Installation and user's guide
H-2000-5004-01-H

RENISHAW
apply innovation

MP4 probe system

Disclaimer

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Renishaw part no: H-2000-5004-01-H

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MP4 tool setting probe

Installation and user's guide

FCC DECLARATION (USA)

FCC Section 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 harmfull interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Section 15.105

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

FCC Section 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.

FCC Section 15.27

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

GB

WARNINGS

Information for the user

Beware of unexpected movement. The user should remain outside of 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.
Remove power before performing any maintenance operations.

Refer to the machine supplier's operating instructions.

Information for the machine supplier

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.

D

ACHTUNG

Informationen für den Benutzer

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

Bei Arbeiten an Werkzeugmaschinen oder Koordinatenmessgeräten wird Augenschutz empfohlen.

Vor Wartungsarbeiten muss die Stromversorgung getrennt werden.

Beziehen Sie sich auf die Wartungsanleitungen des Lieferanten.

Informationen für den Maschinenlieferanten

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 zu versichern, dass ausreichende Sicherheitsvorrichtungen und Verriegelungen eingebaut sind.

Unter gewissen Umständen könnte das Messtaster Fehlsignale melden (Ausgelenkt). Verlassen sie sich nicht auf das Messtastersignal um die Maschine zu stoppen.

DK

ADVARSLER

Oplysninger til brugeren

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

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

Afbryd strømforsyningen, før der foretages vedligeholdelse.

Se maskinleverandørens brugervejledning.

Oplysninger til maskinleverandøren

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 og sikkerhedsblokeringer.

Under visse omstændigheder kan probesignalet ved en fejl angive, at proben står stille. Stol ikke på, at probesignaler stopper maskinens bevægelse.

E

ADVERTANCIAS

Información para el usuario

Tener 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 protección para los ojos en todas las aplicaciones que implican el uso de máquinas herramientas y máquinas de medición de coordenadas.

Quitar la corriente antes de emprender cualquier operación de mantenimiento.

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

Información para el proveedor de la máquina

Corresponde al proveedor de la máquina asegurar que el usuario esté consciente de cualquier peligro que implica el manejo de la máquina, incluyendo los que se mencionan en la documentación sobre los productos Renishaw y le corresponde también asegurarse de proporcionar dispositivos de protección y dispositivos de bloqueo de seguridad adecuados.

Bajo determinadas circunstancias la señal de la sonda puede indicar erroneamente que la sonda está asentada.No fiarse de las señales de la sonda para parar el movimiento de la máquina.

F

AVERTISSEMENTS

Informations à l'attention de l'utilisateur

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

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

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

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

Informations à l'attention du fournisseur de la machine

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

Dans certains cas, il est possible que le signal issu du capteur indique à tort que celui-ci est hors matière. Ne pas se fier aux signaux du capteur qui ne garantissent pas toujours l'arrêt de la machine.

FIN

TURVALLISUUS

Käyttäjälle tarkoitettuja tietoja

Käyttäjien tulee pysyä luotaimen pään ja luotaimen toimintasäteen ulkopuolella.

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

Kytke virta pois päältä ennen huoltotoimenpiteitä.

Katso koneen toimittajan käyttöhjeita.

Tietoja koneen toimittajalle

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 siganaali saattaa osoittaa virheellisesti, että anturi on paikallaan.

GR

ΠΡΟΕΙΔΟΠΟΙΗΣΕΙΣ

Πληροφορίες για τους χρήστες

Προσοχή - κίνδυνος απροσδόκητων κινήσεων. Ο χρήστης πρέπει να παραμένει εκτός του χώρου που επηρεάζεται από όλους τους συνδυασμούς λειτουργίας της κεφαλής του αισθητήρα, της προέκτασης και του αισθητήρα.

Σε όλες τις εφαρμογές που συνεπάγονται τη χρήση εργαλειομηχανών ή εξαρτημάτων CMM, συνιστάται η χρήση συσκευής προστασίας των ματιών.

Αποσυνδέστε το μηχάνημα από το ηλεκτρικό ρεύμα προτού επιχειρήσετε τυχόν εργασίες συντήρησης.

Ανατρέξτε στις οδηγίες λειτουργίας του προμηθευτή του μηχανήματος.

