PHS-2 installation and user's guide

Document part number H-1000-5620-03-B

PHS-2 general information

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ORIGINAL LANGUAGE VERSION

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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	Non-corrugated fibreboard	PAP	21
Outer box	Cardboard - 70% recycled content	PAP	20
Storage box	Polypropylene	PP	5
Packing foam	Low density polyethylene	LDPE	4
Bag	Low density polyethylene	LDPE	4
Metalised bag	Aluminium and low density polythene	C/LDPE	90
Tamper seal	Polypropylene	PP	5

CAUTION: If it is necessary to return any part of the system please ensure it is packaged carefully. Failure to do so could result in transit damage for which the customer would be liable. Products supplied in plastic boxes must be returned in the original packaging.

PHS-2 product compliance

EU declaration of conformity

Contact Renishaw plc or visit www.renishaw.com/EUCMM for the full EU declaration.

UK declaration of conformity

Contact Renishaw plc or visit www.renishaw.com/UKCMM for the full UK declaration.

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.

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.

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.

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

China RoHS

Contact Renishaw plc or visit www.renishaw.com/ChinaRoHSCMM for the full China RoHS tabulation.

PHS-2 safety

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 external air pipes on certain installations. Care should be taken to ensure that the pipes are securely fastened to the barbed air fittings.

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.

NOTE: There are no mains powered units in the PHS-2 system.

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.

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

PHS-2 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.

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 déballer et d'installer ce produit.

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.

RO - AVERTISMENT

Înainte de a desface ambalajul şi a instala acest produs, vă rugăm să căutaţi Anexa 1 şi să citiţi cu atenţie instrucţiunile 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

在拆包和安装本产品之前，请翻到附录1，阅读中文版安全说明。

PHS-2 environmental conditions

The following environmental conditions comply with (or exceed) BSEN61010-1:1993:

Indoor use	IP30 (no protection against water)
Altitude	Up to 2000 m
Operating temperature	+10 °C to +40 °C
Storage temperature	+10 °C to +70 °C
Relative humidity	80% maximum for temperatures up to +31 °C Linear decrease to 50% at +40 °C
Transient overvoltages	Installation category II
Pollution degree	1

PHS-2 introduction

The Renishaw servo positioning head (PHS-2) is a two axis motorised head with ±184° servo drive enabling the probe configuration to be positioned at almost any angle. This makes the head ideal for use in restricted spaces and enables styli to be angled normal to a surface or aligned to the axis of a hole.

The head can carry multiple probing types and very long extensions, making it highly suitable for measurement of large complex parts.

Movement and positioning of the head is co-ordinated directly by the CMM controller, allowing the motion of the head to be synchronised with the motion of the machine's axes for maximum component accessibility and minimum cycle time.

Further sections of this guide give general descriptions of the PHS-2 system components.

Two-axis servo positioning head

The two servo axes (D and E) are functionally identical and feature:

- Backlash-free motor / gearbox units
- Precision mechanical bearings
- High-accuracy, high-resolution angular measurement system for positional feedback
- Reference marks to give axis position on start-up
- Velocity control loops that keep the angular velocity of the axis constant at the commanded value regardless of load
- A high-speed serial link that receives commands from, and transmits status information back to the interface card

During measurement cycles the head does not drive to a locked, repeatable position in the same way as an indexing head. Instead the CMM controller drives the probe tip to the desired position. When a probing point is taken, the respective axes of the head and CMM are latched simultaneously to give accurate probe readings.

The head can hold its position or can be used in a continuous mode whereby it is servo driven continuously to follow a pre-programmed path.

Coloured LEDs on the head indicate probe and head status:

- The green LEDs indicate power is being supplied to the PHS-2 probe head
- The red LEDs indicate when the probe has been triggered

An air supply to the head is required for axis motor cooling to give optimum metrology performance.

Probe arms

Probe arms can be exchanged to allow the use of a wide range of different probe types and configurations. Automatic arm exchange on repeatable kinematic locations is available using the ACR2 autochange rack. Touch-trigger probes can be used to reach up to 750 mm.

Signals are made available to the PC interface card to indicate that an arm is fitted and that the arm is locked safely into position.

PHS interface card

The head is controlled from the PHS interface card in the CMM controller, or directly from the CMM controller. This card handles communications and conditions signals between the head and the CMM controller and also provides power supply to the head axis drives.

The PHS interface card does not handle probing system signals.

ACR2 autochange rack

The ACR2 autochange rack is an arm-changing system for the PHS-2 servo positioning head system. It allows probe extensions or probe adaptors to be exchanged to suit the probing task required without manual intervention. Its modular construction and simple operation enable any number of racks to be positioned anywhere within the machine volume. Each rack is configured from pairs of rack ports which are mounted to a vertical pillar (not supplied by Renishaw).

Further information is given in the ACR2 installation guide (Renishaw part number H-1000-4045). Custom versions are available to mount horizontally when PHS-2 is mounted vertically.

PHS-2 specifications

Operating temperature	15 °C to 40 °C (50 °F to 104 °F)
Weight	3 kg (6.6 lb)
Carry capability	Combined probe and extension mass of 1 kg (2.2 lb)
Maximum torque	2 Nm
Mechanical clutch slip	3 Nm ±0.5 Nm
Movement speed	150 °/s maximum, 70 °/s typical
Arm rotation angle	D-axis: ±184° E-axis: ±184°
Angular resolution	0.2 arc second (approximately 0.1 µm at 100 mm radius)
Collision protection	Electronic over torque
Suitable head interface	PHS-2 interface card / OEM controller
Changer rack system	ACR2

Dimensions

The dimensions of the PHS-2 servo positioning head are shown below. All dimensions are in millimetres.

Air system requirements

A clean, dry air supply to the head is required for axis motor cooling to give optimum metrology performance. This air supply must conform to the specifications laid out in the table below.

NOTE: The air supply piping should be suitably fixed to the CMM and secured around the air fixing barb on the rear of the PHS-2 male kinematic.

Air fitting	Single barb diameter 6.0 mm To suit flexible polyurethane tubing 6 mm - 1/4 in OD
Airflow rate	Typically 0.35 litres/second free air at standard atmospheric conditions
Pressure at head	5 bar (70 psi) to 6 bar (90 psi) gauge at the head
Pressure sensing switch	A pressure sensing switch is required to input to the PC card Switch to open if pressure drops below 3 bar (45 psi)
Cleanliness:	
Maximum allowable particle size	0.1 µm (as ISO 85731 Class 1)
Maximum allowable concentration of particles	0.1 mg/m^3 at standard atmospheric conditions (as ISO 8573-1 Class 1)
Oil: Maximum allowable concentration of droplets, aerosols and vapours	0.01 mg/m^3 of the air at standard atmospheric conditions (as ISO 8573-1 Class 1)

PHS-2 installation

The PHS-2 probe head mounts onto the CMM quill via a kinematic mounting plate. This allows for easy exchange of heads and for interchangeability with other Renishaw motorised head systems.

The kinematic joint cam is locked in place using the 5 mm A/F hexagonal key supplied with each kit.

Failure to ensure that the cam is fully locked could result in the cam unlocking during operation and the head becoming separated from the quill.

Kinematic joint locking mechanism:

Reference marks

Each axis must be referenced to enable its zero position to be set. This zero position is nominally at the mid-travel point of the axis - the absolute position of the mark is within ±1.5°.

The PHS-2 has two methods available to determine the zero position, your integrator will setup your system using one of them.

NOTE: A specific procedure must be followed in order for the probe's orientation to be determined. Details of this procedure are given in the PHS programmer's guide (Renishaw part number H-1000-6005).

Probe orientation with reference marks nominally at zero:

Axis rotational alignment

Rotational alignment of the head axes can be found by using the spirit level tool (Renishaw part number A-2150-1070). The spirit level should be screwed into an HA-8 PHS-2 M8 arm and the arm mounted onto the head.

The following procedure describes the method of calculating the individual axes offsets:

1. Rotate the E-axis through +90°.
2. Small adjustments in the D and E-axes should be made until the bubble indicates the head is level.
3. Once the head axes have been aligned to the CMM axes, the initial rotation of +90° in the E-axis should be subtracted from the E-axis levelled position.
4. These positions are now the angular offsets of each head axis from the datum position.
5. These should now be stored in software for that particular head.

Calculation of the individual head axis offsets:

Probe arms

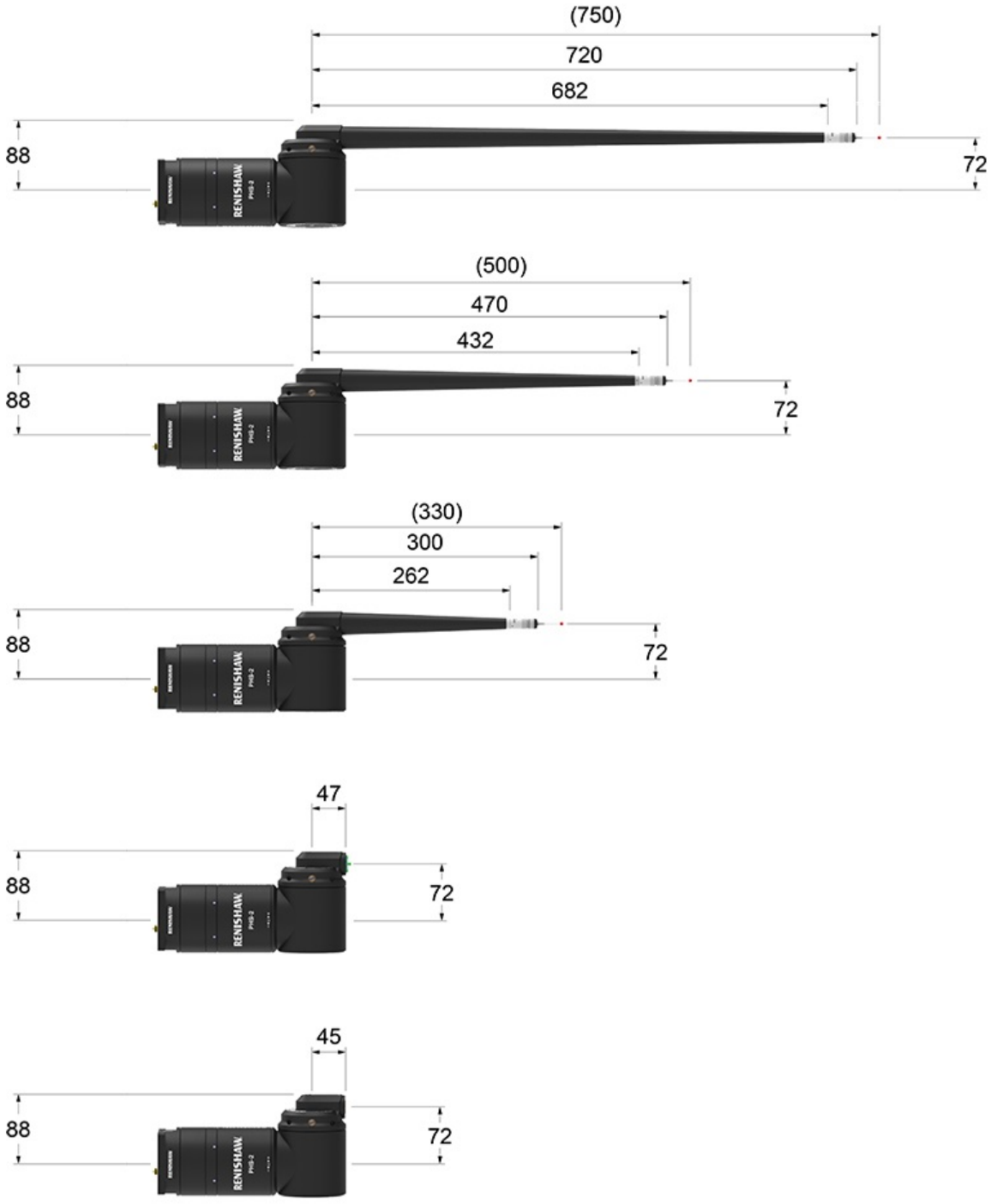
NOTE: It is advised that probe arms should be changed using the autochange rack. Manual probe arm change should only be used for the initial connection. The probe arm should be exchanged using the autochange rack before an application.

Specifications

Four types of probe arms are available for the PHS-2 system.

Probe arm	Description
HE-750	Probe arm with integral carbon fibre extension bar and M8 bush to give 750 mm total reach with Renishaw TP20 touch-trigger probe + 30 mm stylus.
HE-500	Probe arm with integral carbon fibre extension bar and M8 bush to give 500 mm total reach with Renishaw TP20 touch-trigger probe + 30 mm stylus.
HE-330	Probe arm with integral carbon fibre extension bar and M8 bush to give 330 mm total reach with Renishaw TP20 touch-trigger probe + 30 mm stylus.
HA-M	Probe arm with multiwire autojoint adaptor. Suitable for Renishaw multiwire probes and extensions.
HA-8	Probe arm with M8 bush.

NOTE: The following figure gives dimensions with different probe arm assemblies. All dimensions are in millimetres.



Use of extensions on PHS-2 system

The PHS-2 has a range of extensions and adaptors. For the best system accuracy, use the following guidelines:

- Always use the probe at the minimum radius - only use extensions when necessary and then the shortest needed to reach a feature
- If an extension is necessary, use the lightest probe and extension combination

Preferred combinations

Extension / adaptor	Radius to probe tip with TP2 or TP20 probe and 30 mm stylus
HA-8	114 mm
HA-8 + PEL1	164 mm
HA-8 + PEL2	214 mm
HA-8 + PEL3	314 mm
HE-330	330 mm
HE-500	500 mm
HE-750	750 mm

NOTE: When using extensions it is recommended that two C-spanners should be used to fit the probe.

ACR2 autochange rack

The ACR2 autochange rack is an arm-changing system for the PHS-2 servo positioning head. It allows probe extensions or probe adaptors to be exchanged to suit the probing task required.

Arms are locked or unlocked from the head by motion of the machine itself. The head engages a rack port and the machine drives the port up to unlock an arm or down to lock it in position.

No power connections or signal connectors are necessary to the rack, making installation very simple.

The ACR2 is supplied as pairs of rack ports which are mounted onto a suitable fixture supplied by the OEM. The system is modular and any number of port pairs can be used anywhere on the CMM.

System features

Modular construction	Ports can be positioned in pairs anywhere on the machine.
Simple concept	The change cycle is operated by CMM motion. No power connections are needed and all sensing and overtravel protection is contained within the PHS-2 servo positioning head itself; no motors, switches or sensors within the rack.
Expandable concept	Any number of racks can be fitted anywhere on the machine, for example a four port rack at one end and a two port rack at the other.
Versatile probing	ACR2 ports can accommodate touch-trigger, analogue contact or laser scanning probes, with or without extension bars.
Safe operation	Sensors on the PHS-2 servo positioning head detect collisions and check whether arms are correctly and safely locked in position after a change cycle.
Sealed arm locations	Covers with effective seals protect electrical contacts and kinematic locations when not in use.

System description

The ACR2 rack consists of pairs of ports that store arms. The arms are either head adaptors (HA) or head extensions (HE). The ports allow arms stored in them to be automatically locked and unlocked onto a PHS-2 servo positioning head.

To change probe arms automatically, the CMM must be programmed to complete a series of movements using positions calculated during the port datum routine. These movements cause a mechanism inside the port to rotate a screwdriver which engages a slot on the arm.

The slot activates a cam which locks the arm in place when rotated.

Manual fitment of probe arms can be achieved using the S10 autojoint key supplied.

Arms are located in the rack port on two steel pins which pass through holes in the arm. A spring-loaded lid secures the arm in position and seals the spring-loaded electrical contacts and kinematic locations against contamination.

Signals are provided by the servo positioning head to indicate when an arm is present and whether the arm is locked correctly and safely. This ensures that arms are always positively locked on the head.

NOTE: The maximum operating speed of the ACR2 autochange rack should not exceed 100 mm/s.

The following figure shows an example of a six-port ACR2 installation.

