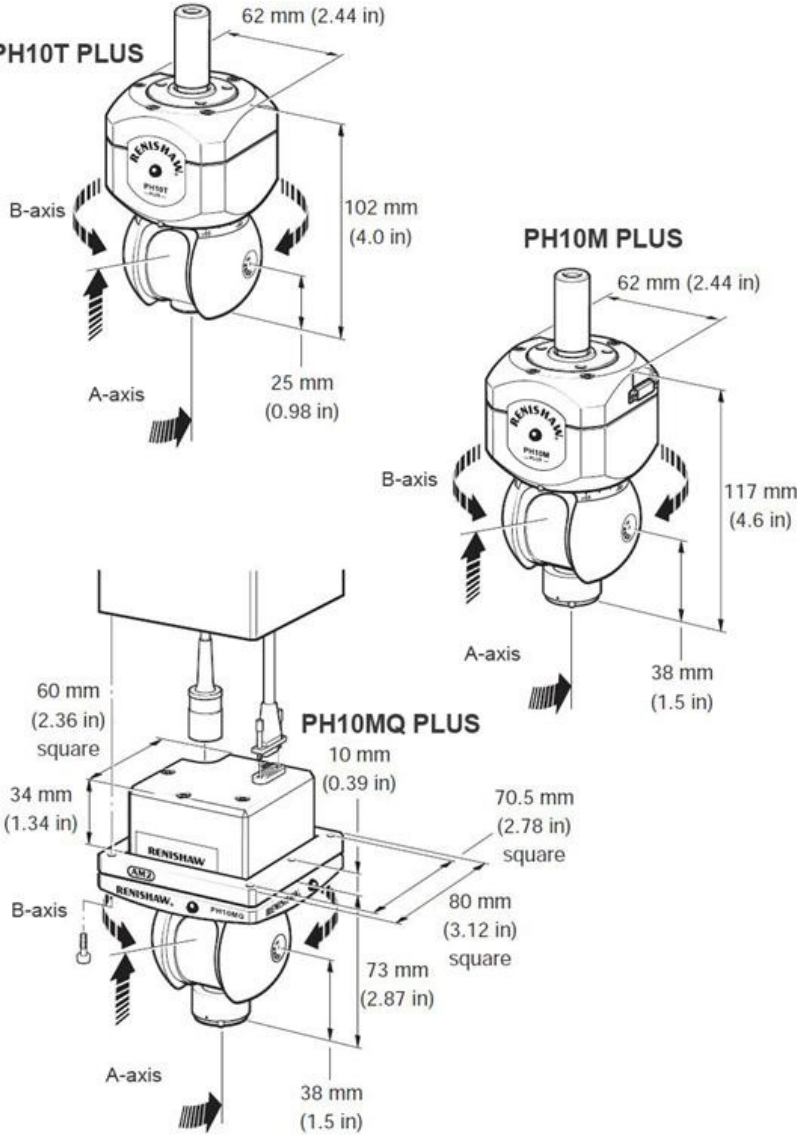
### Specification

<b>Repeatability of position (at a distance of 100 mm)</b>	PH10T PLUS PH10M PLUS PH10MQ PLUS	<0.4 µm TP20 and stylus <0.4 µm TP6A and stylus <0.4 µm TP6A and stylus
<b>Accuracy of step spacing from theoretical position</b>	PH10T PLUS PH10M PLUS PH10MQ PLUS	±0.24 mm TP6 probe and stylus ±0.3 mm TP6A probe and stylus ±0.3 mm TP6A probe and stylus
<b>Positioning</b>	Step A-axis 0° to 105° B-axis -180° to +180° Total	7.5° 15 positions 48 positions 720 positions
<b>Probe mounting</b>	PH10T PLUS PH10M PLUS PH10MQ PLUS	M8 thread, 18 mm diameter bush face Multiwired autojoint Multiwired autojoint
<b>Dimensions from quill face</b>	XY (all) Z (PH10T PLUS) Z (PH10M PLUS) Z (PH10MQ PLUS)	62 mm 102 mm 117 mm 73 mm
<b>Weight</b>	PH10T PLUS PH10M PLUS PH10MQ PLUS	595 g 620 g 730 g

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## PH10 PLUS range dimensions



**CAUTION:** Please ensure that the head is mounted as rigidly as possible in the CMM's quill. Avoid collisions between the head, workpiece or CMM bed, ensuring 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 and do not move the head axes by hand when locked or unlocked.

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# Styli

Renishaw manufacture 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, M3 and M4 thread sizes.

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

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



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# Probe extension bars

Renishaw manufactures a comprehensive range of extension bars and adaptors to allow increased component penetration.

There are three types in the range:

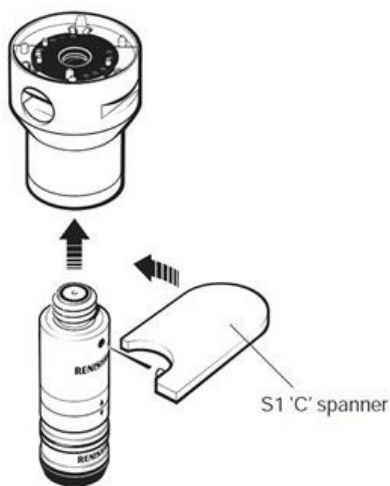
- Autojoint to M8 bush (PAA series)
- Autojoint to autojoint (PEM series)
- M8 thread to M8 bush (PEL series)

## Autojoint to M8 bush

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

Extensions	Length	Material	Weight
PAA1	32 mm	Steel	57 g
PAA2	144 mm	Aluminium	85 g
PAA3	300 mm	Aluminium	144 g

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



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).

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### Autojoint to autojoint

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

Extensions	Length	Material	Weight
PEM25	25 mm	Aluminium	60 g
PEM1	50 mm	Aluminium	64 g
PEM2	100 mm	Aluminium	93 g
PEM3	200 mm	Aluminium	147 g

### M8 thread to M8 bush

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

Extensions	Length	Material	Weight
PEL1	50 mm	Aluminium	22 g
PEL2	100 mm	Aluminium	43 g
PEL3	200 mm	Aluminium	80 g
PEL4	300 mm	Aluminium	141 g

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# PH10 compatible probes

## M8 touch-trigger probes

This range of probes utilises the M8 bush for mounting to the head. These can be fitted directly onto the PH10T PLUS head, but when used with the PH10M PLUS or PH10MQ PLUS heads, one of the autojoint to M8 bush extension bars of the PAA1 adaptor must be used.

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-1000-5008
TP20	13.2 mm	Universal probe for DCC and manual CMMs with module changing.	H-1000-5021
TP200	13.5 mm	Universal probe with strain gauge for DCC CMM - 100 mm max stylus length.	H-1000-5014

\* An autojoint version (TP6A) is also available

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### Multiwire (autojoint) probes

This range of probes is compatible with the PH10M PLUS and PH10MQ PLUS heads only and utilise the Renishaw multiwired autojoint connection to the head.

Probe	Diameter	Application	Weight	User's guide
SP25M	25 mm	High speed scanning probe.	65 g (body) 35 g (SM25-1) 40 g (SM25-2) 49 g (SM25-3) 71 g (SM25-4) 45 g (SM25-5) 40 g (TM25-20)	H-1000-5104
TP7M	25 mm	Universal probe with strain gauge for DCC CMMs.	85 g (without stylus)	H-1000-2010
SP600M*	50 mm	Analogue contact scanning probe.	216 g (without stylus)	H-1000-5175

Probes in this range require comprehensive integration with your CMM.

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

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# PH10 connection of probes and extensions

## PH10T PLUS M8 connection

PH10T PLUS is designed to carry Renishaw probes and extensions with an M8 screw thread. 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.

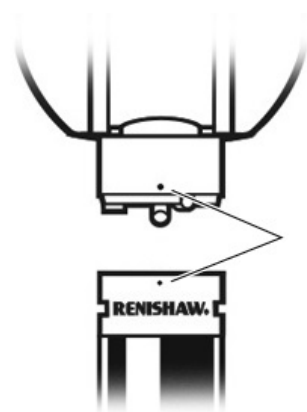


## PH10M PLUS and PH10MQ PLUS autojoint connection

PH10M PLUS and PH10MQ PLUS heads use a Renishaw autojoint which is a highly repeatable kinematic joint, one half is integral to 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 systems (ACR1 or ACR3). In both cases, the connection's repeatability eliminates the need for probe requalification after exchange.

If an extension bar, adaptor or probe needs to be attached to the head manually, ensure that the location dots shown in the image below are aligned.



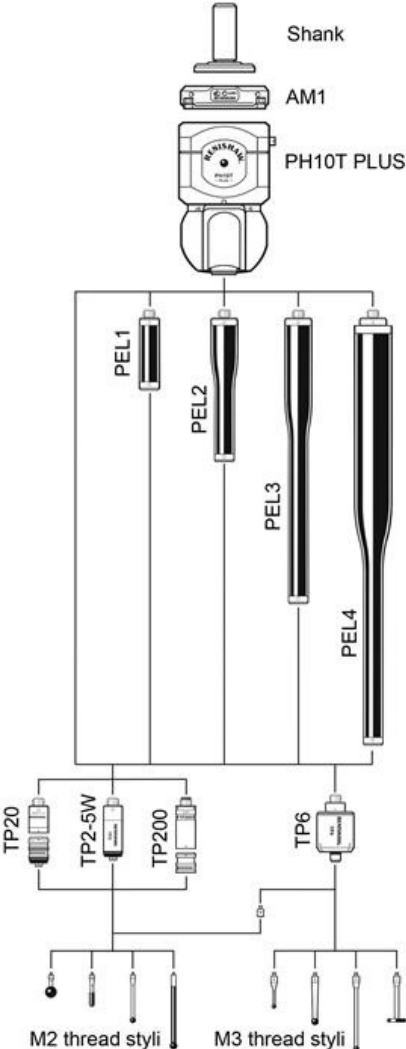
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## Probe system diagrams

### PH10T PLUS probe system diagram

The diagram below shows the range of extensions, probes and styli which can be used in conjunction with the PH10T head.