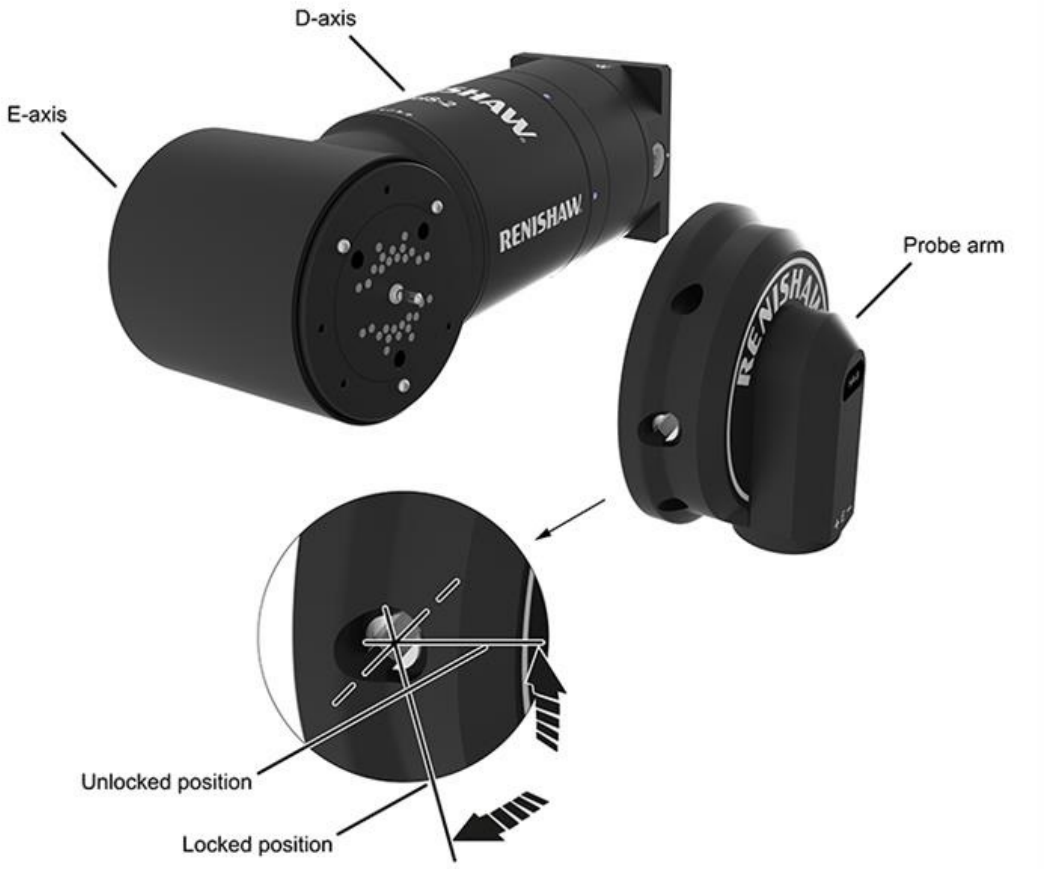
Six-port ACR2 installation:

Manual operation

To change a probe arm manually

1. Using the autojoint key, ensure that the cam slot which operates the locking mechanism is in the unlocked '1 o'clock' position (see figure below).

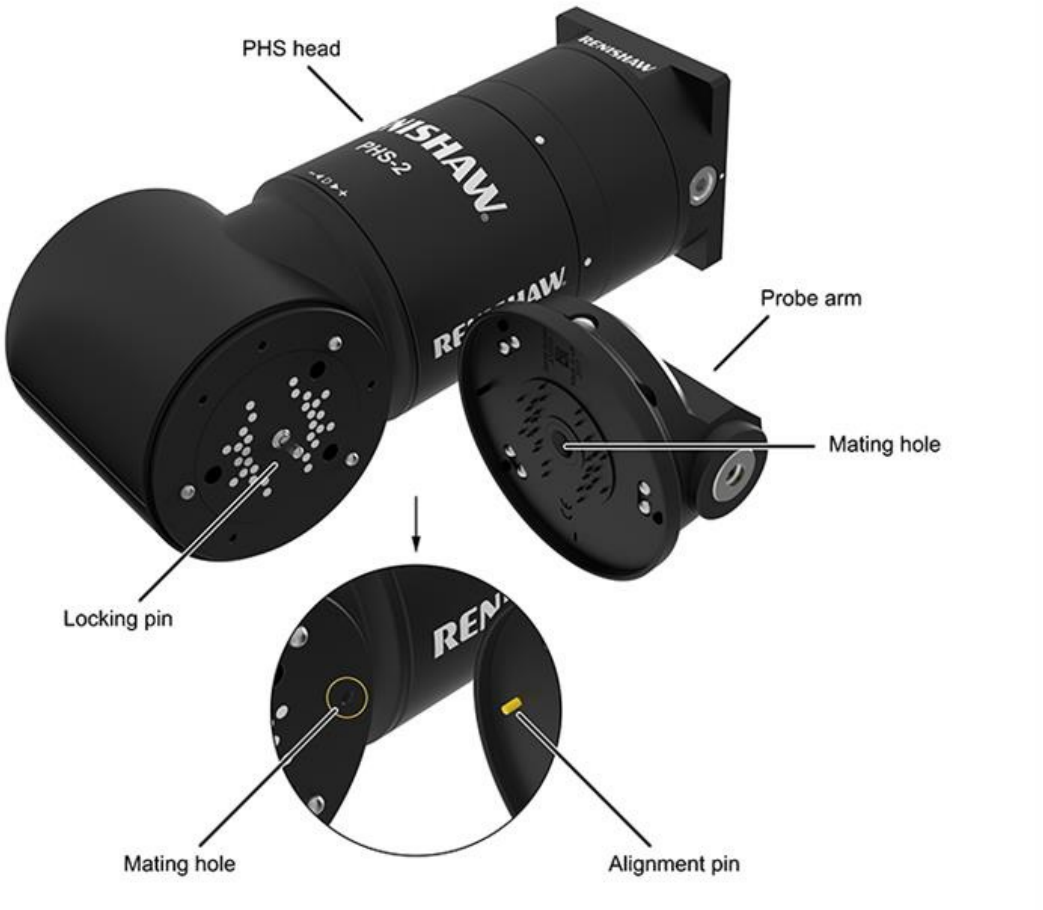
Cam positions:



2. Place the probe arm in position, ensuring that the central pin on the head is aligned with the mating hole on the probe arm.

3. The alignment pin in the probe arm will engage and align the kinematic locations (see figure below).

Probe arm locking mechanism:



4. Once aligned, turn the key to its locked '5 o'clock' position (see 'Cam positions' above).

The arm will not lock in position if the kinematics are not correctly engaged or the arm is in the wrong orientation.

Refer to the ACR2 installation guide (Renishaw part number H-1000-4045) for information on automatic probe exchange.

NOTE: For best repeatability, it is recommended that the probe should be unloaded and loaded in the autochange rack before use.

Automatic operation

This section gives a suggested method for datuming an ACR2 autochange rack port and the recommended CMM movements for change cycles using that datum position.

Port datum procedure

This method allows datuming of each ACR2 port by taking probing points on one of the location pins.

1. Qualify the PHS-2 and probe combination (see following figure).

NOTE: The probe tip must be qualified before the port can be datumed. Refer to the PHS1 calibration guide (Renishaw part number H-1000-4048) for recommended probe calibration procedure, as this is also applicable to PHS-2.

A typical probe assembly suitable for port datuming would be:

- HA-8 probe arm
- TP20 probe
- PS17R 20 mm stylus

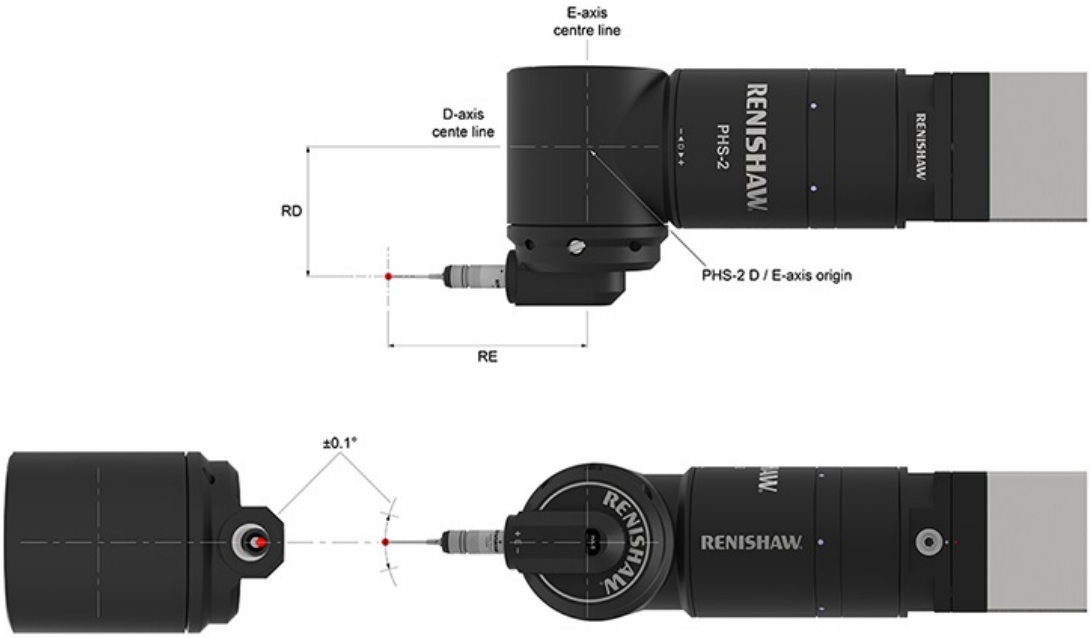
Nominal offset values for this probe assembly are:

- RD 72 mm
- RE 104 mm

The values RD and RE should be established to within ±0.1 mm by the probe qualification procedure.

NOTE: The angular orientation of the D and E axes required for port datuming (D 0°, E 0°). The probe tip should be aligned to the axis origins to within 0.1°.

Probe calibration:



NOTE: Angular orientation of D and E axes required for port datum procedure (D and E 0°).

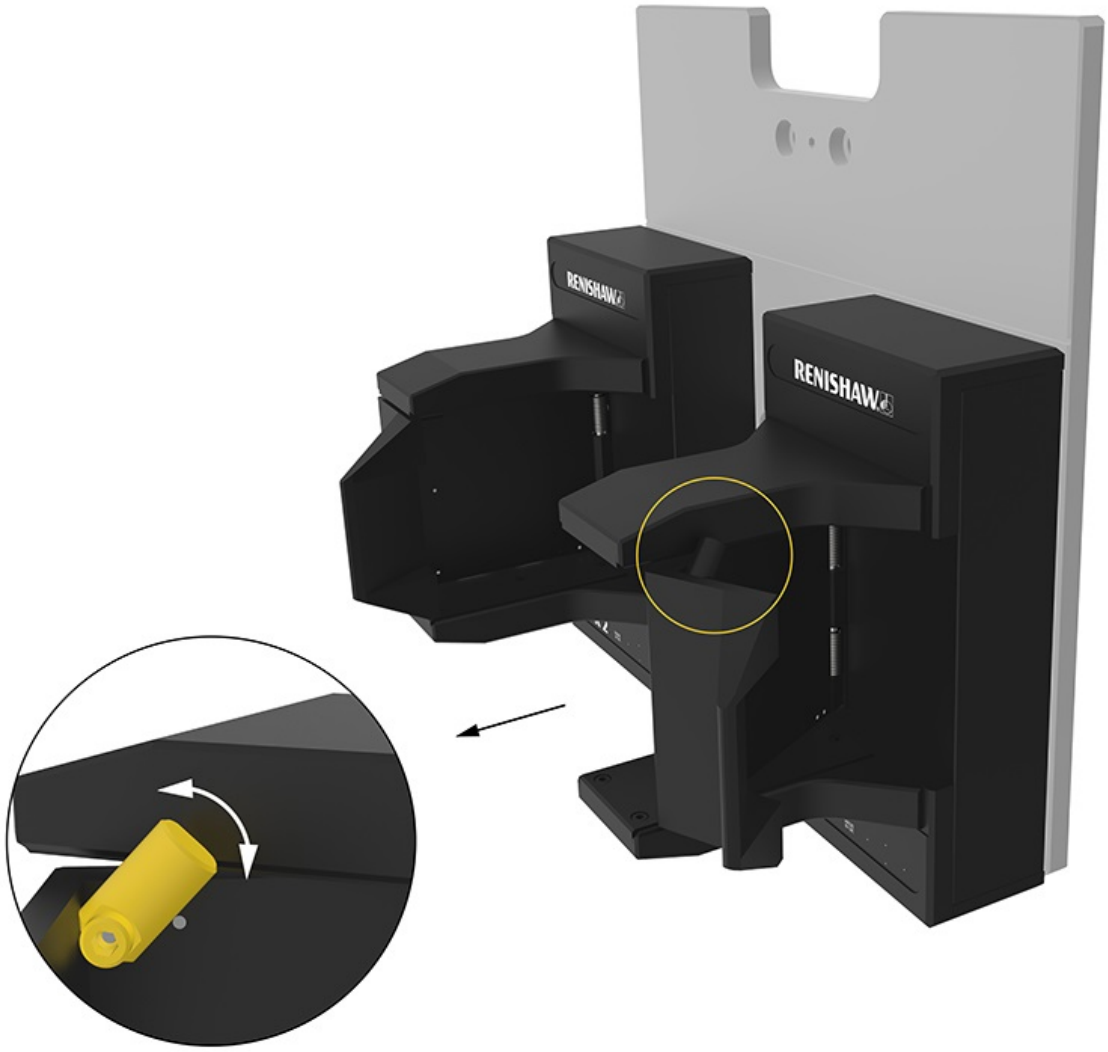
2. Position the ACR2 port in the lower latched position (see figure below).

Port in lower latched position:

NOTE: To move between upper and lower positions manually, the two port pins must be pushed to the left to disengage the motion locks.

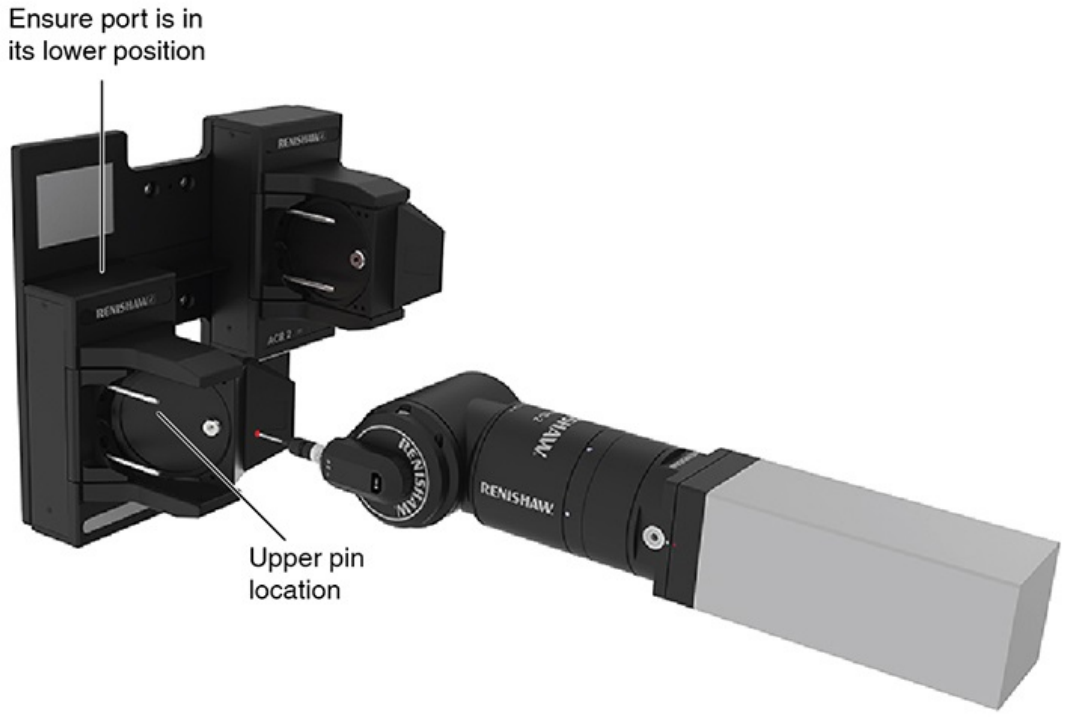
3. Lift the lid retaining clip to hold the latch in an open position (see figure below).

Lift the lid retaining clip:



4. Take four points around the full diameter of the upper location pin in the ZX plane (assuming the rack is oriented to the CMM axes as shown).

ACR port datuming procedure:



5. Use the four points to create a circle.

6. Use the centre point of the circle as the coordinates for the pin datum in the X and Z axes, XP and ZP.

7. Take one point on the end of the upper location pin in the Y-axis and use it as the coordinate for the pin datum in the Y axis, YP.

Pin datum position:

8. Offset the position XP, YP, ZP to the PHS-2 D/E axis origin as shown below. Use this point XD, YD, ZD as the pin datum point. XD = XP - RD

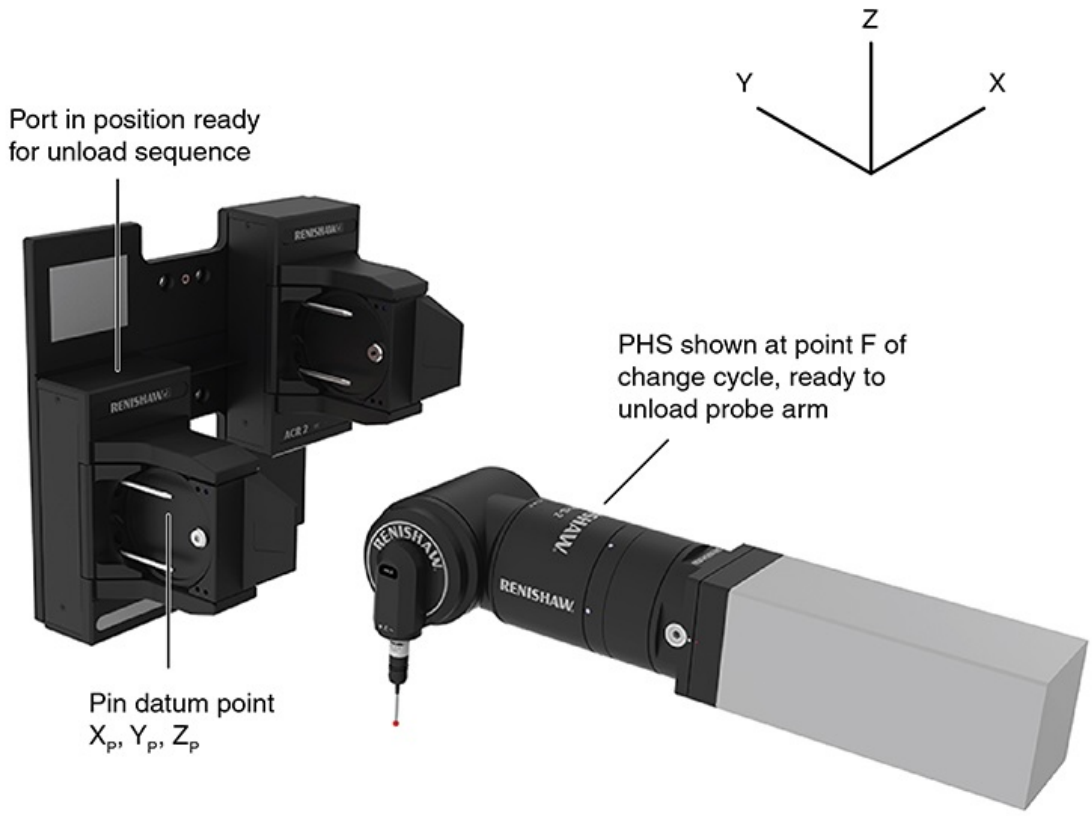
YD = YP + RE ZD = ZP

Change cycles

To change probe arms automatically using the ACR2, the CMM must be programmed to complete a series of movements using the positions given in this section. When manually loading the arm into the autochange rack, care must be taken to ensure that the port is locked in the uppermost position.