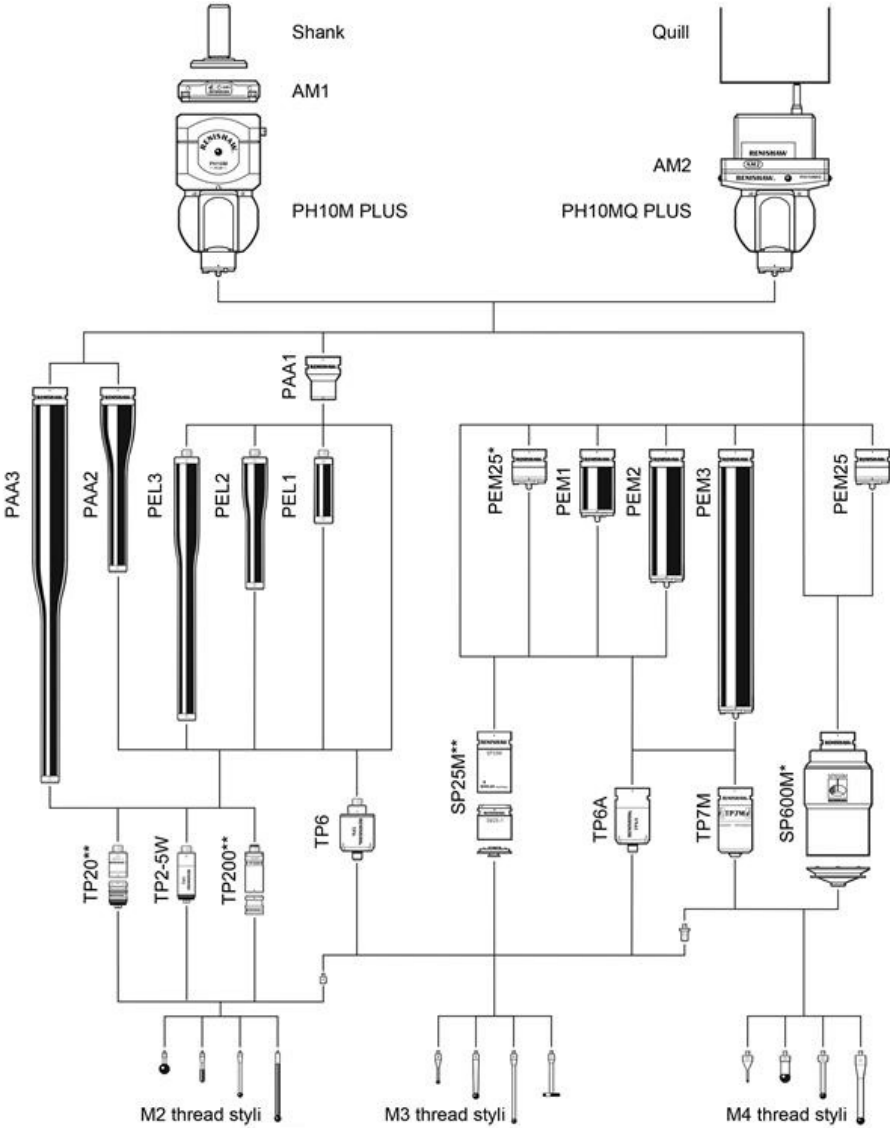


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## PH10M PLUS and PH10MQ PLUS probe system diagrams

The diagram below shows the range of extensions, probes and styli which can be used in conjunction with the PH10M PLUS and PH10MQ PLUS heads.



\* PH10MQ PLUS used with SP600M requires a PEM25 extension bar to achieve A = 97.5° or A = 105° in all B-axis positions.

\*\* Other modules versions are available for TP20, TP200 and SP25M.

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# HCU2 hand control unit

The HCU2 hand control unit is an optional control which enables the PH10 PLUS system to be used in manual mode or in a teach cycle. A LCD dot matrix display provides information on system status.



## Manual mode

In manual mode the optional HCU2 hand control unit is used to control head and probe functions. If the HCU2 is connected to the PHC10-3 PLUS controller when power is applied to the system, the system will enter manual mode. For further information refer to the HCU2 user's guide (part number H-1000-5361).

## Automatic mode

In automatic mode the system is under the control of the CMM computer. The HCU2 cannot be used to control head or probe functions in automatic mode. With no HCU2 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 HCU2 connected) for operation under manual mode.

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

See the HCU2 user's guide (part number H-1000-5361) for further information on the features and operation of the unit, or contact your Renishaw representative for advice.



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# PHC10-3 PLUS probe head controllers

PH10 PLUS heads must be used in conjunction with either the PHC10-3 PLUS controller or the UCC T3 PLUS or UCC S3 universal CMM controller.

## PHC10-3 PLUS controller

PHC10-3 PLUS manages all all head functions and communicates via a serial interface with the CMM computer.

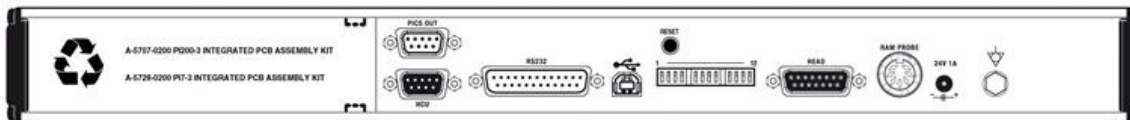
If an internal probe interface is fitted with the PHC10-3 PLUS it will obtain its power internally from the PHC10-3 PLUS controller.



PHC10-3 PLUS is available in three options:

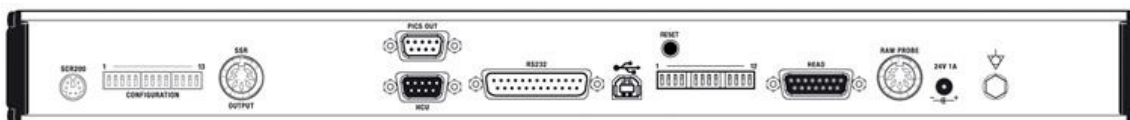
### Standard PHC10-3 PLUS with provision for interface card to be inserted

(Renishaw part number A-5863-0100)



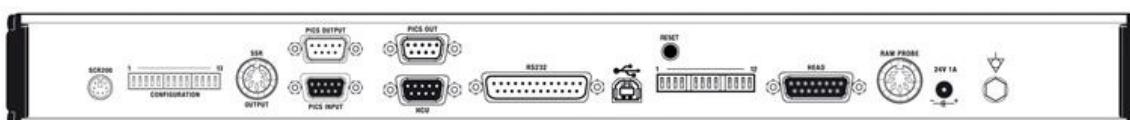
### PHC10-3 PLUS with single rear panel and integrated PI 200-3 probe interface

(Renishaw part number A-5863-0200)



### PHC10-3 PLUS with integrated PI 200-3 probe interface and external PICS loop

(Renishaw part number A-5863-0300)




Refer to the PHC10-3 PLUS installation guide (Renishaw part number H-1000-0077) for further detail.


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### Powering PHC10-3 PLUS

The PHC10-3 PLUS head controller is to be used with the provided PSU. This is a 24 Vdc 40 W supply and is connected to the PHC10-3 PLUS via Ø5.5 mm dc jack plug.

 **NOTE:** PHC10-3 PLUS does not require a protective earth, however an equipotential bonding point is provided on the rear panel for connection to the rest of the installation.

 **NOTE:** For system interconnection diagrams refer to the PHC10-3 PLUS installation guide (Renishaw part number H-1000-7592).

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## Renishaw CMM controllers

The same PHC10-3 PLUS controller functionality is also incorporated into the UCC T3 PLUS and UCC S3 CMM controllers . For further information consult installation guide (Renishaw part number H-1000-2118).



## PH10 PLUS installation and user's guide

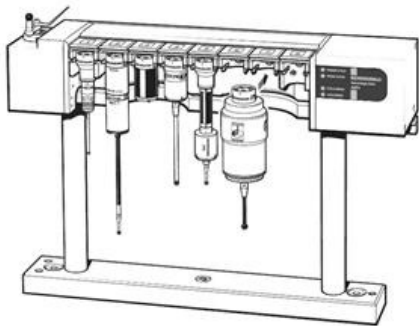
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# Autochange racks

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

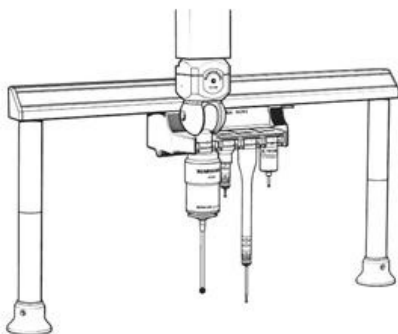
## ACR1

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.



## ACR3

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).



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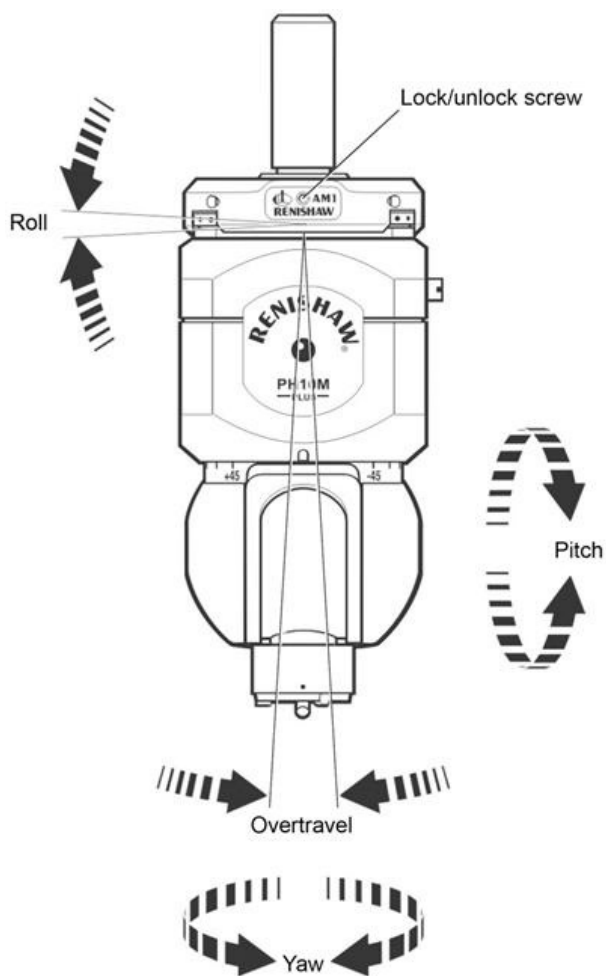
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# Adjustment modules

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

## AM1 adjustment module

The AM1 adjustment module shown below is designed for use on the PH10T PLUS and PH10M PLUS. It has a quick release mechanism allowing for rapid head exchange and features inbuilt overtravel protection. For further information on the AM1, please refer to the AM1 user's guide (part number H-1000-4010).

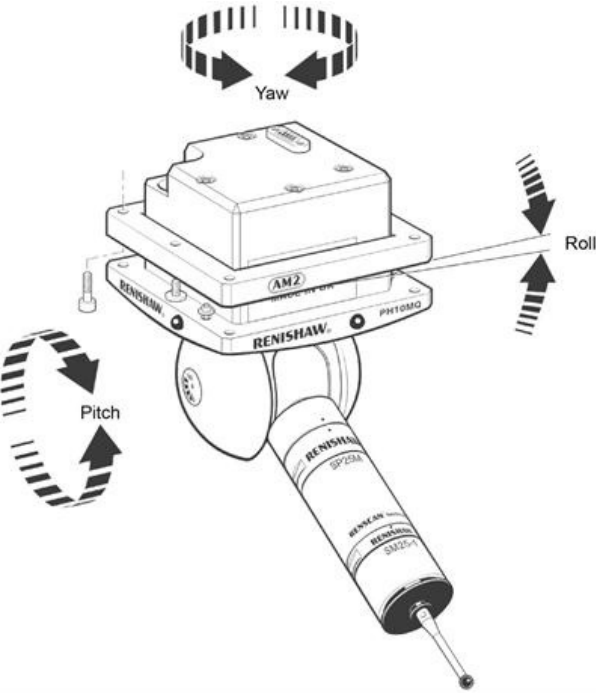


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## AM2 adjustment module

The AM2 adjustment module shown below is designed for use with the PH10MQ PLUS. For further information on the AM2, please refer to the AM2 product information sheet (part number H-1000-2051).



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# Maintenance

There are no user serviceable parts inside any PH10 PLUS system components. Components requiring attention must be returned to an authorised Renishaw customer service centre.