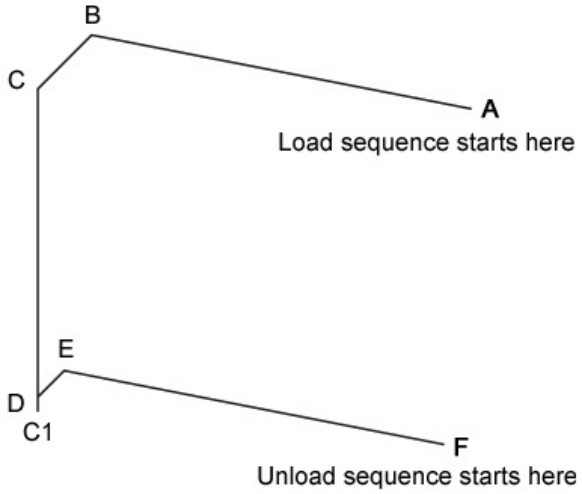
The co-ordinates of the positions given in this section are relative to the coordinate system defined on the pin datum point XD, YD, ZD calculated in the previous section.

Change cycle:



NOTE: D and E axes in correct orientation for change cycle (D0, E-90).

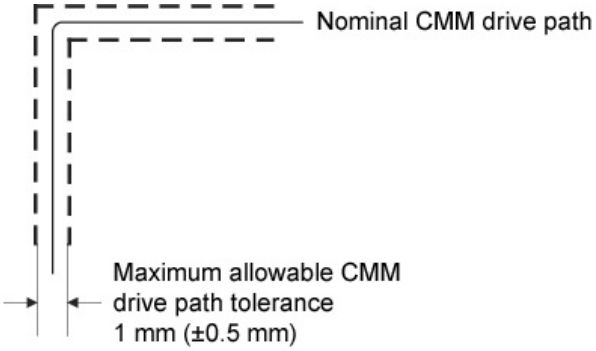
Load sequence:



Axis orientation:

The following figure shows the maximum tolerance acceptable on the CMM drive path during the automatic change cycle.

Nominal CMM drive path:



The table below gives co-ordinates for the points in the automatic change cycle relative to the pin datum point XD, YD, ZD.

PHS-2 axis origin position relative to pin datum point XD, YD, ZD:

Point	X	Y	Z
A	+74	-135.5	+68.5
B	+74	+14.5	+68.5
C	+50	+14.5	+68.5
C1	+50	+14.5	-35.5
D	+50	+14.5	-31.5
E	+53.5	+14.5	-31.5
F	+53.5	-135.5	-31.5

The following table gives the incremental values for the moves between points in the automatic change cycle:

Moves in automatic change cycle:

Move	Axis	Incremental value	Function
A to B	Y	+150	PHS-2 moves in (or out of) port without probe arm loaded
B to C	X	-24	PHS-2 latches (or unlatches) port with probe arm unlocked
C to C1	Z	-104	Arm locking move (load cycle only)
D to C	Z	100	Arm unlocking move (unload cycle only)
C1 to D	Z	+4	Locking mechanism backoff (load cycle only)
D to E	X	+3.5	PHS-2 latches (or unlatches) port with probe arm locked
E to F	Y	-150	PHS-2 moves in (or out of) port with probe arm locked

Unloading a probe arm

- Recall the pin datum XD, YD, ZD set in step 8 of the port datum procedure in the 'Port datum procedure' section
- Ensure the PHS-2 has a probe arm fitted
- Ensure the PHS-2 is oriented into the correct position to enter the port (D 0°, E 90°)

Position relative to pin datum XD, YD, ZD:

X-axis	Y-axis	Z-axis	Point	Description
+53.5	-135.5	-31.5	F	Stand off position. Head is in front of port and has probe arm fitted. Head is orientated to D 0°, E 90°.
	-114			Transit stage. PHS-2 contacts the ACR2 port lid. This may cause a probe trigger so the probing system should be disabled before reaching this point.
	-20			Transit stage. Probe arm engages port location pins. Renishaw recommend that servo control of the head axes should be switched off at this point. NOTE: Remove only 24 V servo power from the head. Do not remove logic power as this will cause head position loss.
+53.5	+14.5	-31.5	E	PHS-2 fully located in ACR2 port.
+50	+14.5	-35.5	D	ACR2 ready to activate unlock mechanism.
+50	+14.5	+68.5	C	Probe arm unlocked from PHS-2 head.
+74	+14.5	+68.5	B	Move PHS-2 head clear of probe arm.
	-20			Transit stage. Servo control of the head

				should be re-enabled. NOTE: The position of the head may have changed under gravity and that the head should be help in its current position before returning to the previous orientation.
	-114			Transit stage. PHS-2 clears the ACR2 port lid.
+74	-135.5	+68.5	A	Stand off position. Head is in front of port with no probe arm fitted.

Loading a probe arm

- Recall the pin datum XD, YD, ZD set in step 8 of the port datum procedure in the 'Port datum procedure' section
- Ensure the PHS-2 does not have a probe arm fitted
- Ensure the PHS-2 is oriented into the correct position to enter the port (D 0°, E 90°)

Position relative to pin datum XD, YD, ZD:

X-axis	Y-axis	Z-axis	Point	Description
+74	-135.5	+68.5	A	Stand off position. Head is in front of port with no probe arm fitted. Head is oriented to D 0°, E 90°.
		-114		Transit stage. PHS-2 contacts the ACR2 port lid.
		-20		Transit stage. Renishaw recommends that servo control of the head axes should be switched off at this point. NOTE: Remove only 24 V servo power from the head. Do not remove logic power as this will cause head position loss.
+74	+14.5	+68.5	B	PHS2 located in ACR2 port clear of probe arm.
+50	+14.5	+68.5	C	Locate PHS2 head onto probe arm ready for lock sequence.
+50	+14.5	-35.5	C1	Lock probe arm to PHS-2 head.
+50	+14.5	-31.5	D	Move probe arm lock mechanism to normal position.
+53.5	+14.5	-31.5	E	Move ACR2 port into fully locked position.
		-20		Transit stage. Probe arm begins to clear port location pins. Servo control of the head should

				be re-enabled.
.		-114		Transit stage. PHS2 clears the ACR2 port lid. Probing system can now be enabled. Note that the position of the head may have changed under gravity and that the head should be held in its current position before returning to the previous orientation
-53.5	-135.5	-31.5	F	Stand off position. Head is in front of port with new probe arm fitted.

PHS-2 troubleshooting

NOTE: Due to the extent of the CMM manufacturer's system responsibility, the following is only a basic fault diagnosis. For further diagnosis please contact the OEM.

Fault diagnosis:

Observation	Checklist
Red LEDs not lit on head.	Check cable connections. Check fitting of PC card. Check secure fitting of head to male kinematic.
Green LED will not illuminate.	Check 24 V power supply.
No movement of head.	Check fitting and lock of arm probe.
Head powers up briefly then dies.	Check resistance of head power supply cables.
Three amber LEDs - head disengages	Head temperature exceeded 60 °C. Check air supply to head.
Three LED's flash amber	Communication with controller failed

PHS interface card

Specification

Size

Length	190 mm
Height	95 mm
General	To fit dual connector ISA bus slot

Power supply

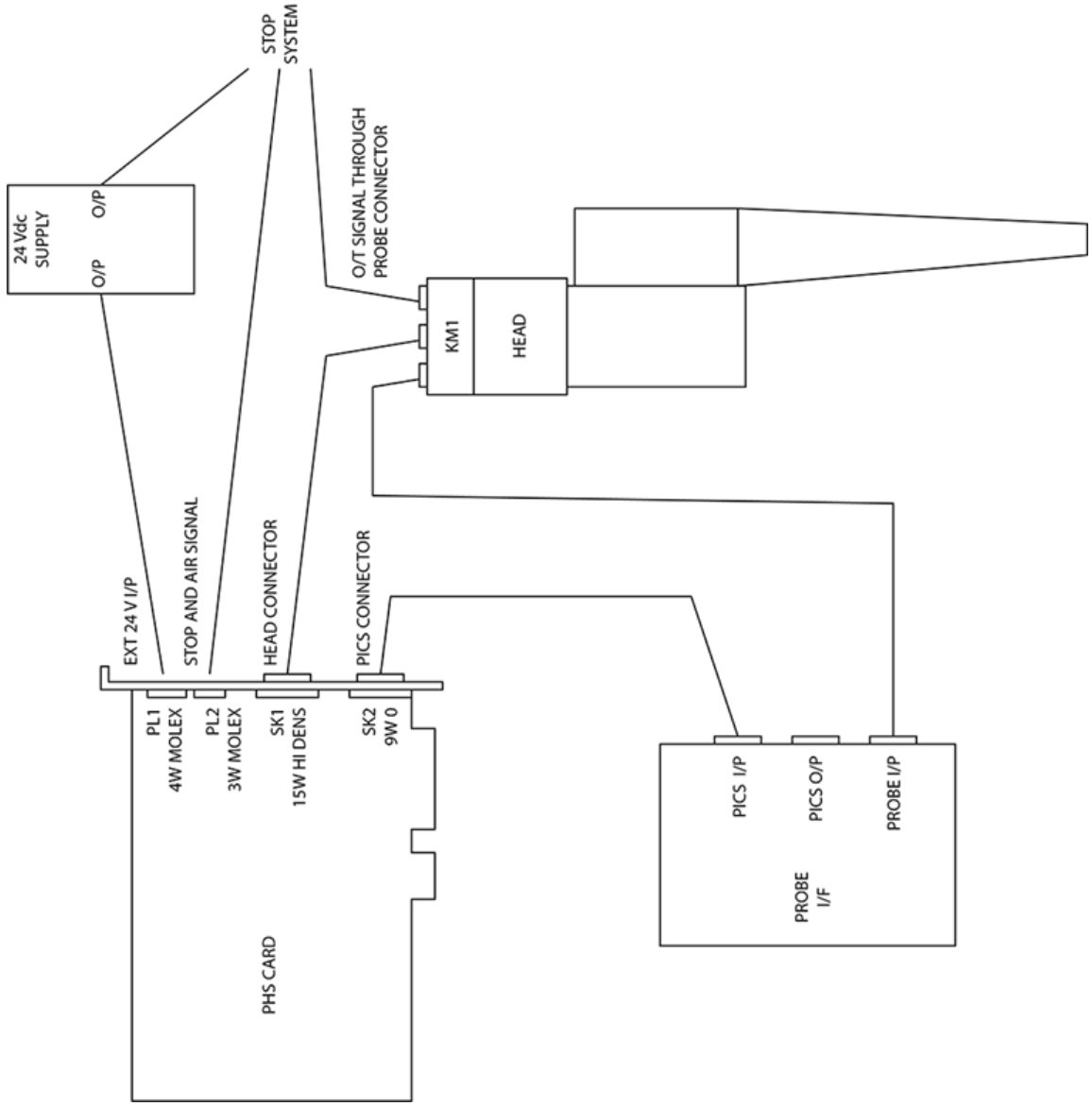
Card	+5 V via PC bus 500 mA maximum
Head logic	+12 V via PC bus 400 mA typical ~2 A instantaneously
Head motors	+24 V external supply 2 A maximum This unit must be supplied from a 24 Vdc SELV supply complying with the essential requirements of BS EN 61010 or similar specification.

PHS interface card installation

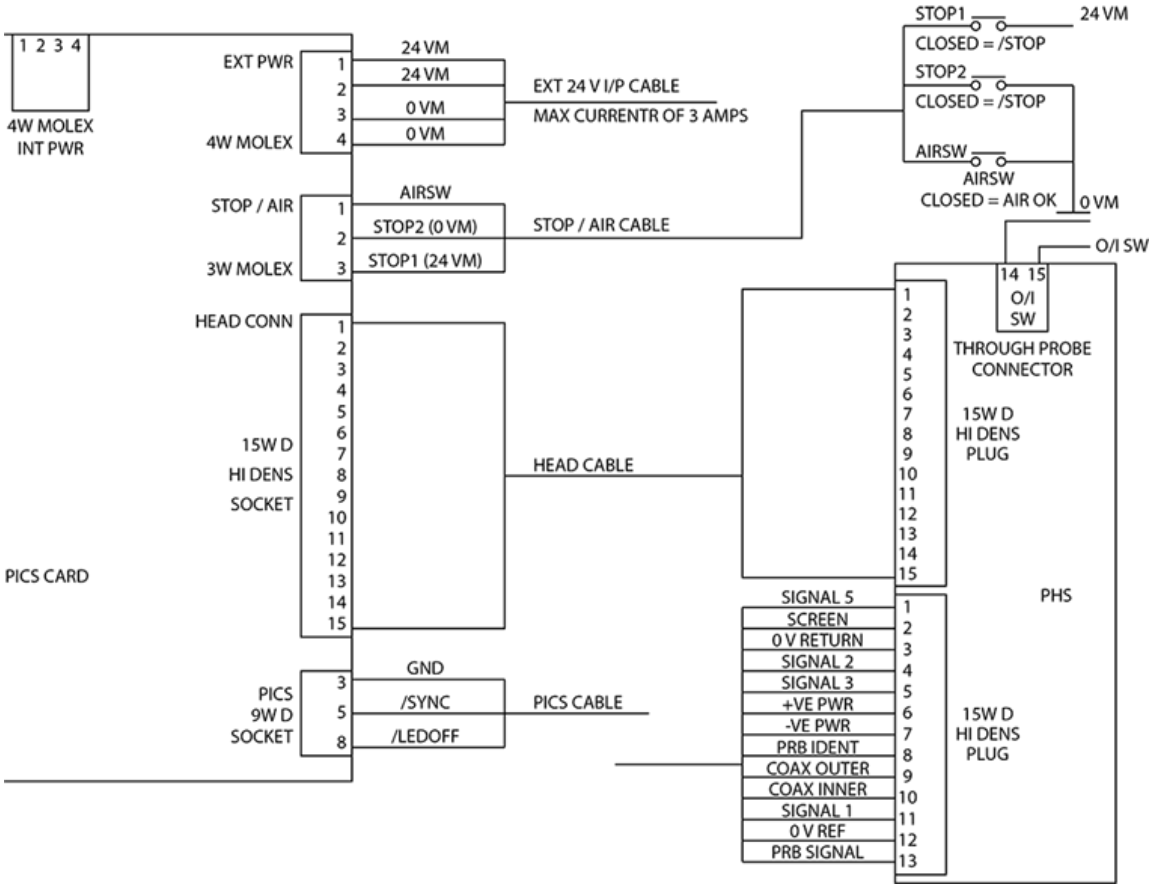
CAUTION: The probe interface card is susceptible to damage by static discharge. It is therefore recommended that:
- The use of an anti-static wristband, connected to a suitable earth point, is employed whenever the card is handled
- Movement, which can generate static electricity, is kept to a minimum

System installation

This section describes the connections and cables used on the PHS2 servo positioning head system.



NOTES:
Air good signal switches to +24 V common (0 VM).
STOP requires +24 V supply across the 3W MOLEX pins 2 and 3.


1 2 3 4
4W MOLEX
INT PWR
EXT PWR
4W MOLEX
24 VM
24 VM
0 VM
0 VM
EXT 24 V I/P CABLE
MAX CURRENTR OF 3 AMPS
STOP / AIR
3W MOLEX
AIRSW
STOP2 (0 VM)
STOP1 (24 VM)
STOP / AIR CABLE
HEAD CONN
15W D
HI DENS
SOCKET
HEAD CABLE
PICS CARD
PICS
9W D
SOCKET
GND
/SYNC
/LEDOFF
PICS CABLE
STOP1
24 VM
CLOSED = /STOP
STOP2
CLOSED = /STOP
AIRSW
AIRSW
CLOSED = AIR OK
0 VM
O/I SW
14 15
O/I
SW
THROUGH PROBE
CONNECTOR
15W D
HI DENS
PLUG
PHS
SIGNAL 5
SCREEN
0 V RETURN
SIGNAL 2
SIGNAL 3
+VE PWR
-VE PWR
PRB IDENT
COAX OUTER
COAX INNER
SIGNAL 1
0 V REF
PRB SIGNAL
15W D
HI DENS
PLUG

PHS card connectors

PHS card connectors

The following sections give pin connection details for connectors on the PHS interface card.

Head data connector

The head data connector on the PHS card is a 15-way high-density D socket.

PICS connector

The Renishaw PICS (product interconnection signal) system allows a standard method of connection for all real time signals used by Renishaw probing products and gives access to probing system control features.

Refer to the PICS installation guide (Renishaw part number H-1000-5000) for a detailed description of PICS and for suggested termination circuits.

A standard Renishaw PL24 (5 m) or PL25 (0.3 m) cable can be used to connect this socket to the PICS OUTPUT connection on a Renishaw probe interface.

Pin number	Signal
1	Not connected.
2	Not connected.
3	GND.
4	Not connected.
5	Not connected. /SYNC (input signal connected to probe interface PICS OUTPUT) Default: Edge (high) = trigger This signal can be used as a probe trigger input to the PC interface card to latch the PHS1 head position. Refer to the PHS1 programmer's guide (Renishaw part number H-1000-6005) for further information.
6	Not connected.
7	Not connected.
8	/LEDOFF (input signal to probe interface PICS OUTPUT) Low = On and triggered
9	Not connected.

External 24 Vdc input connector - 4-way Molex

- Head motor power can be supplied either through this external connector or through an internal connector
- Maximum total current through connector to be 3 A
- This unit must be supplied from a 24 Vdc SELV supply complying with the essential requirements of BSEN61010 or similar specification

Pin number	Signal
1	24 VM
2	24 VM
3	0 VM
4	0 VM

Air / stop signal input connector - 3-way Molex

- Connector rated at 30 Vdc, 1 A maximum

Pin number	Signal
1	AIRSW
2	STOP2 (connect to 0 VM)
3	STOP1 (connect to 24 VM)

NOTES:
1. At least one of the STOP lines must be through a STOP button (open = STOP).
2. Connect AIRSW to 0 VM through a pressure switch (switch closed = pressure OK).

Internal 24 Vdc input connector - 4-way Molex

- This internal 24 V connector can be used to supply head motor power instead of the external 24 V connector. Applying 24 V through this connector will automatically select the internal connector and disable the external connector.
- Maximum total current through connector to be 3 A.

Pin number	Signal
1	24 VM
2	24 VM
3	0 VM
4	0 VM

Head connectors

The following sections give pin connection details for connectors on the PHS-2 head.

PHS data connector

The PC data connector on the PHS-2 head is a 15-way high-density D plug.

Probe connector

This connector carries two sets of signals from the head.

- Probing system signals from 2-wire and multiwire probes.
- Head overtravel switch signals. Switch rated at 30 Vdc, 1 A maximum.

15-way high-density D plug

Pin number	Signal
1 to 13	Probe signals
14	Overtravel SW
15	Overtravel SW

NOTE: Pins 14 and 15 are permanently connected within the head.

- Each pin carries different signals depending on the probe type used
- 2-wire probe signals (e.g. TP20, TP6, TP200) are carried on pins 3 (0 V) and 13 (probe signal)

System installation and connection drawings

The illustrations in this section give information on system installation.

Kinematic joint installation and alignment

The PHS-2 head must be aligned to the axes of the machine to ensure correct operation with the ACR2 autochange rack. This section describes how to perform plane and rotational alignment of each axis of the head.

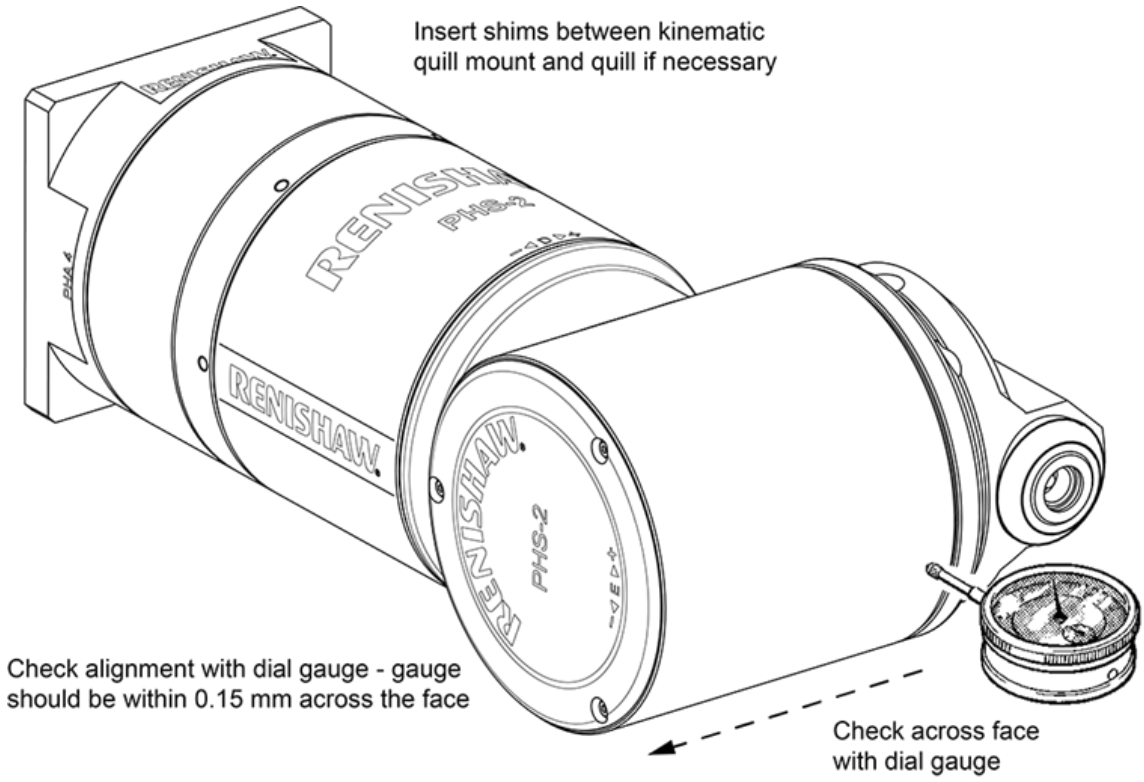
D-axis alignment in the horizontal plane

The head must be aligned with the machine axes so that the mounting holes in the probe arm are aligned with the pins of the ACR2 ports.

The head must be aligned to within ±0.1° of the CMM axes. It may be necessary to place shims between the kinematic quill mount and the CMM quill to achieve this.

The plane alignment of the D-axis can be checked by clocking the head as shown below.

Plane alignment of the D-axis:



D-axis alignment in the vertical plane

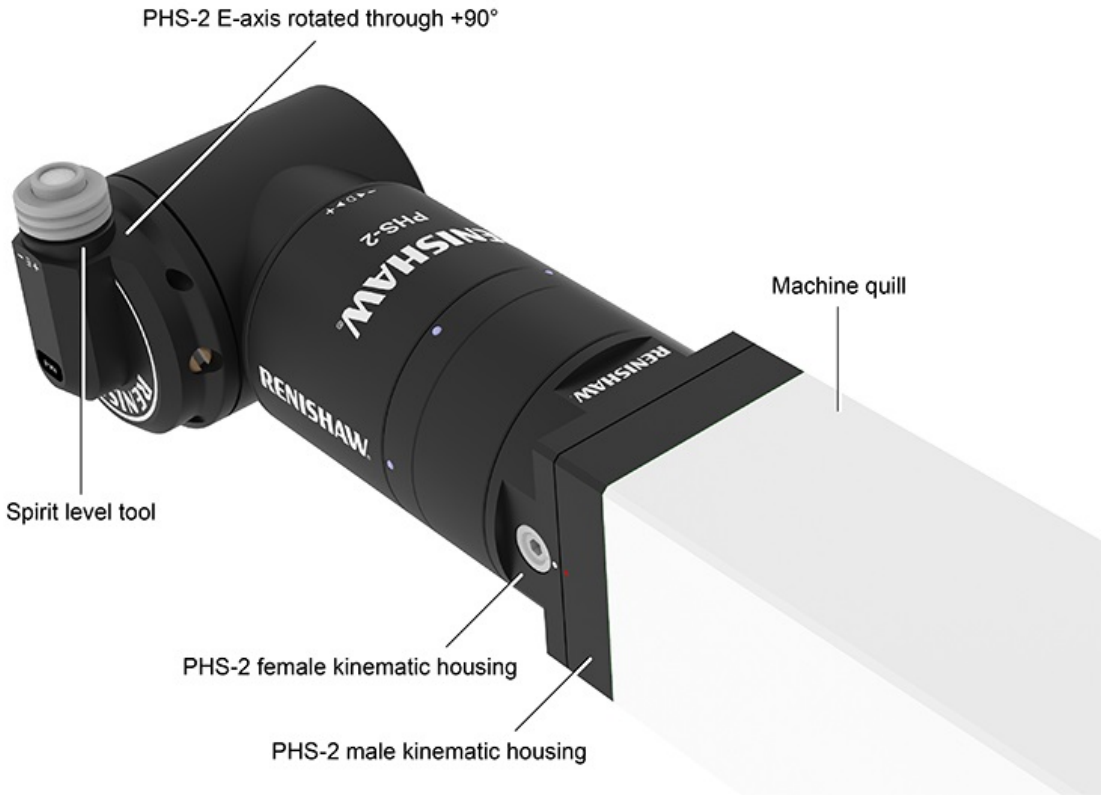
This does not need to be accurately aligned as the rotation in the E-axis can compensate for any misalignment.

Axis rotation

Rotational alignment of the head axes can be found by using the spirit level tool (A-2150-1070). The spirit level should be screwed into a HA8 PHS M8 arm and the arm mounted onto the head. The following procedure describes the method of calculating the individual axes offsets.

1. Rotate the E-axis through +90°.
2. Make small adjustments in the D-axis and E-axis until the bubble indicates the head is level.
3. With the head axes aligned to the CMM axes, subtract the initial rotation of +90° in the E-axis from the E-axis levelled position.
4. These positions are now the angular offsets of each head axis from the datum position.
5. Store these positions in software for that particular head.

Calculation of the individual head axis offsets:



Kinematic joint installation and cable connections

The following pages show information on kinematic joint variations and cable installations.

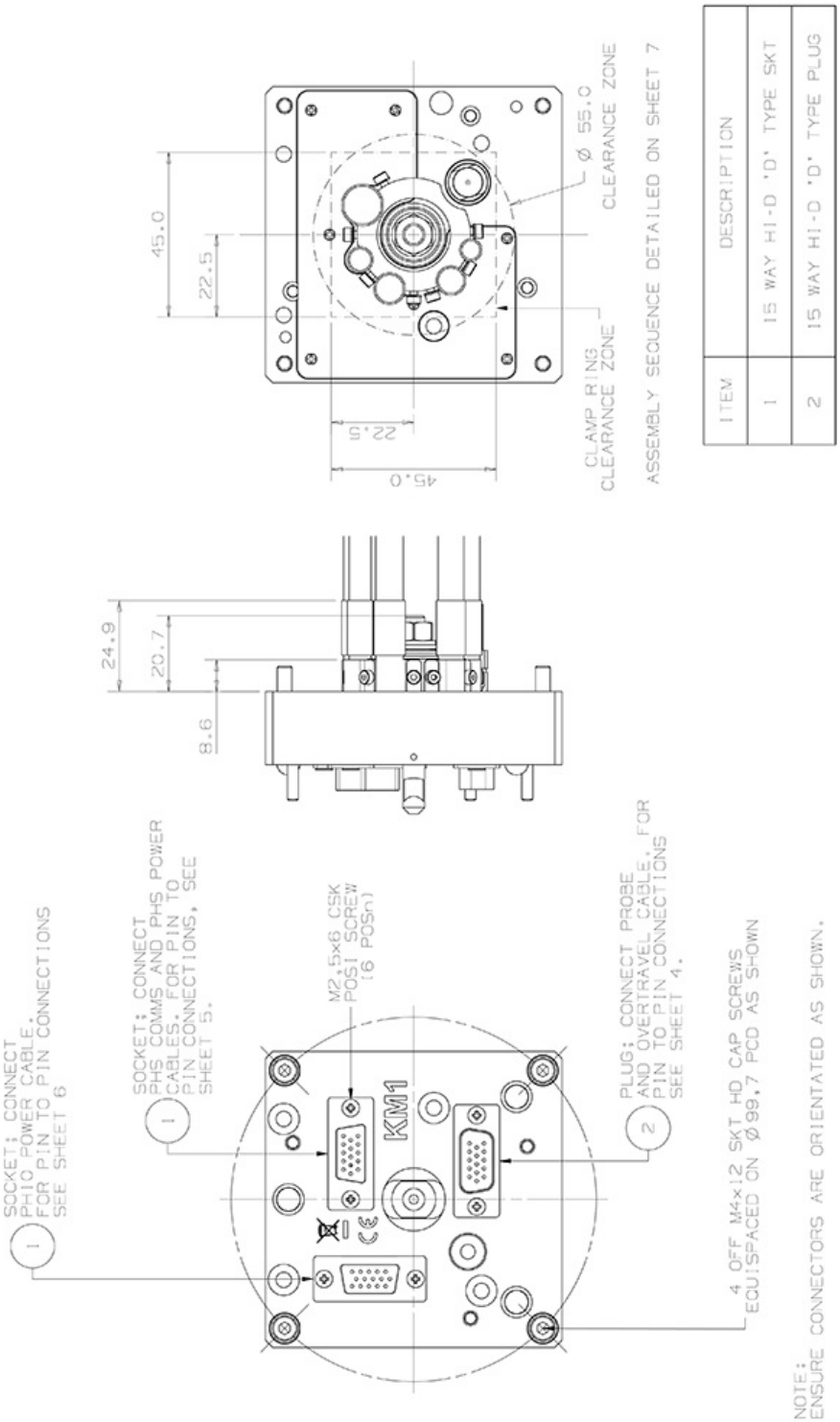
Cable connections

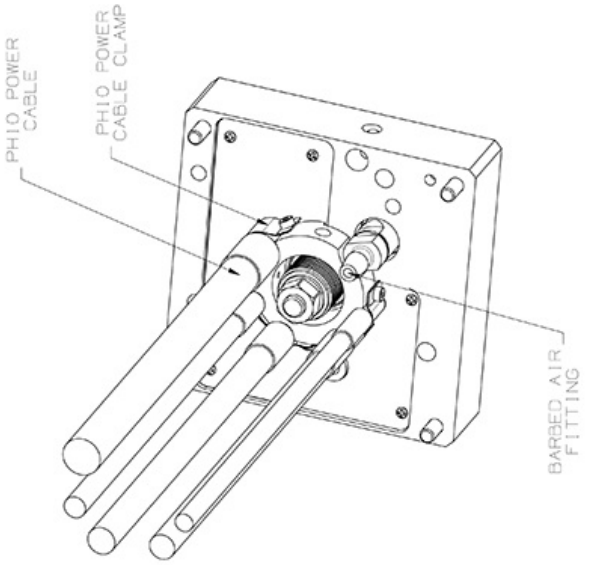
There are four individual cables in the PHS-2 system:

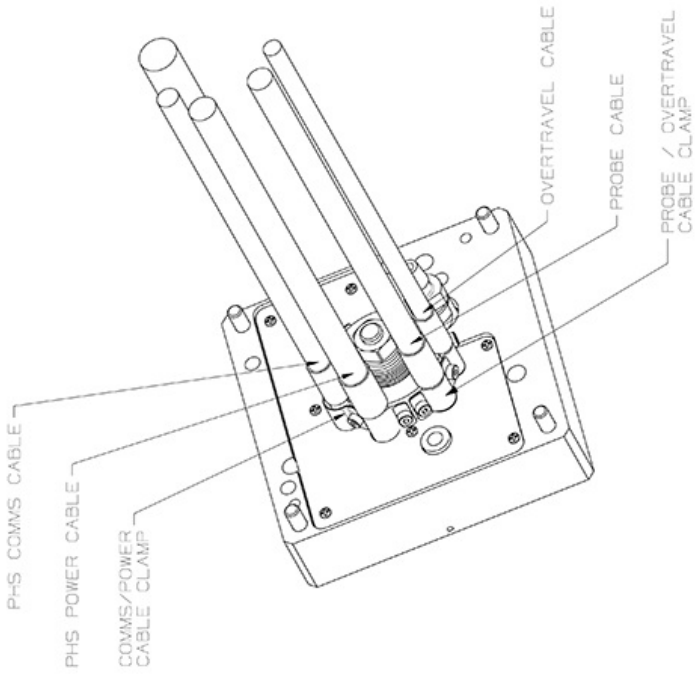
- Power cable
- Comms cable
- Probe cable
- Overtravel signal cable

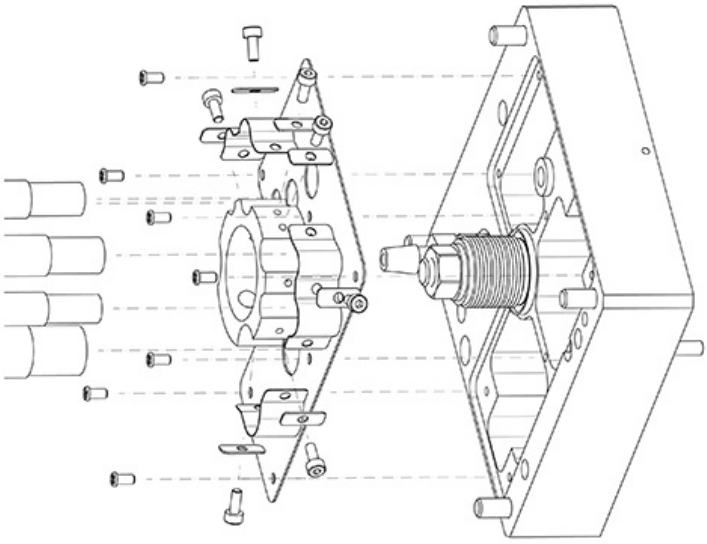
Maximum cable length is 30 m.