## Cleaning

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

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# Troubleshooting

## Overload error

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

## Obstruct error

Possible cause	Solution
Head / stylus configuration obstructed	Check head for damage. Remove obstruction and repeat move.
Probe extension combination too long	Use a shorter / lighter stylus combination.
Internal head fault	Contact your Renishaw representative.
PH10 PLUS head and non-PLUS PHC10-3 or third party controller	Contact your Renishaw representative.

## Datum error

Possible cause	Solution
Cable / connections faulty	Check condition of cabling from head to controller.
Head / stylus configuration obstructed	Remove obstruction and update head using HCU2 or under CMM control.
Probe extension combination too long	Use shorter / lighter stylus combination.
Head damaged	Contact your Renishaw representative.



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### No head movement in automatic mode

Possible cause	Solution
Head controller in manual mode	Change to automatic mode.
Power loss	Check mains cable connections and integrity. Check power block is supplying 24 V. Check CMM emergency stop condition - power may have been removed by CMM.
Cable / connection fault	Check connection and integrity of cabling between head and controller.
Communications failure	Check RS232 baud rate.
Incorrect command set selected	Check correct command set is selected.
PICS STOP is asserted by other system component	Clear the fault asserting PICS STOP.

### No head movement in manual mode

Possible cause	Solution
Head controller in automatic mode.	Change to manual mode.
Power loss	Check mains cable connections and integrity. Check power block is supplying 24 V. Check CMM emergency stop condition - power may have been removed by CMM.
Cable / connection fault	Check connection and integrity of cabling between head and controller.

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### No probe output signal received by the CMM computer

Possible cause	Solution
Cable / connection fault	Check connection and integrity of cabling between head and controller. Check connection and integrity of cabling between controller and interface. Check connection and integrity of cabling between interface and computer.
Multiwire bypass connector not fitted	Fit a multiwire bypass connector which will permit a standard touch-trigger probe signal to reach controller
Multiwired probe in use	Check that the multiwire cable is correctly fitted to the head. Check that the trigger output to the CMM computer is connected to the multiwired probe interface.

### No probe signal

Possible cause	Solution
Probe incorrectly attached	Remove probe and reattach.
Cable / connections faulty	Check condition of cabling from head to controller.
Probe failure	Contact your Renishaw representative.
Probe output disabled by CMM	Check probe output.

### Poor measurement performance

Possible cause	Solution
Loose head mounting	Ensure all mounting screws are tight and that mounting to the CMM is secure
Probe incorrectly attached	Remove probe and reattach
Force applied to head during lock up	Lock and unlock the head
Incorrect lock up position	Reposition head correctly
Position not qualified	Check qualification information
Probe damping enabled during measurement	Ensure probe damping is not enabled during measurement moves

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

- Your CMM manufacturer and model
- The probe head model
- The probe head serial number
- The head controller serial number
- The head controller version number
- The LED sequence on the PHC10-3
- The stylus configuration fitted

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

# Appendix 1 - International safety warnings

## 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 пълния работен обсег на комбинацията глава на пробника / удължител / пробник.

Препоръчва се защита на очите във всички приложения, включващи използване на машинни инструменти или СММ (машини за измерване на координатите).

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 продуктовата документация на Renishaw, и да гарантира осигуряване на съответни предпазители и безопасителни 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, това може да се отрази неблагоприятно на осигуряването от оборудването защита.

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### CZ - 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 hlavičky, prodloužení a sondy.

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

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.

Pokud je zařízení používáno způsobem, který není specifikován výrobcem, může dojít ke snížení ochrany poskytované zařízením.

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### 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.

Se under vedligeholdelse i produktokumentationen for at få instruktioner til sikker rengøring af Renishawprodukter.

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 produktokumentation, 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.

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### DE - SICHERHEITSANWEISUNGEN

Zwischen zwei beweglichen und zwischen beweglichen und statischen Teilen besteht Einklemmgefahr. Der Messtasterkopf darf während des Betriebs oder einem Messtasterwechsel nicht festgehalten werden.

Auf unerwartete Bewegungen achten. Der Anwender soll sich nur außerhalb des Messtaster-Arbeitsbereiches aufhalten.

Bei Arbeiten an Koordinatenmessgeräten und Werkzeugmaschinen wird ein Augenschutz empfohlen.

Anleitungen zur sicheren Reinigung von Renishaw Produkten sind im Kapitel Wartung in der Produktdokumentation enthalten.

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 Messtastersignal, 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.

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### ΕΛ - ΠΡΟΕΙΔΟΠΟΙΗΣΕΙΣ

Υπάρχει κίνδυνος συμπίεσης μεταξύ κινούμενων μερών καθώς και μεταξύ 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 ξαφνικές 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.

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.

Ανατρέξτε στις 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 και 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.



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### 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.

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.

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### ES - AVISOS

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

Tenga cuidado con los movimientos inesperados. 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.

Para instrucciones sobre seguridad a la hora de limpiar los productos Renishaw, remitirse a la sección de mantenimiento en la documentación sobre el producto.

Quite la corriente antes de realizar cualquier operación de mantenimiento.

Remítase a las instrucciones de manejo del proveedor de la máquina.

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

En determinadas circunstancias, la señal de la sonda puede indicar erróneamente que la sonda está asentada. No confíe en las señales de la sonda para detener la máquina.

Si no se cumplen las indicaciones especificadas por el fabricante para la utilización del equipo, la protección de este puede resultar inutilizada.

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### ET - HOIATUSED

Muljumisoht eksisteerib masina liikuvate ning liikuvate ja liikumatute osade vahel. Ärge hoidke masina liikumise ajal või sondi käsitsi vahetamise ajal sondipeast kinni.

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

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

Renishaw' toodete ohutu puhastamise juhised on toodud vastava toote dokumentatsioonis.