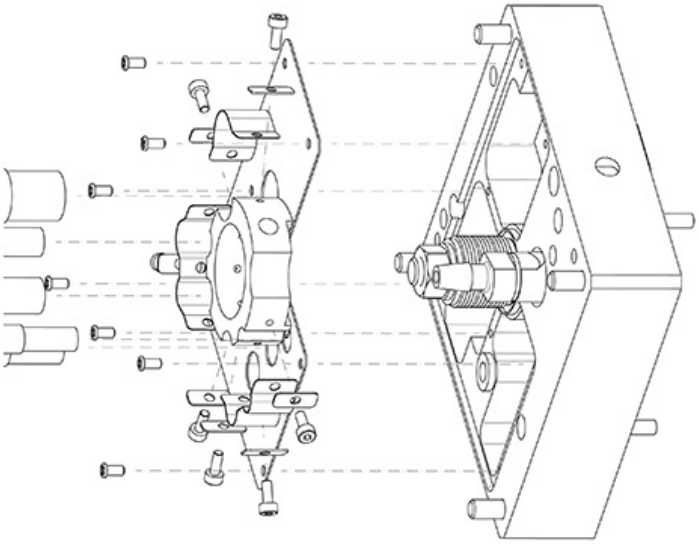
NOTE: It is recommended that the resistance of the power cable should be typically 3 W but should not exceed 5 W total loop resistance as a thermal fuse and switch mode power supply are configured to monitor the correct voltage to the head. High cable resistance may trigger the thermal fuse.
This is usually evident by the symptom of a brief power up, approximately 1 or 2 seconds, where the head LED lights before extinguishing. Exchanging heads may appear to solve the problem however this is usually due to electrical tolerance differences between systems.


ITEM
DESCRIPTION
1
15 WAY HI-D 'D' TYPE SKT
2
15 WAY HI-D 'D' TYPE PLUG
ASSEMBLY SEQUENCE DETAILED ON SHEET 7
Ø 55.0
CLEARANCE ZONE
CLAMP RING
CLEARANCE ZONE
45.0
22.5
22.5
45.0
24.9
20.7
8.6
KM1
M2.5x6 CSK
POSI SCREW
(6 POS'n)
SOCKET: CONNECT
PHS COMMS AND PHS POWER
CABLES. FOR PIN TO
PIN CONNECTIONS, SEE
SHEET 5.
PLUG: CONNECT PROBE
AND OVERTRAVEL CABLE. FOR
PIN TO PIN CONNECTIONS
SEE SHEET 4.
SOCKET: CONNECT
PHIO POWER CABLE.
FOR PIN TO PIN CONNECTIONS
SEE SHEET 6
4 OFF M4x12 SKT HD CAP SCREWS
EQUISPACED ON Ø99.7 PCD AS SHOWN
NOTE:
ENSURE CONNECTORS ARE ORIENTATED AS SHOWN.


PH10 POWER CABLE
PH10 POWER CABLE CLAMP
BARBED AIR FITTING


OVERTRAVEL CABLE
PROBE CABLE
PROBE / OVERTRAVEL CABLE CLAMP
PHS COMMS CABLE
PHS POWER CABLE
COMMS/POWER CABLE CLAMP





FOR PROBE CABLE PREPARATION SEE DRAWING A-2150-0483 (30M) OR A-2150-0487 (18M).
FOR OVERTRAVEL CABLE PREPARATION SEE DRAWING A-2150-0484 (30M) OR A-2150-0488 (18M).

NOTE: TO ENABLE THE USE OF 'OTM' / 'OTP' OPTICAL PROBING SYSTEMS WITH A PHS/PH10 KINEMATIC INSTALLATION, THE BROWN / WHITE WIRE IS TO BE CONNECTED IN PARALLEL WITH THE GREEN WIRE (PIN 3). IF OPTICAL PROBING IS NOT REQUIRED, THE BROWN / WHITE WIRE IS TO BE CUT-BACK FLUSH WITH THE OUTER SHEATH. ONCE THIS WIRE HAS BEEN REMOVED SUBSEQUENT USE OF THE 'OTM' / 'OTP' SYSTEM WILL NOT BE POSSIBLE WITHOUT FIRST RENEWING THE PROBE CABLE AND PARALLELING THE BROWN / WHITE AND GREEN WIRES.

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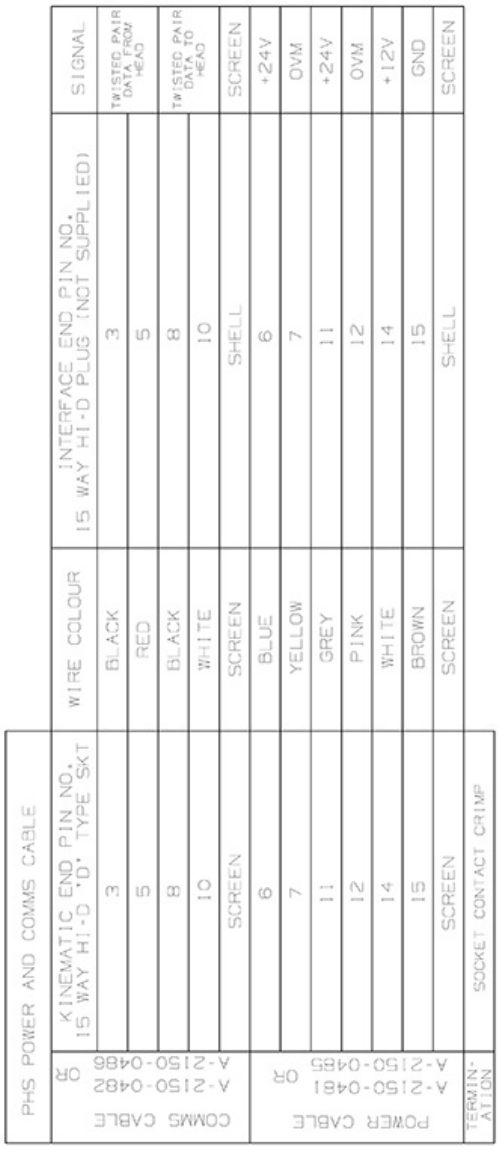
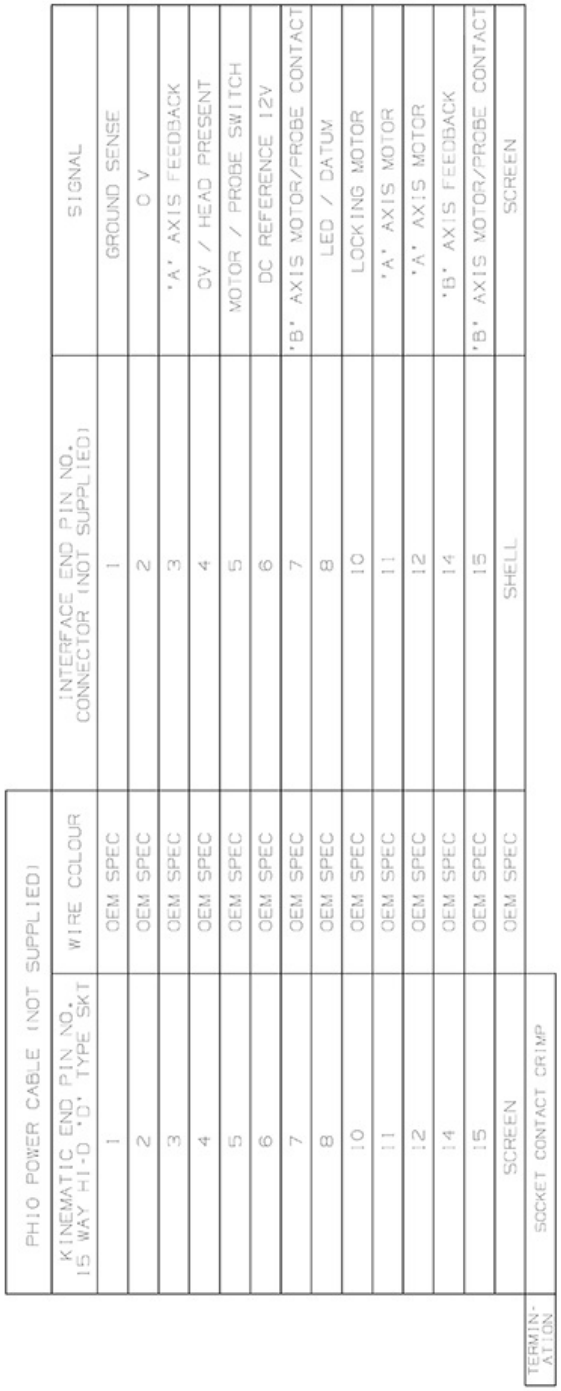


FOR COMMS CABLE PREPARATION SEE DRAWING A-2150-0482 (3CM) OR A-2150-0486 (18M).
FOR POWER CABLE PREPARATION SEE DRAWING A-2150-0481 (3CM) OR A-2150-0485 (18M).



PH10 POWER CABLE (NOT SUPPLIED)			INTERFACE END PIN NO. CONNECTOR (NOT SUPPLIED)	SIGNAL
KINEMATIC END PIN NO. 15 WAY HI-D 'D' TYPE SKT	WIRE COLOUR	TERMIN-ATION		
1	OEM SPEC		1	GROUND SENSE
2	OEM SPEC		2	0 V
3	OEM SPEC		3	'A' AXIS FEEDBACK
4	OEM SPEC		4	0V / HEAD PRESENT
5	OEM SPEC		5	MOTOR / PROBE SWITCH
6	OEM SPEC		6	DC REFERENCE 12V
7	OEM SPEC		7	'B' AXIS MOTOR/PROBE CONTACT
8	OEM SPEC		8	LED / DATUM
10	OEM SPEC		10	LOCKING MOTOR
11	OEM SPEC		11	'A' AXIS MOTOR
12	OEM SPEC		12	'A' AXIS MOTOR
14	OEM SPEC		14	'B' AXIS FEEDBACK
15	OEM SPEC		15	'B' AXIS MOTOR/PROBE CONTACT
SCREEN	OEM SPEC		SHELL	SCREEN
SOCKET CONTACT CRIMP				

ASSEMBLY SEQUENCE.

1. PREPARE CABLES AS DETAILED ON THE RELEVANT DRAWINGS.

2. THREAD WIRES THROUGH CORRECT HOLE IN SHIELD PLATE (SEE SHEETS 2 & 3).

3. CLAMP CABLES TO CLAMP-RING WITH APPROPRIATE CABLE CLAMP-STRIP (SEE SHEETS 2&3) ENSURE FOLDED-BACK SCREEN IS FIRMLY CLAMPED BETWEEN CLAMP-RING AND CABLE CLAMP-STRIP.

5. ATTACH SHIELD PLATE / CLAMP RING / CABLE ASSEMBLY TO KINEMATIC WITH M2 SCREWS (7 OFF), ENSURING CABLES PASS THROUGH CORRECT KINEMATIC HOUSING APERTURE.

6. WIRE-UP CONNECTORS AS DETAILED ON SHEETS 4, 5, AND 6.

7. ATTACH CONNECTORS TO KINEMATIC HOUSING USING THE M2.5 X 6 CSK POZIDRIVE SCREWS (6 POSNS). ENSURE CONNECTORS ARE ORIENTATED AS SHOWN ON SHEET 1.

8. ATTACH ASSEMBLY TO QUILL / QUILL MOUNT WITH M4 CAPSCREWS (4 POSNS).

CONNECTOR REMOVAL SEQUENCE.

REMOVAL SEQUENCE IS REVERSE OF ASSEMBLY SEQUENCE WITHOUT DISCONNECTING CABLES FROM CONNECTORS, THEN FOLLOWING THE STEPS BELOW;

1. REMOVE M2.5 CSK POZI SCREWS.

2. PULL CONNECTORS AWAY FROM FRONT FACE.

3. ROTATE CONNECTOR ABOUT VERTICAL AXIS UNTIL PERPENDICULAR TO FRONT FACE.

4. PUSH CONNECTOR AND CABLE THROUGH KINEMATIC HOUSING.

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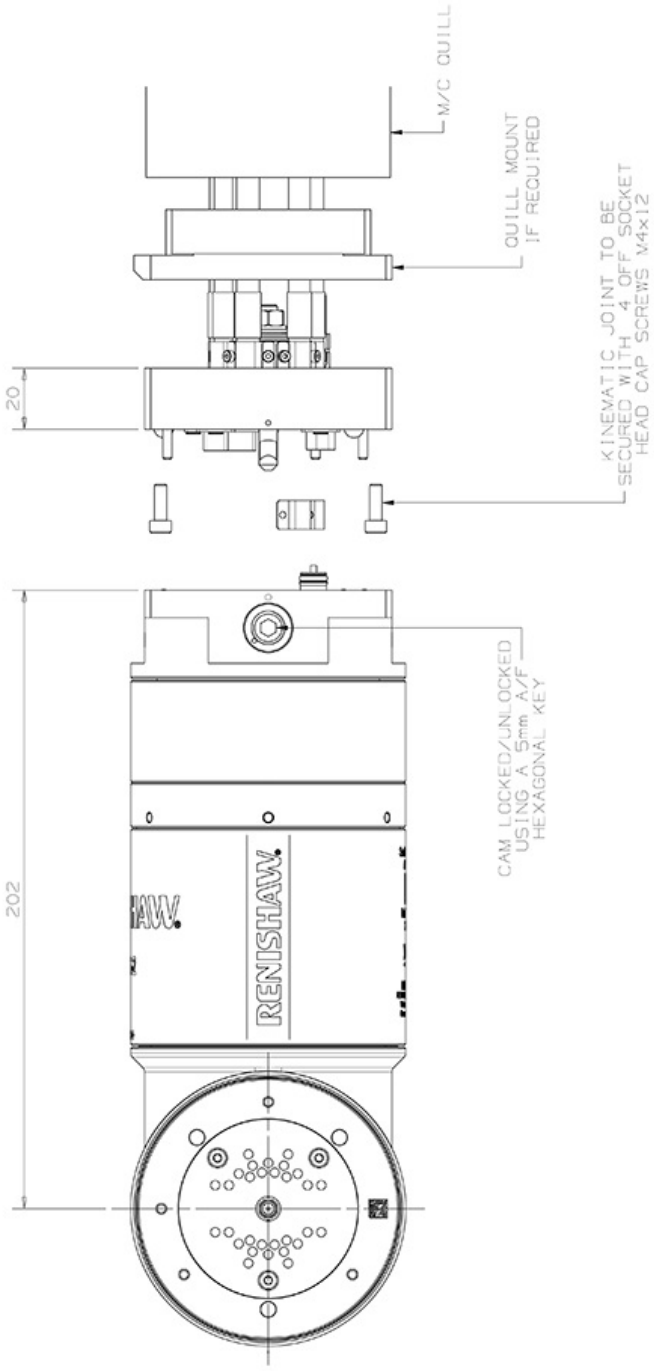
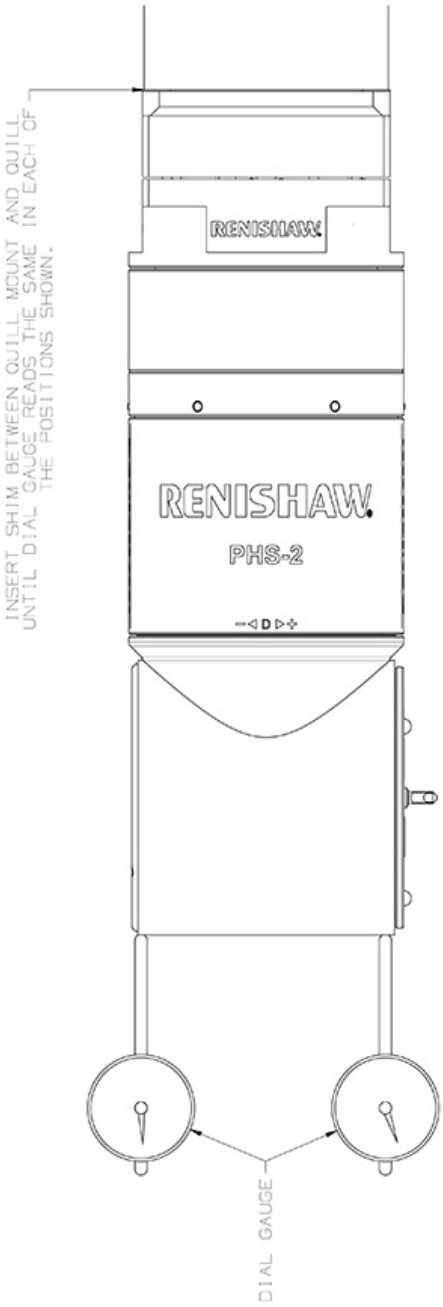
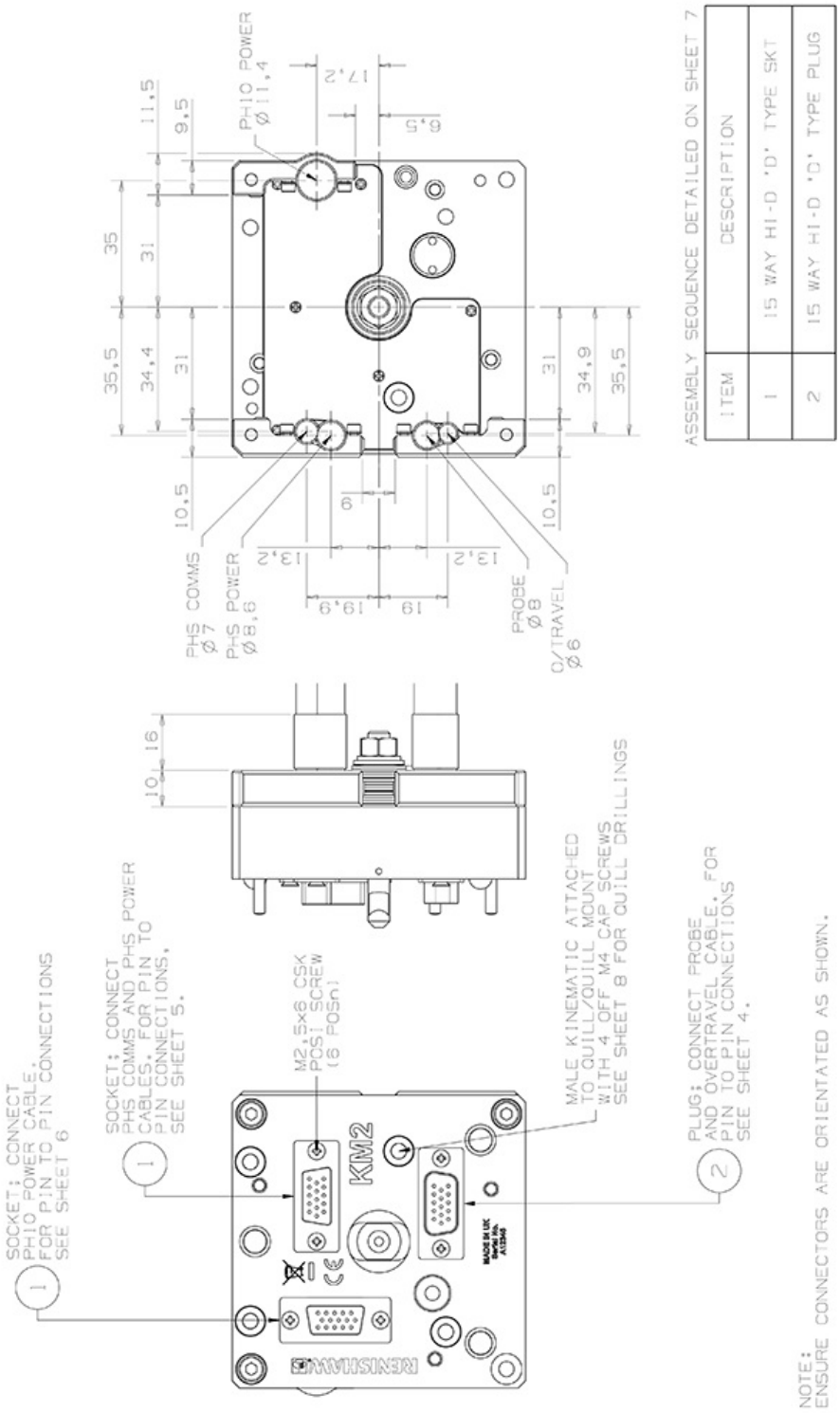
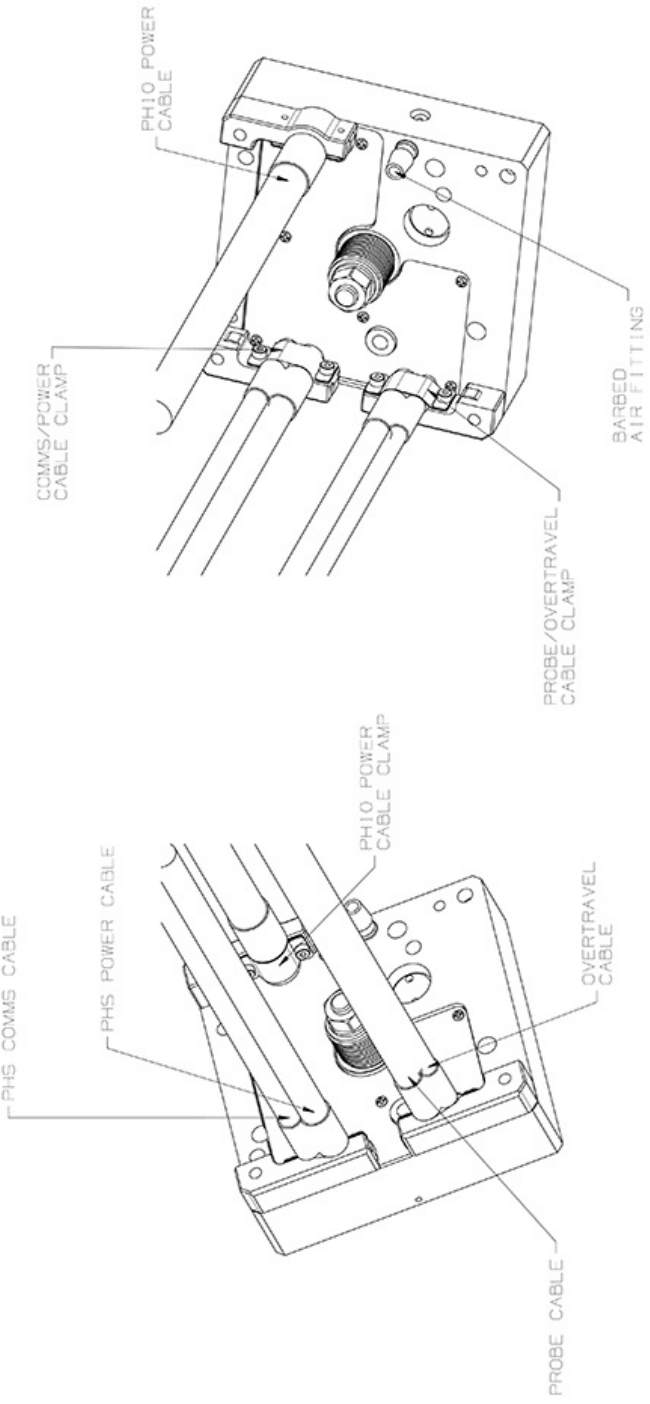

M/C QUILL
QUILL MOUNT
IF REQUIRED
KINEMATIC JOINT TO BE
SECURED WITH 4 OFF SOCKET
HEAD CAP SCREWS M4x12
20
CAM LOCKED/UNLOCKED
USING A 5mm A/F
HEXAGONAL KEY
202
RENISHAW.

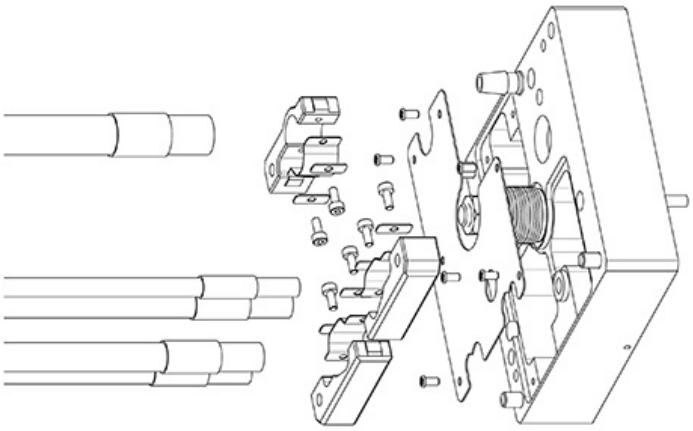

INSERT SHIM BETWEEN QUILL MOUNT AND QUILL UNTIL DIAL GAUGE READS THE SAME IN EACH OF THE POSITIONS SHOWN.
RENISHAW
RENISHAW
PHS-2
DIAL GAUGE

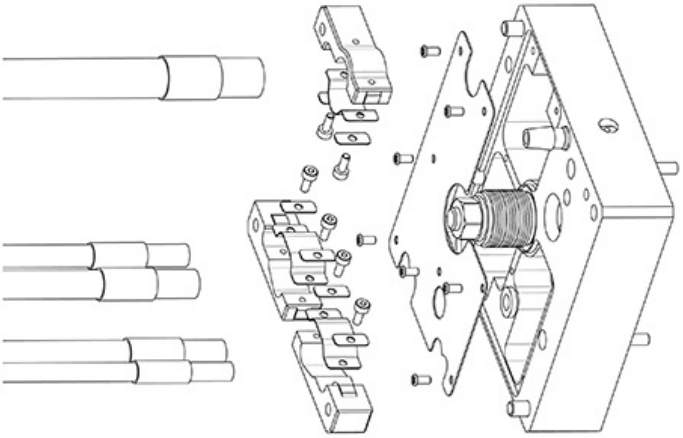
PHS-2 installation and user's guide



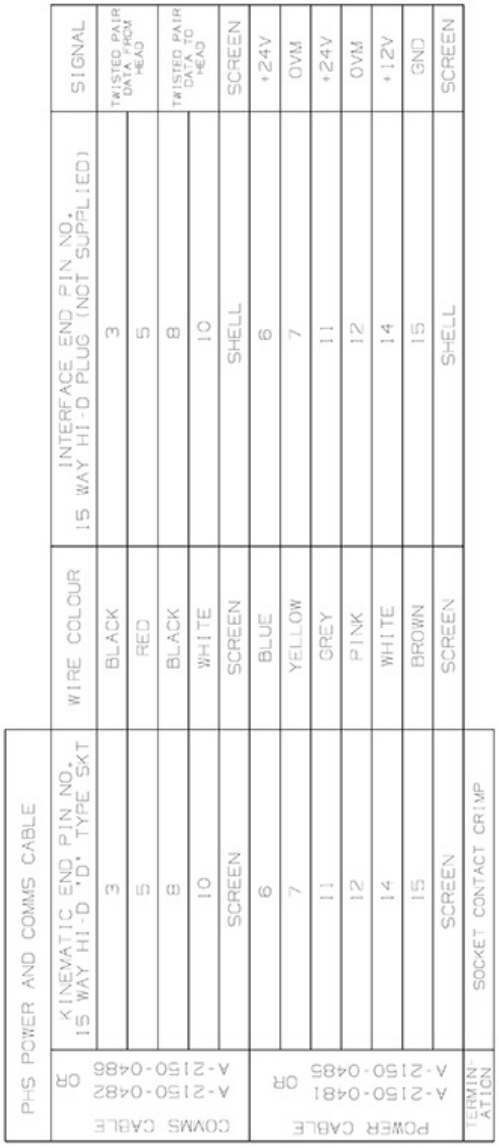

PH10 POWER CABLE
COMMS/POWER CABLE CLAMP
BARBED AIR FITTING
PROBE/OVERTRAVEL CABLE CLAMP
PH10 POWER CABLE CLAMP
PHS POWER CABLE
PHS COMMS CABLE
OVERTRAVEL CABLE
PROBE CABLE

PHS-2 installation and user's guide

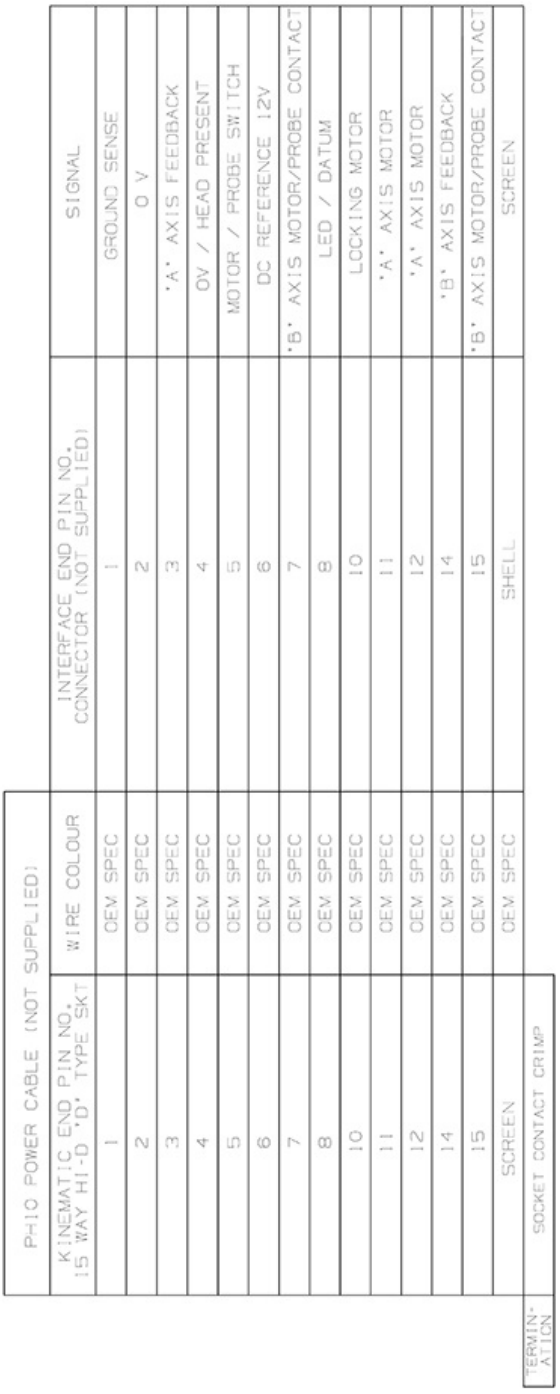




PROBE AND OVERTRAVEL CABLE
KINEMATIC END PIN NO.
15 WAY HI-D 'D' TYPE PLUG
WIRE COLOUR
INTERFACE END PIN NO.
15 WAY HI-D CONNECTOR(NOT SUPPLIED)
1 BROWN 1
2 BLACK / WHITE 2
3 GREEN 3
4 VIOLET 4
5 YELLOW 5
6 RED 6
7 BLUE 7
8 WHITE 8
9 COAX OUTER 9
10 COAX CORE 10
11 ORANGE 11
12 BLUE / WHITE 12
13 GREY 13
SEE NOTE BELOW BROWN / WHITE SEE NOTE BELOW
SCREEN SCREEN SHELL
PROBE CABLE
A-2150-0483 OR A-2150-0487
OVERTRAVEL CABLE
A-2150-0484 OR A-1250-0488
TERMIN-ATION
14 WHITE
15 BROWN
MALE CONTACT PIN CRIMP
FOR PROBE CABLE PREPARATION SEE DRAWING A-2150-0483 (30M) OR A-2150-0487 (18M).
FOR OVERTRAVEL CABLE PREPARATION SEE DRAWING A-2150-0484 (30M) OR A-2150-0488 (18M).
NOTE: TO ENABLE THE USE OF 'OTM' / 'OTP' OPTICAL PROBING SYSTEMS WITH A PHS/PHIC KINEMATIC INSTALLATION,
THE BROWN / WHITE WIRE IS TO BE CONNECTED IN PARALLEL WITH THE GREEN WIRE (PIN 3). IF OPTICAL PROBING IS NOT REQUIRED,
THE BROWN / WHITE WIRE IS TO BE CUT-BACK FLUSH WITH THE OUTER SHEATH. ONCE THIS WIRE HAS BEEN REMOVED SUBSEQUENT
USE OF THE 'OTM' / 'OTP' SYSTEM WILL NOT BE POSSIBLE WITHOUT FIRST RENEWING THE PROBE CABLE AND PARALLELING THE
BROWN / WHITE AND GREEN WIRES.



FOR COMMS CABLE PREPARATION SEE DRAWING A-2150-0482 (30M) OR A-2150-0486 (18M).
FOR POWER CABLE PREPARATION SEE DRAWING A-2150-0481 (30M) OR A-2150-0485 (18M).


PH10 POWER CABLE (NOT SUPPLIED)
KINEMATIC END PIN NO.
15 WAY HI-D 'D' TYPE SKT
WIRE COLOUR
INTERFACE END PIN NO.
CONNECTOR (NOT SUPPLIED)
SIGNAL
1 OEM SPEC 1 GROUND SENSE
2 OEM SPEC 2 0 V
3 OEM SPEC 3 'A' AXIS FEEDBACK
4 OEM SPEC 4 0V / HEAD PRESENT
5 OEM SPEC 5 MOTOR / PROBE SWITCH
6 OEM SPEC 6 DC REFERENCE 12V
7 OEM SPEC 7 'B' AXIS MOTOR/PROBE CONTACT
8 OEM SPEC 8 LED / DATUM
10 OEM SPEC 10 LOCKING MOTOR
11 OEM SPEC 11 'A' AXIS MOTOR
12 OEM SPEC 12 'A' AXIS MOTOR
14 OEM SPEC 14 'B' AXIS FEEDBACK
15 OEM SPEC 15 'B' AXIS MOTOR/PROBE CONTACT
SCREEN OEM SPEC SHELL SCREEN
TERMIN-ATION
SOCKET CONTACT CRIMP

ASSEMBLY SEQUENCE.

1. PREPARE CABLES AS DETAILED ON THE RELEVANT DRAWINGS.

2. THREAD WIRES THROUGH CORRECT HOLE IN SHIELD PLATE (SEE SHEETS 2 & 3).

3. CLAMP CABLES TO CLAMP-RING WITH APPROPRIATE CABLE CLAMP-STRIP (SEE SHEETS 2&3) ENSURE FOLDED-BACK SCREEN IS FIRMLY CLAMPED BETWEEN CLAMP-RING AND CABLE CLAMP-STRIP.