Enne hooldustööde tegemist ühendage seade toiteallikast lahti.

Täpsemad juhised leiate masina tarnija poolt antud kasutusjuhendist.

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 viidata valesti sondiga seotud olukorrale. Ärge lootke masina liikumise peatamiseks sondi signaalile.

Kui seadet kasutatakse viisil, mida tootja ei ole ette näinud, võib seadme pakutav kaitse väheneda.

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### FI - VAROITUS

Liikkuvien osien ja staattisten osien välillä on litistymisvaara. Älä pidä kiinni anturin päästä sen liikkessa tai vaihtaessasi anturia käsin.

Varo odottamatonta liikettä. Käyttäjän tulee pysyä anturin pään, lisäosien ja anturiyhdistelmien toimintasäteen ulkopuolella.

Silmänsuojainten käyttö on suositeltavaa kaikkia työstökoneita ja koordinoituja mittauskoneita (CMM) käytettäessä.

Renishaw-tuotteiden turvalliset puhdistusohjeet löytyvät kunkin tuotteen huolto-ohjeista.

Katkaise virta ennen huoltotoimenpiteiden suorittamista.

Tutustu koneen toimittajan käyttöohjeisiin.

Koneen toimittajan vastuulla on että käyttäjä on saanut tiedon mahdollisista käyttöön liittyvistä vaaroista, mukaan lukien Renishaw'n tuoteselosteessa mainitut vaarat. Konetoimittajan tulee myös varmistaa, että suojukset ja turvalukitukset ovat riittävät.

Tietyissä olosuhteissa anturilta tuleva signaali saattaa virheellisesti osoittaa, että anturi on paikallaan. Älä luota siihen, että anturin signaalit pysäyttävät varmuudella koneen liikkumisen.

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

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### 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 lors du chargement manuel du palpeur.

Attention aux mouvements imprévisibles. L'utilisateur doit toujours rester en dehors de la zone de sécurité des configurations tête / rallonge / palpeur.

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

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 de s'assurer que l'utilisateur a pris connaissance des dangers d'utilisation, y compris ceux décrits dans la documentation du produit Renishaw, et de s'assurer que des protections et verrouillages de sûreté adéquats sont prévus.

Il peut arriver dans certains cas que le signal du palpeur indique à tort son état "au repos". Il ne faut pas se fier aux signaux venant du palpeur car ils ne garantissent pas toujours l'arrêt de la machine.

Si l'équipement est utilisé d'une façon contre indiquée par le fabricant, la protection fournie par le matériel peut être compromise.

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### 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, ná nuair atá tóireadóir á athrú.

Fainic an chorraíl gan choinne. Ba cheart don úsáideoir fanacht lasmuigh de chlúdach iomlán oibre cheann/shíneadh/theaglaimí an tóireadóra.

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

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

Bain an chumhacht de sula ndéantar aon oibríochtaí cothabhála.

Déan tagairt do threoracha oibríúcháin sholáthraí an mheaisín féin.

Is í freagracht sholáthraí an mheaisín í chun a chinntiú go gcuirtear an t-úsáideoir ar an eolas i leith aon ghuaiseacha a bhaineann leis an oibríúchán, lena n-áirítear iad siúd a luaitear i gcáipéisíocht táirge Renishaw, agus chun a chinntiú go soláthraítear sciatha cosanta agus idirghlais sábháilteachta leordhóthanacha.

Féadtar toisc bhréagach tóireadóra-shuite a léiriú i roinnt cúinsí le comhartha an tóireadóra féin. Ná bí ag brath ar chomharthaí tóireadóra le gluaiseacht an mheaisín a stopadh.

Má úsáidtear an trealamh ar bhealach nach bhfuil mionsonraithe ag an déantúsóir, d'fhéadfadh an chosaint sa trealamh bheith lagaithe.

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### HR - NAPOMENA

Između dijelova u pokretu i između pokretnih i statičkih dijelova postoji opasnost od uklještenja. Tijekom pomicanja ili ručne zamjene sonde, nemojte držati glavu sonde.

Budite oprezni zbog mogućnosti neočekivanog pomicanja. Korisnik mora ostati izvan punog radnog dometa glave sonde/produžetka/kombinacija sonde.

Kod svih primjena koje uključuju upotrebu alatnih strojeva ili CMM-ova preporučuje se zaštita očiju.

Za upute o sigurnom čišćenju proizvoda Renishaw proučite informacije o održavanju u odgovarajućoj dokumentaciji proizvoda.

Isključite napajanje prije provođenja bilo kakvih radova održavanja.

Proučite upute za rad dobavljača stroja.

Dobavljač stroja dužan je osigurati da korisnik bude upozoren na sve opasnosti tijekom rada, uključujući one navedene u dokumentaciji proizvoda Renishaw, te mora osigurati odgovarajuće zaštite i sigurnosne blokade.

Pod određenim okolnostima signal sonde može lažno pokazivati stanje položaja sonde. Nemojte se pouzdati da će signali sonde zaustaviti kretanje stroja.

Ako se oprema koristi na način koji se razlikuje od onoga koji navodi proizvođač, zaštita opreme se može narušiti.

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### HU - FIGYELMEZTETÉSEK

A mozgó alkatrészek, illetve a mozgó és álló alkatrészek között becsípődés veszélye áll fenn. A tapintófejet ne fogja meg mozgás, vagy a tapintó kézzel történő cseréje közben.

Legyen óvatos a nem várt mozgások tekintetében. Tartózkodjon a tapintófej és hosszabbítójának teljes mozgáskörzetén kívül!

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

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

Karbantartási munkák előtt mindig áramtalanítsa a gépet.

Ezzel kapcsolatban tekintse át a gép gyártója által kiadott kezelési utasítást.

A gép gyártójának kötelessége felhívni a felhasználó figyelmét a berendezés használata során fennálló valamennyi veszélyre, beleértve a Renishaw termékeihez tartozó dokumentációban említett kockázatokat is; emellett az ő felelőssége a megfelelő védőelemek és biztonsági megszakító berendezések biztosítása is.

A tapintó jel, bizonyos körülmények között, tévesen jelezheti, hogy a tapintó még nem tért ki. Ne hagyatkozzon a tapintó jelére, ha meg kell állítani a gépet.

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



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### 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 testina 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 prolunghie e di altri accessori della sonda.

Si raccomanda di indossare occhiali protettivi in applicazioni che comportano l'utilizzo di macchine utensili e macchine di misura a coordinate.

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

Prima di effettuare qualsiasi intervento di manutenzione, togliere la 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 sicurezza e interblocchi di sicurezza 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.

Il grado di protezione normalmente fornito sui dispositivi potrebbe essere reso meno efficace in caso di utilizzo non conforme a quanto specificato dal produttore.

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### JA - 警告

可動部の間または可動部と固定部の間に指などが挟まれる危険があります。駆動中やプローブの手動交換中は、プローブヘッドを手で持たないでください。

予想外の動作に注意してください。プローブシステムの可動範囲内に入らないでください。

工作機械や三次元測定機を使用する場合は、保護眼鏡の着用を推奨します。

レニショー製品を清掃する場合は、関連する製品の説明書のメンテナンスに関するセクションを参照してください。

メンテナンス作業を行う前には必ず、電源を切ってください。

機械メーカーの操作説明書を参照してください。

レニショーの製品説明書に記載されている内容も含め、操作に伴うあらゆる危険性をユーザーへ周知してください。また、適切な保護機構とインターロックシステムの設置は、各工作機械メーカーの責任で行なってください。

ある状況下では、プローブ信号出力が正しく出力されない場合もあります。プローブ信号のみに頼って機械を停止させないようにしてください。

本製品をメーカーが指定する方法以外で使用した場合、本製品の保護性能・機能が低下することがあります。

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### LT - ĮSPĖJIMAI

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

Saugokitės netikėtų judesių. Naudotojas turi saugotis patekti į bet kurią zondo galvutės / ilgintuvo / zondų junginio veikimo zonos dalį.

Atliekant visus darbus, kai naudojami įrenginio įrankiai, įrenginys valomas ir prižiūrimas, rekomenduojama užsidėti apsauginius akinius.

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

Prieš atlikdami techninę priežiūrą, išjunkite elektros srovės tiekimą.

Laikykites įrenginio tiekėjo naudojimo nurodymų.

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

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

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

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### LV - BRĪDINĀJUMS

Pastāv risks tikt saspiestam starp kustīgajām daļām, kā arī starp kustīgajām un nekustīgajām daļām. Neturiet zondes galviņu kustības laikā vai manuāli mainot zondi.

Uzmanieties no nejaušām kustībām. Lietotājam jāpaliek ārpus zondes galviņas/uzgaļa/kontaktmērgalviņas pilna darbības rādiusa.

Izmantojot darba iekārtas vai koordinātu mērīšanas ierīces, ieteicams izmantot acu aizsarglīdzekļus.

Lai uzzinātu par drošu „Renishaw” izstrādājumu tīrīšanu, attiecīgā izstrādājuma dokumentācijā izlasiet informāciju par apkopi.

Atvienojiet izstrādājumu no strāvas pirms jebkuru apkopes darbu veikšanas.

Skatiet iekārtas piegādātāja ekspluatācijas instrukcijas.

Iekārtas piegādātājs atbild par to, lai lietotājs tiktu 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 signāliem, lai apturētu iekārtas kustību.

Ja iekārtu lieto neatbilstīgi ražotāja norādēm, tās nodrošinātā aizsardzība var mazināties.

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### MT - TWISSIJET

Jeżistu perikli li persuna tinqaras bejn il-partijiet li jkunu jiċċaqilqu u l-partijiet statiči. Iżzommx ir-ras tas-sonda waqt il-moviment, jew meta tkun qiegħed/qiegħda tibdel sonda.

Oqgħod attent għal moviment mhux mistenni. L-utent għandu jibqa' 'l barra miż-żona kompleta tal-operat tal-kombinazzjonijiet tat-tagħmir tal-probe head/extension/probe.

Fix-xogħol kollu li jinvolvi l-użu ta' għodda tal-magni jew CMMs, il-protezzjoni tal-għajnejn hi rakkomandata.

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 tibda tagħmel xi xogħol ta' manutenzjoni.

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

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

Taħt ċerti ċirkustanzi, is-sinjali tas-sonda jista' jindika b'mod falz kundizzjoni probe-seated. Tiddependix fuq is-sinjali tas-sonda biex twaqqaf il-moviment tal-magna.

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

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### 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.

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

Voor alle toepassingen waarbij bewerkingsmachines of CMM's worden gebruikt, wordt het dragen van een veiligheidsbril aanbevolen.

Voor het veilig reinigen van Renishaw producten wordt verwezen naar de onderhoudsinstructies in de bijbehorende productdocumentatie.

Schakel de stroom uit, voordat u onderhoudswerkzaamheden verricht.

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 voor het stoppen van de machinebeweging.

Gebruik van deze apparatuur op een manier die de fabrikant niet voorgeschreven heeft, kan de bescherming door de apparatuur beperken.

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### 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 niespodziewane ruchy maszyny. Użytkownik powinien pozostawać poza pełnym zasięgiem roboczym zespołu głowica sondy / łącznik przedłużający / sonda.

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

Aby uzyskać instrukcje dotyczące bezpiecznego wykonywania czyszczenia produktów Renishaw, należy zapoznać się z informacjami dotyczącymi konserwacji w dokumentacji odpowiedniego produktu.