5. ATTACH SHIELD PLATE / CLAMP RING / CABLE ASSEMBLY TO KINEMATIC WITH M2 SCREWS (7 OFF), ENSURING CABLES PASS THROUGH CORRECT KINEMATIC HOUSING APERTURE.

6. WIRE-UP CONNECTORS AS DETAILED ON SHEETS 4, 5, AND 6.

7. ATTACH CONNECTORS TO KINEMATIC HOUSING USING THE M2.5 X 6 CSK POZIDRIVE SCREWS (6 POSNS). ENSURE CONNECTORS ARE ORIENTATED AS SHOWN ON SHEET 1.

8. ATTACH ASSEMBLY TO QUILL / QUILL MOUNT WITH M4 CAPSCREWS (4 POSNS).

CONNECTOR REMOVAL SEQUENCE.

REMOVAL SEQUENCE IS REVERSE OF ASSEMBLY SEQUENCE WITHOUT DISCONNECTING CABLES FROM CONNECTORS, THEN FOLLOWING THE STEPS BELOW;

1. REMOVE M2.5 CSK POZI SCREWS.

2. PULL CONNECTORS AWAY FROM FRONT FACE.

3. ROTATE CONNECTOR ABOUT VERTICAL AXIS UNTIL PERPENDICULAR TO FRONT FACE.

4. PUSH CONNECTOR AND CABLE THROUGH KINEMATIC HOUSING.

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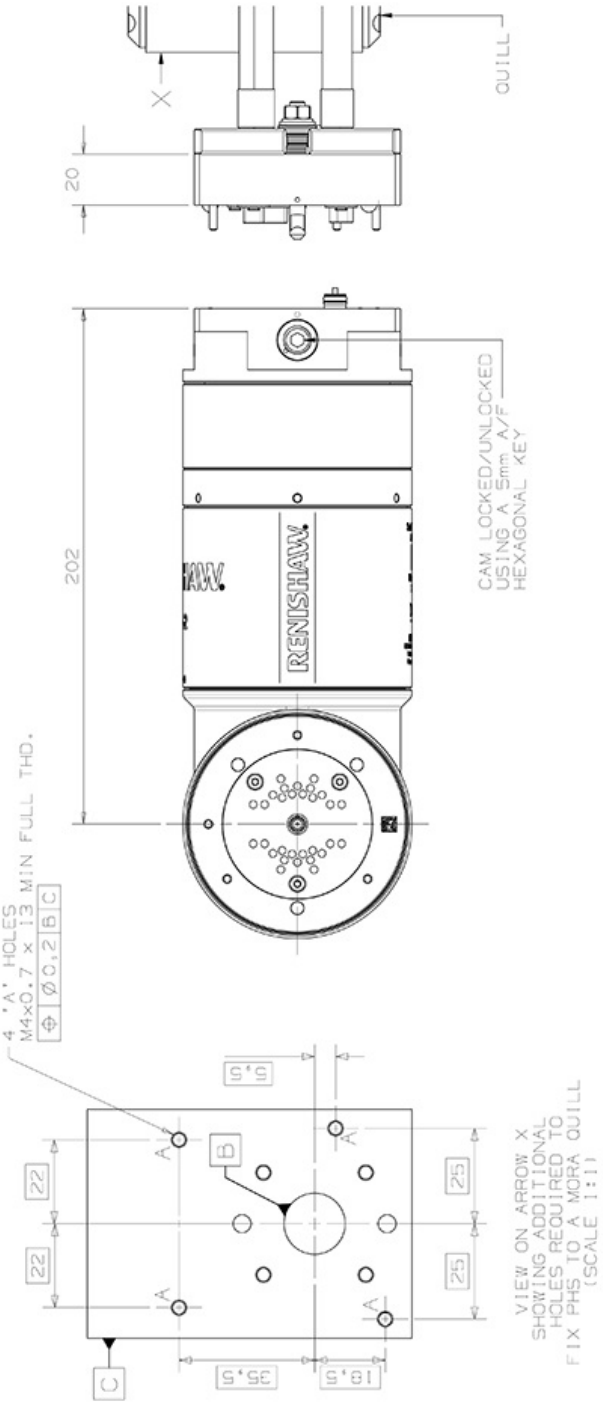
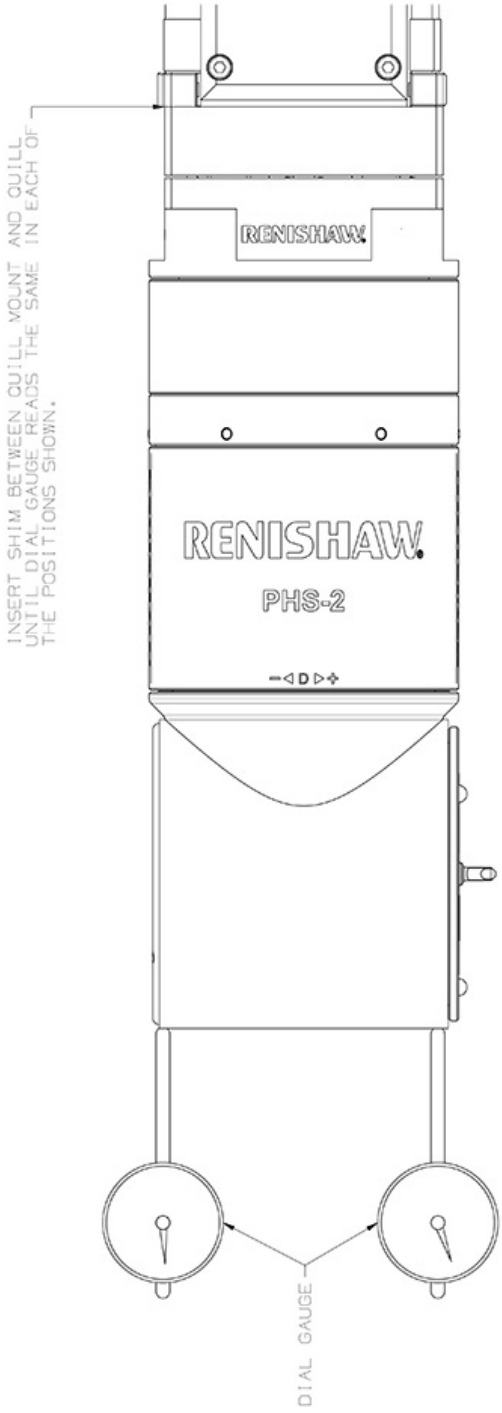
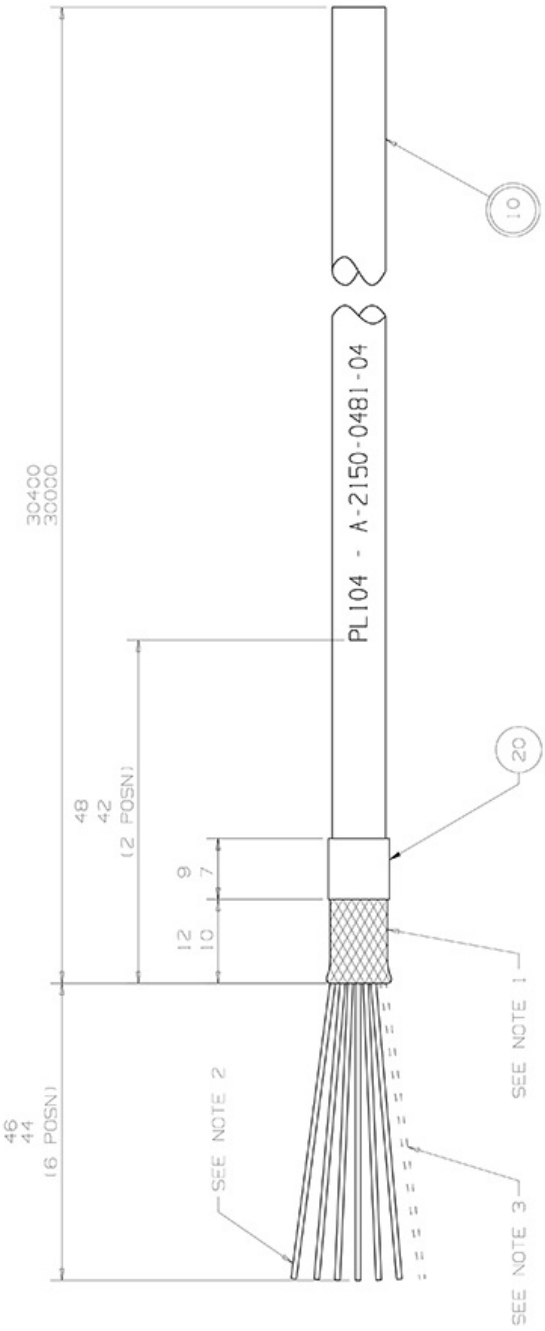
PHS-2 installation and user's guide



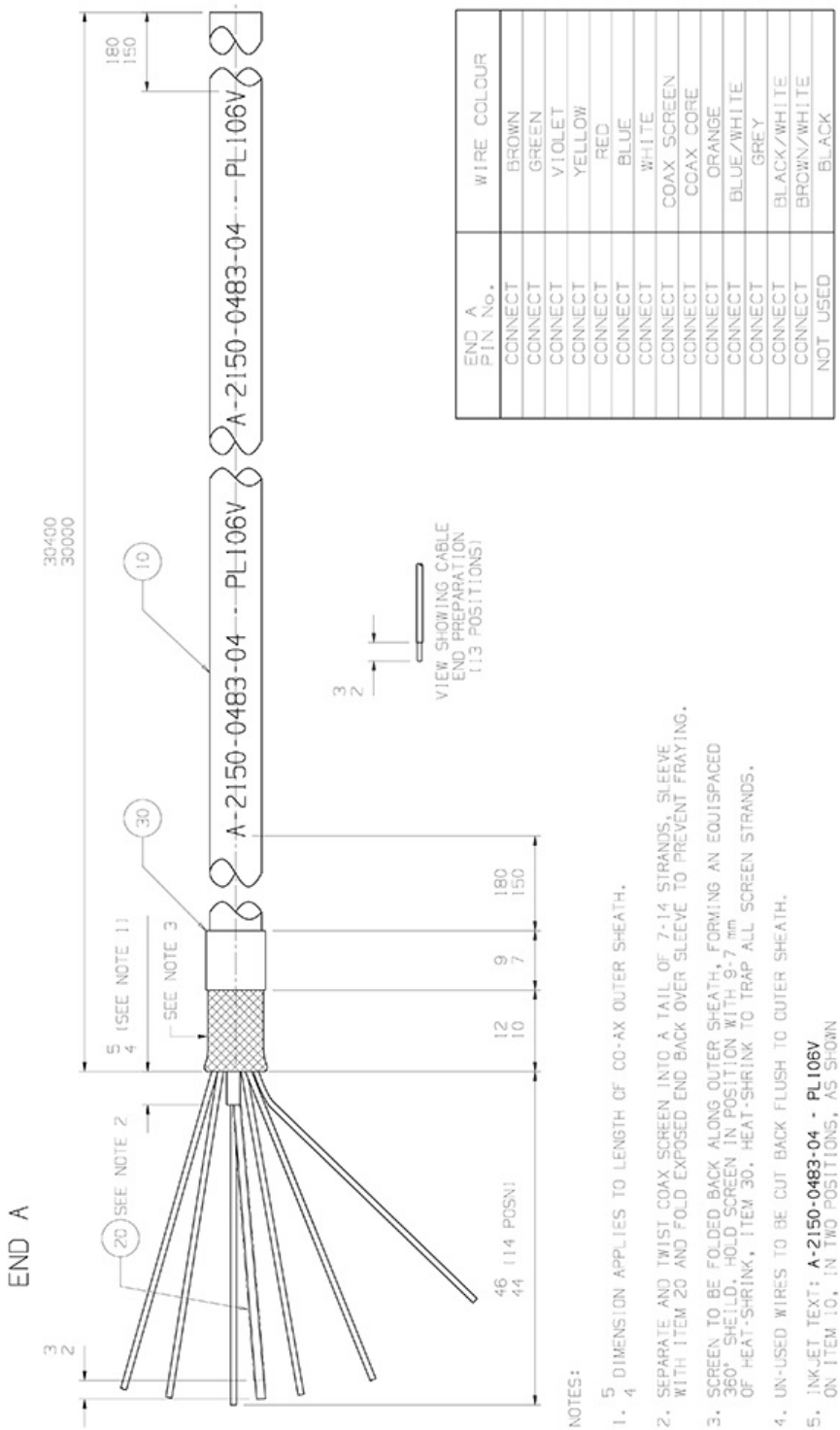
PHS-2 installation and user's guide

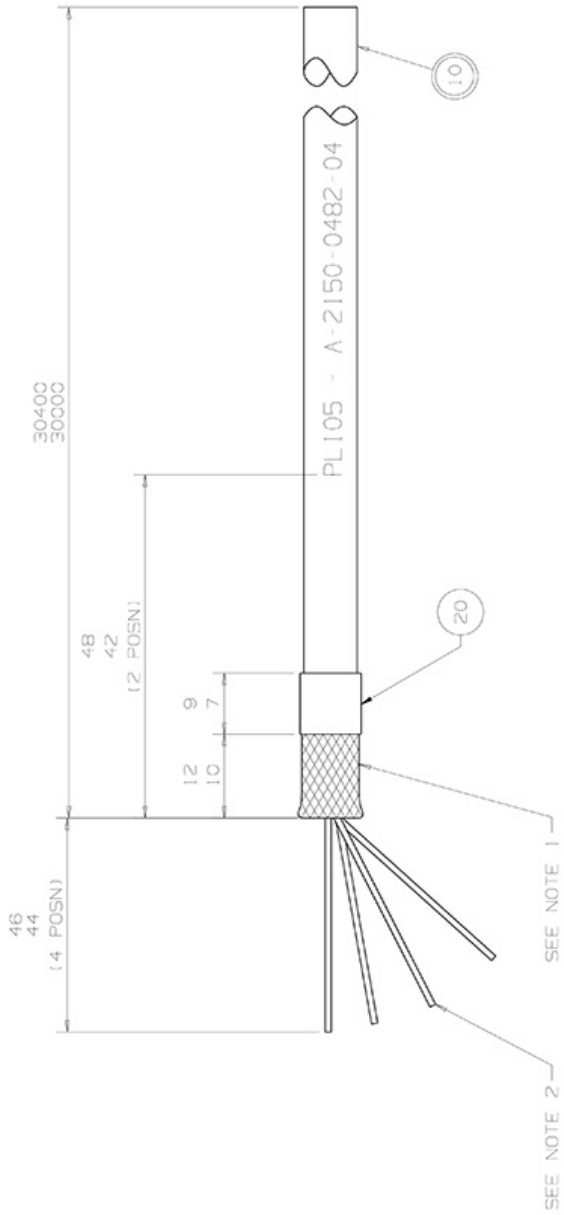




NOTES:

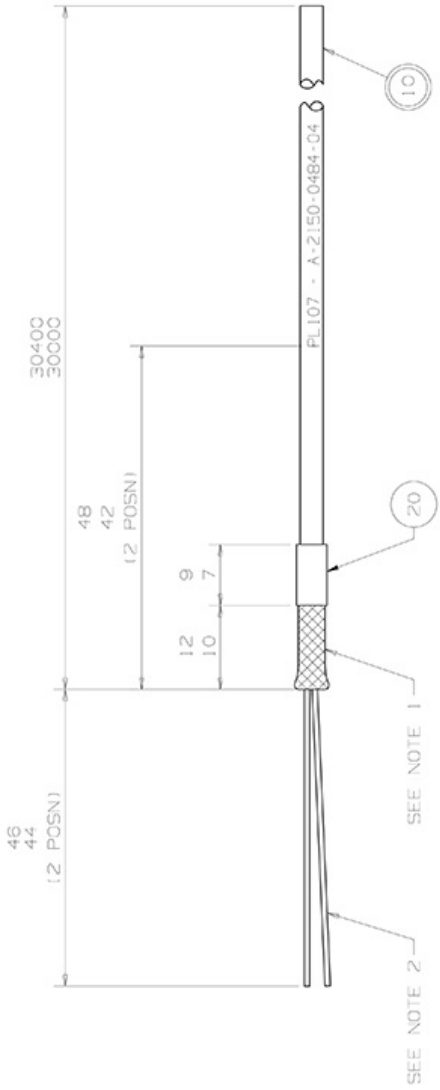
1. SCREEN TO BE FOLDED BACK ALONG OUTER SHEATH, FORMING A 360° SCREEN. SCREEN HELD IN POSITION WITH 9-7MM OF HEAT SHRINK ITEM 20.
2. CUT WIRES TO REQUIRED LENGTH BUT DO NOT CUT BACK INSULATION.
3. CUT GREEN WIRE FLUSH WITH OUTER SHEATH.
4. INK JET IDENT AND PART NUMBER; 'PL104 - A-2150-0481-04' WHERE SHOWN, AT BOTH ENDS OF CABLE IN WHITE INK (RENISHAW REF R-7251-0000) AND ADDITIVE (RENISHAW REF R-7231-0000).