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

Zapoznać się z instrukcjami obsługi dostarczonymi przez dostawcę urządzeń.

Na dostawcy maszyny 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 pewnych okolicznościach sygnał z sondy może błędnie wskazywać stan gotowości sondy. Nie należy zatrzymywać pracy maszyny polegając wyłącznie na sygnale z sondy.

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

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### PT - ATENÇÃO

Risco de beliscadura entre as peças em movimento e entre estas e as estáticas. Não segurar no cabeçote do apalpador durante os movimentos ou durante a troca manual do apalpador.

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

Em todas as aplicações que envolvam a utilização de máquinas-ferramenta e CMMs, é recomendada a utilização de proteção para os olhos.

Para instruções relativas à limpeza segura dos produtos Renishaw, consultar as informações sobre manutenção na respectiva 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 da responsabilidade do fornecedor da máquina assegurar que o utilizador tem conhecimento de quaisquer perigos envolvidos no funcionamento, incluindo os mencionados na documentação do produto da Renishaw, e garantir que são fornecidas proteções e bloqueios de segurança.

Sob certas circunstâncias, o sinal do apalpador pode incorretamente indicar uma condição de não contato do apalpador. Não confie nos sinais do apalpador para parar o movimento da máquina.

Se o equipamento for utilizado de uma maneira não indicada pelo fabricante, a proteção disponibilizada pelo equipamento pode ficar comprometida.



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### 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. O usuário deve permanecer fora da área de trabalho das combinações de cabeçote / extensão / apalpador.

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

Para instruções relativas à limpeza segura dos produtos Renishaw, consultar as informações sobre manutenção na respectiva documentação do produto.

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

Consultați instrucțiunile de operare livrate de furnizorul mașinii.

Furnizorul mașinii este responsabil să asigure că utilizatorul cunoaște pericolele pe care le presupune operarea mașinii, inclusiv cele menționate în documentația produsului Renishaw, și să asigure că sunt furnizate dispozitivele de blocare și de protecție corespunzătoare.

Sob certas circunstâncias, o sinal do apalpador pode incorretamente indicar uma condição de não contato do apalpador. Não confie nos sinais do apalpador para parar o movimento da máquina.

Dacă echipamentul este folosit în alte condiții decât cele specificate de producător, gradul de siguranță oferit de acesta poate fi diminuat.

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### SK - VÝSTRAHY

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

Dávajte 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.

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 výrobku spoločnosti Renishaw, a zaručiť poskytnutie adekvátnych zábran a bezpečnostných blokovacích poistiek.

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, ktorý nešpecifikoval výrobca, môže to negatívne ovplyvniť ochranu poskytovanú zariadením.

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### SL - OPOZORILA

Nevarnost stiska med premikajočimi se deli oziroma med premikajočimi se in statičnimi deli. Ne držite merilne glave med premiki ali ko ročno menjavate glavo.

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

Pri vsaki uporabi obdelovalnih strojev ali koordinatnih merilnih strojev priporočamo uporabo zaščitnih očal.

O varnem čiščenju izdelkov Renishaw si preberite razdelek Vzdrževanje v pripadajoči 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 dokumentaciji Renishaw, in da zagotovi vsa potrebna varovala in varnostne zapore.

V določenih pogojih lahko signal glave lažno nakazuje, da je glava spravljena. Ne zanašajte se na signale glave za ustavitev gibanja stroja.

Drugačna uporaba opreme, kot jo je predpisal proizvajalec, lahko povzroči izpad zaščitnih funkcij opreme.

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### 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.

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 säkerhetsföreglingar tillhandahålls.

Under vissa omständigheter kan probsignalen felaktigt ange att en prob är monterad. Não confie nos sinais do apalpador para parar o movimento da máquina.

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

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### TW - 警告

行走移動零件之間以及行走移動零件與靜止零件之間存在夾傷的危險。在移動時或手工更動換測頭時，切勿握住測頭座。

謹防意外移動。使用者位置應保持在測頭座／延長桿／測頭組合件的整個工作包覆面以外。

在所有涉及使用工具機或三次元量床的應用中，建議要有眼睛保護措施。

有關 Renishaw 公司產品的安全清潔指示，請參見相關產品說明書的維護資訊。

執行任何維修工作前，請先關閉總電源。

請參閱機器供應商的操作指南。

機器供應商有責任確保使用者瞭解操作機器所存在的任何危險，包括 Renishaw 產品說明書中提及之情況，並保證提供充分的安全防護罩和安全聯鎖裝置。

在某些情況下，測頭的顯示信號可能錯誤表示測頭已就位。切勿單憑測頭訊號來停止機器的行程移動。

如果裝置使用方式與製造商要求的方式不符，則裝置提供的保護功能可能會減弱。

## PH10 PLUS installation and user's guide

[www.renishaw.com](http://www.renishaw.com)

### 中文 — 警告

运动部件之间以及运动部件与静止部件之间存在夹伤危险。在移动时或手工更换测头时，切勿握住测头座。

谨防意外移动。用户应该保持在测座/加长杆/测头组合件的整个工作区以外。

在所有涉及使用机床或坐标测量机 (CMM) 的应用中，建议采取保护眼睛的措施。

有关雷尼绍产品的安全清洁的指示，请参阅相关产品说明书中的维护说明。

在执行任何维护作业之前，请先断开电源。

请参阅机床供应商的操作说明书。

机床制造商有责任确保用户了解操作中存在的任何危险(包括雷尼绍产品说明书中提到的危险)，并确保提供充分的防护装置和安全联锁装置。

在某些情况下，有误发测头已复位状态信号的可能。切勿单凭测头信号来停止机床运动。

如果设备使用方式与制造商要求的方式不符，则设备提供的保护功能可能会减弱。

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