END A
A-2150-0483-04 - PL106V
A-2150-0483-04 - PL106V
SEE NOTE 1
SEE NOTE 2
SEE NOTE 3
VIEW SHOWING CABLE END PREPARATION (13 POSITIONS)
END A PIN No.
WIRE COLOUR
CONNECT BROWN
CONNECT GREEN
CONNECT VIOLET
CONNECT YELLOW
CONNECT RED
CONNECT BLUE
CONNECT WHITE
CONNECT COAX SCREEN
CONNECT COAX CORE
CONNECT ORANGE
CONNECT BLUE/WHITE
CONNECT GREY
CONNECT BLACK/WHITE
CONNECT BROWN/WHITE
NOT USED BLACK
NOTES:
1. DIMENSION APPLIES TO LENGTH OF CO-AX OUTER SHEATH.
2. SEPARATE AND TWIST COAX SCREEN INTO A TAIL OF 7-14 STRANDS, SLEEVE WITH ITEM 20 AND FOLD EXPOSED END BACK OVER SLEEVE TO PREVENT FRAYING.
3. SCREEN TO BE FOLDED BACK ALONG OUTER SHEATH, FORMING AN EQUISPACED 360° SHIELD. HOLD SCREEN IN POSITION WITH 9.7 mm OF HEAT-SHRINK, ITEM 30. HEAT-SHRINK TO TRAP ALL SCREEN STRANDS.
4. UN-USED WIRES TO BE CUT BACK FLUSH TO OUTER SHEATH.
5. INK-JET TEXT: A-2150-0483-04 - PL106V ON ITEM 10, IN TWO POSITIONS, AS SHOWN



NOTES:

1. SCREEN TO BE FOLDED BACK ALONG OUTER SHEATH, FORMING A 360° SCREEN. SCREEN HELD IN POSITION WITH 9-7MM OF HEAT SHRINK ITEM 20.
2. CUT WIRES TO REQUIRED LENGTH BUT DO NOT CUT BACK INSULATION.
3. INK JET IDENT AND PART NUMBER; 'PL105 - A-2150-0482-04' WHERE SHOWN, AT BOTH ENDS OF CABLE IN WHITE INK (RENISHAW REF R-7251-0000) AND ADDITIVE (RENISHAW REF R-7231-0000).



NOTES:

1. SCREEN TO BE FOLDED BACK ALONG OUTER SHEATH, FORMING A 360° SCREEN. SCREEN HELD IN POSITION WITH 9-7MM OF HEAT SHRINK ITEM 20.
2. CUT WIRES TO REQUIRED LENGTH BUT DO NOT CUT BACK INSULATION.
3. INK JET IDENT AND PART NUMBER; 'PL107 - A-2150-0484-04' WHERE SHOWN, AT BOTH ENDS OF CABLE IN WHITE INK (RENISHAW REF R-7251-0000) AND ADDITITIVE (RENISHAW REF R-7231-0000).

Appendix 1 - PHS-2 international safety recommendations

BG - Безопасност

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 комбинациите глава на пробника / удължител / пробник.

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

При определени монтажи има външни въздуховоди. Трябва да се внимава и да се гарантира, че тръбите са фиксирани добре към назъбените фитинги за въздух.

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.

ЗАБЕЛЕЖКА: В системата PHS-2 липсват блокове, които са с мрежово захранване.

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 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.

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

CZ - Bezpečnost

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 se měl zdržovat mimo pracovní rozsah stroje, zejména mimo místa pohybu snímací hlavy, prodlužovacího nástavce a sondy.

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

Jisté instalace obsahují externí vzduchové potrubí. Je třeba věnovat pozornost bezpečnému uchycení potrubí k vzduchovým fitinkům se záseky.

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.

POZNÁMKA: Systém PHS-2 neobsahuje elektřinou napájené jednotky.

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.

Předpokládaným způsobem nouzového zastavení produktů společnosti Renishaw je odpojení napájení.

DA - Sikkerhed

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.

Ved visse installationer er der flere udvendige rør til luft. Man skal være omhyggelig med at fastgøre disse rør til samlingerne med modhager.

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

Afbryd strømforsyningen, før der foretages vedligeholdelse. Se maskinleverandørens brugervejledning.

BEMÆRK: Der er ingen enheder i PHS-2 systemet, der strømforsynes fra lysnettet.

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.

Den forventede metode til nødstop af Renishawprodukter er afbrydelse af strømforsyningen.

DE - Sicherheitshinweise

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 darf sich nur außerhalb des Messtaster-Arbeitsbereiches aufhalten.

Bei Arbeiten an Koordinatenmessgeräten und Werkzeugmaschinen wird ein Augenschutz empfohlen.

Bei bestimmten Aufstellarten sind externe Luftschläuche vorgesehen. Achten Sie darauf, dass die Schläuche sicher an den vorgesehenen Schlauchanschlüssen befestigt werden.

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

Vor Wartungsarbeiten begonnen werden, muss die Stromversorgung getrennt werden. Beachten Sie die Bedienungsanleitungen des Maschinenherstellers.

HINWEIS: Das PHS-2-System enthält keine mit Netzstrom versorgten Bauteile.

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.

Halten Sie Renishaw Produkte im Notfall durch Ausschalten der Stromversorgung an.

EL - Ασφάλεια

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.

Υπάρχουν εξωτερικοί σωλήνες αέρα σε ορισμένες εγκαταστάσεις. Πρέπει να δίδεται προσοχή ώστε να εξασφαλίζεται ότι οι σωλήνες στερεώνονται με ασφάλεια στους οδοντωτούς συνδέσμους αέρα.

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 οποιεσδήποτε εργασίες συντήρησης. Ανατρέξτε στις οδηγίες λειτουργίας του προμηθευτή του μηχανήματος.

ΣΗΜΕΙΩΣΗ: Στο σύστημα PHS-2 δεν υπάρχουν μονάδες που συνδέονται με το κεντρικό ηλεκτρικό ρεύμα.

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.

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

ES - Seguridad

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.

Algunas instalaciones cuentan con conducciones de aire externas. Asegúrese de que las tuberías están bien sujetas a las mordazas de las conducciones de aires.

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 emprender cualquier operación de mantenimiento. Remítase a las instrucciones de manejo del proveedor de la máquina.

NOTA: El sistema PHS-2 no tiene unidades alimentadas con conexión a la red eléctrica.

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.

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

ET - Ohutus

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 soovitav kasutada kaitseprille.

Teatavatel paigaldistel on välised õhutorud. Hoolitsege selle eest, et torud oleksid õhusüsteemi kidaliste seadiste küljes kindlalt kinni.

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.

MÄRKUS. PHS-2-süsteemis puuduvad võrgutoitega üksused.

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.

Esmaseks masina hädaseiskamise meetodiks on Renishaw' toodete puhul elektritoite katkestamine.

FI - Turvallisuus

Liikkuvien osien ja staattisten osien välillä on litistymisvaara. Älä pidä kiinni anturin päästä sen liikkuessa 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.

Tietyissä asennuksissa on ulkoisia ilmaputkia. Käyttäjän tulee huolehtia siitä, että putket ovat tiukasti kiinni liitosyhteissä.

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

Katkaise virta ennen huoltotoimenpiteiden suorittamista. Tutustu koneen toimittajan käyttöohjeisiin.

HUOMAA: PHS-2-järjestelmässä ei ole sähköverkkoon kytkettäviä laitteita.

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.

Renishaw-tuotteiden hätäpysäytys tehdään tavallisesti katkaisemalla virransyöttö.

FR - Sécurité

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 impromptus. 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 ou MMT.

Il existe plusieurs tubulures sur certaines installations. Veiller à ce que celle-ci sont correctement raccordées aux arrivées d'air à crans.

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.

REMARQUE : Il n'existe pas de raccordement secteur sur un system PHS-2.

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.

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

GA - Sábháilteacht

Tá guaiseacha cúngúcháin ann idir páirteanna atá ag gluaiseacht agus idir páirteanna atá ag gluaiseacht agus páirteanna stataca. 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/theaglamaí an tóireadóra.

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

Tá aerphíobáin sheachtracha ar shuiteálacha áirithe. Ní mór aire a thabhairt lena chinntiú go bhfuil na píobáin feistithe go daingean leis na feistis aeir dheilgneacha.

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 oibriúcháin sholáthraí an mheaisín féin.

NÓTA: Níl aon aonad príomhchumhachta sa chóras PHS-2.

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 oibriúchán, 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.

Is é an modh a bhítear ag dúil le stop éigeandála a sholáthar do tháirgí Renishaw ná an chumhacht a bhaint díobh.

HR - Sigurnost

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 opsega glave sonde/produžetka/kombinacija sonde.

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

Na određenim instalacijama su vanjske cijevi za zrak. Potrebno je paziti kako biste bili sigurni da su cijevi dobro učvršćene na bodljikave priključke za zrak.

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.

NAPOMENA: U sustavu PHS-2 nema uređaja na struju.

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.

Očekivana metoda omogućavanja zaustavljanja u nuždi za proizvode Renishaw je isključenje napajanja.

HU - Biztonság

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. A felhasználónak a mérőfej, a hosszabbító és a különféle mérőfej-kombinációk teljes munkatartományán kívül kell tartózkodnia.

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

Bizonyos összeállításoknál külső levegőcsövek kerülnek alkalmazásra. Gondoskodni kell arról, hogy a csövek megfelelően legyenek rögzítve a levegőellátás gyorscsatlakozóihoz.

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.

MEGJEGYZÉS: A PHS-2 rendszerben nincsenek hálózati áramról működő egységek.

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.

A Renishaw termékei esetében a vészleállítás megfelelő módja a tápellátás megszüntetése.

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 prolunghe 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.

Alcune installazioni includono tubature esterne per l'aria. Assicurarsi che i tubi siano fissati correttamente ai ganci di sostegno.

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.

NOTA: Il sistema PHS-2 non contiene unità collegate all'impianto di alimentazione centrale.

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

JA - 安全について

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。駆動中は、システムの可動範囲内に入らないでください。

工作機械または三次元測定機の使用を含むすべてのアプリケーションにおいて、保護眼鏡の着用を推奨します。

場合によっては、外付けエア配管が取り付けられていることがあります。配管がエア配管の接続口にしっかりと固定されていることを確認してください。

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。

注： PHS-2 システムには、電源供給を受けて動作する部品がありません。

操作に伴うあらゆる危険性（レニショー製品の説明書に記載されている内容を含む）をユーザー様に明示すること、それらを防止する充分なカバーおよび安全用インターロックを取り付けることは工作機械メーカーの責任で行ってください。

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。

レニショー製品を緊急停止する場合には、電源供給を切って緊急停止してください。

LT - Sauga

Tarp judančių detalių bei tarp judančių ir statiškų 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.

Atskiruose modeliuose yra išoriniai oro vamzdžiai. Pasirūpinkite, kad vamzdžiai būtų tinkamai pritvirtinti prie rantytųjų oro jungčių.

„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.

PASTABA: PHS-2 sistemoje nėra mazgų, maitinamų iš maitinimo tinklo.

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.

Tinkamiausias būdas sustabdyti „Renishaw“ prietaisą – nutraukti elektros srovės tiekimą.

LV - Drošība

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.

Dažās iekārtās ir uzstādītas ārējas gaisa caurules. Jāpārliecinās, ka caurules ir droši piestiprinātas pie atkarpainajiem gaisvadu stiprinājumiem.

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.

PIEZĪME: PHS-2 sistēmā nav elektroierīču.

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.

Ir paredzēts, ka „Renishaw" izstrādājumu avārijas apturēšanai lietotājs to atvienos no strāvas.

MT - Sigurtà

Jeżistu perikli li persuna tinqaras bejn il-partijiet li jkunu jiċċaqilqu u l-partijiet statiċi. Iżżommx 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.

F'ċerti installazzjonijiet hemm pajpijiet ta' l-arja li jgħaddu minn barra. Għandu jkun hemm kawtela biex jiġi żgurat li l-pipes jkunu mwaħħlin b'mod sod mal-barbed air fittings.

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

Itfi d-dawl qabel tibda tagħmel xi xogħol ta' manutenzjoni. Irreferi għall-istruzzjonijiet tal-operat tal-fornitur tal-magna.

NOTA: M'hemmx tagħmir imħaddem bil-provvista ta' l-elettriku fis-sistema PHS-2.

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 l-interlocks tas-sigurtà adegwati pprovduti.

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

Il-metodu mistenni ta' waqfien ta' emerġenza għal prodotti ta' Renishaw huwa billi jintefa l-iswiċċ li jforni l-elettriku lill-prodott.

NL - Veiligheid

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 werkbereik te blijven van combinaties van tasterkop, verlengstuk en meettaster.

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

Bepaalde installaties hebben externe luchtleidingen. Zorg ervoor dat de leidingen stevig worden bevestigd aan de luchtfittingen.

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

Schakel de stroom uit, voordat u onderhoudwerkzaamheden verricht. Raadpleeg de bedieningshandleiding van de machineleverancier.

OPMERKING: Er zijn geen delen die onder hoogspanning staan in het PHS-2 system.

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.

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

PL - Bezpieczeństwo

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 wystrzegać się nieskoordynowanych ruchów. 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.

W pewnych instalacjach występują zewnętrzne przewody rurowe powietrza. Należy zadbać, aby te przewody rurowe były pewnie zamocowane do króćców powietrza ze zgrubieniami.

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.

UWAGA: System PHS-2 nie zawiera żadnych zespołów o zasilaniu sieciowym.

Na dostawcy obrabiarki 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.

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

PT - Segurança

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 do cabeçote/extensão/apalpador.

Recomenda-se a utilização de proteção ocular em todas as aplicações que envolvam a utilização de ferramentas de máquinas ou o CMM.

Existem tubos de ar externos em algumas instalações. Deve ser assegurado que os tubos estejam fixados com segurança às conexões pneumáticas.

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.

NOTA: Não há unidades conectadas à rede elétrica no sistema PHS-2.

É responsabilidade do fornecedor da máquina garantir que o operador esteja consciente dos perigos envolvidos na operação, incluindo os mencionados na documentação dos produtos da Renishaw, e garantir o fornecimento de bloqueios de segurança e proteções adequadas.

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

O método esperado para permitir uma paragem de emergência dos produtos Renishaw é o de desligar a alimentação.

RO - Instrucţiuni de siguranţă

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

Atenţie la deplasările neaşteptate. Operatorul trebuie să rămână complet în afara spatiului de lucru al capului / al prelungirii / al palpatorului.

În toate aplicaţiile care presupun utilizarea maşinilor unelte sau a MMC, se recomandă protejarea ochilor.

Anumite instalații sunt prevăzute cu țevi externe de aer. Trebuie să aveți grijă ca țevile să fie bine fixate pe niplurile inelate.

Pentru instrucțiuni privind curățarea în siguranță a produselor Renishaw, consultați informațiile privind întreținerea din documentația corespunzătoare a produsului respectiv.

Înaintea executării oricăror operaţii de întreţinere, scoateţi echipamentul de sub tensiune. Consultați instrucțiunile de operare livrate de furnizorul mașinii.

NOTĂ: Nu există unități cu alimentare de la rețea în sistemul PHS-2.

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.

În anumite circumstanţe, semnalul palpatorului poate indica în mod eronat poziţia aşezată a acestuia. Nu vă bazaţi pe semnalele primite de la palpator pentru a opri deplasarea maşinii.

Metoda sugerată pentru oprirea de urgență a produselor Renishaw este întreruperea alimentării cu curent.

SK - Bezpečnosť

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

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

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

Niektoré inštalácie obsahujú externé vzduchové potrubia. Treba dbať na zaručenie bezpečného pripevnenia hadíc k zúbkovaným vzduchovým armatúram.

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.

POZNÁMKA: V systéme PHS-2 sa nenachádzajú žiadne jednotky napájané z elektrickej siete.

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.

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

SL - Varnost

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.

Nekatere inštalacije imajo zunanje zračne cevi. Poskrbite, da bodo cevi zanesljivo priključene na priključke za zrak.

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.

OPOMBA: V sistemu PHS-2 ni delov, ki bi se napajali iz električnega omrežja.

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.

Predvidena metoda za zaustavitev izdelkov Renishaw v sili je izklop električnega napajanja.

SV - Säkerhetsföreskrifter

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.

Vissa anläggningar innehåller externa luftslangar. Var noga med att kontrollera att slangarna sitter ordentligt fast på slangkopplingarna.

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

Koppla bort strömmen innan underhåll utförs. Se maskintillverkarens bruksanvisning.

OBS: Det finns inga nätströmsdrivna enheter i PHS-2-systemet.

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

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

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

ZH - 安全性

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。在移动时或手动更换测头时，切勿握住测座。

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。

某些装置上装有外部气管。小心确保气管牢固安装在带挂钩的空气接头上。

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。

注：PHS-2系统内含有由交流电源供电的装置。

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），并应确保提供充分的防护装置和安全联锁装置。

在某些情况下，测头信号可能错误地表示测头已就位。切勿单凭测头信号来停止机器运动。

紧急关闭雷尼绍产品的方法是断开电源。

ZH-TW - 安全

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。

在使用工具機或 CMM 的應用程序中，建議採用眼部防護措施。

某些裝置設有外接空氣管。務必謹慎確保空氣管安全固定於倒鉤型氣動接頭。

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。

附註： PHS-2 系統沒有主電源供電的裝置。

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。

Renishaw 公司產品的緊急關機方法是關閉電源。

Renishaw plc
New Mills, Wotton-under-Edge
Gloucestershire, GL12 8JR
United Kingdom

T +44 (0)1453 524524
F +44 (0)1453 524901

www.renishaw.com/cmmsupport

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For worldwide contact details, please visit our main website at www.renishaw.com/contact

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