Πληροφορίες για τους προμηθευτές των μηχανημάτων

Αποτελεί ευθύνη του προμηθευτή του μηχανήματος να εξασφαλίσει ότι ο χρήστης είναι ενήμερος ενδεχόμενων κινδύνων που συνεπάγεται η λειτουργία, συμπεριλαμβανομένων όσων αναφέρονται στο έντυπο συνοδευτικό υλικό των προϊόντων της Renishaw. Είναι επίσης ευθύνη του να εξασφαλίσει ότι υπάρχουν τα απαιτούμενα προστατευτικά καλύμματα και μανδαλώσεις ασφάλειας.

Σε ορισμένες περιπτώσεις το σήμα ανιχνευτή μπορεί να δείξει λανθασμένα ότι ο ανιχνευτής έχει τοποθετηθεί. Μη βασίζεστε στα σήματα ανιχνευτή για να διακόψετε την κίνηση του μηχανήματος.

I

AVVERTENZE

Informazioni per l'utente

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

Si raccomanda di indossare occhiali di protezione in applicazioni che comportano l'utilizzo di macchine utensili e macchine per misurare a coordinate

Prima di effettuare qualsiasi intervento di manutenzione, isolare dall'alimentazione di rete.

Consultare le istruzioni d'uso del fabbricante della macchina.

Informazioni per il 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 della Renishaw, e di fornire ripari di sicurezza e interruttori di esclusione adeguati.

È possibile che in certe situazioni venga erroneamente prodotto un segnale che indica che la sonda è in posizione Non fare affidamento sugli impulsi trasmessi dalla sonda per arrestare la macchina.

NL

WAARSCHUWINGEN

Informatie voor de Gebruiker

Oppassen voor onverwachte beweging.De gebruiker dient buiten het werkende signaalveld van de Tasterkop/ Extensie/Taster combinaties te blijven.

Het dragen van oogbescherming wordt tijdens gebruik van Bewerkingsmachines en CMM's aanbevolen.

Voordat u enig onderhoud verricht dient u de stroom uit te schakelen.

Raadpleeg de bedieningsinstructies van de machineleverancier.

Informatie voor de Machineleverancier

De leverancier van de machine is ervoor verantwoordelijk dat de gebruiker op de hoogte wordt gesteld van de risico's die verbonden zijn aan bediening, waaronder de risico's die vermeld worden in de produktendocumentatie van Renishaw. De leverancier dient er tevens voor te zorgen dat de machine is voorzien van voldoende beveiligingen en veiligheidsgrendelinrichtingen.

Onder bepaalde omstandigheden kan het tastersignaal een onjuiste tastertoestand aangeven.Vertrouw niet op de tastersignalen voor het stoppen van de machinebeweging.

P

AVISOS

Informações para o Utilizador

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

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

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

Consultar as instruções de funcionamento do fabricante da máquina.

Informações para o Fornecedor da Máquina

É responsabilidade do fabricante da máquina assegurar que o usuário esteja consciente de quaisquer perigos envolvidos na operação, incluindo os mencionados na documentação
dos produtos Renishaw e assegurar que são fornecidas proteções e bloqueios de segurança adequados.

Em determinadas circunstâncias, o sinal do apalpador pode indicar incorretamente uma condição de toque. Não confie nos sinais do apalpador para parar o movimento da máquina.

SW

VARNING

Information för användaren

Se upp för plötsliga rörelser.Användaren bör befinna sig utanför arbetsområdet för sondhuvudet/förlängningen/sond-kombinationerna.

Ögonskydd rekommenderas för alla tillämpningar som involverar bruket av maskinverktyg och CMM.

Koppla bort strömmen innan underhåll utförs.

Se maskintillverkarens bruksanvisning.

Information för maskinleverantören

Maskinleverantören ansvarar för att a nvändaren informeras om de risker som drift innebär, inklusive de som nämns i Renishaws produktdokumentation, samt att tillräckligt goda skydd och säkerhetsförreglingar tillhandahålls.

Under vissa omständigheter kan sondens signal falskt ange att en sond är monterad.Lita ej på sondsignaler för att stoppa maskinens rörelse.

Installation and users guide

WARRANTY
Equipment requiring attention under warranty must be returned to your supplier. No claims will be considered where Renishaw equipment has been misused, or repairs or adjustments have been attempted by unauthorised persons.

CARE OF THE PROBE
Treat the probe as a precision instrument.

CHANGES TO EQUIPMENT
Renishaw reserves the right to change specifications without notice.

CNC MACHINE
CNC machine tools must always be operated by competent persons in accordance with manufacturers instructions.

IP RATING
IPX8

ENVIRONMENT
Temperature
The MP4 is specified for storage over –10° to 70° C (14 to 158° F) and operation over 5° to 60° C (41° to 140° F) ambient temperature range.

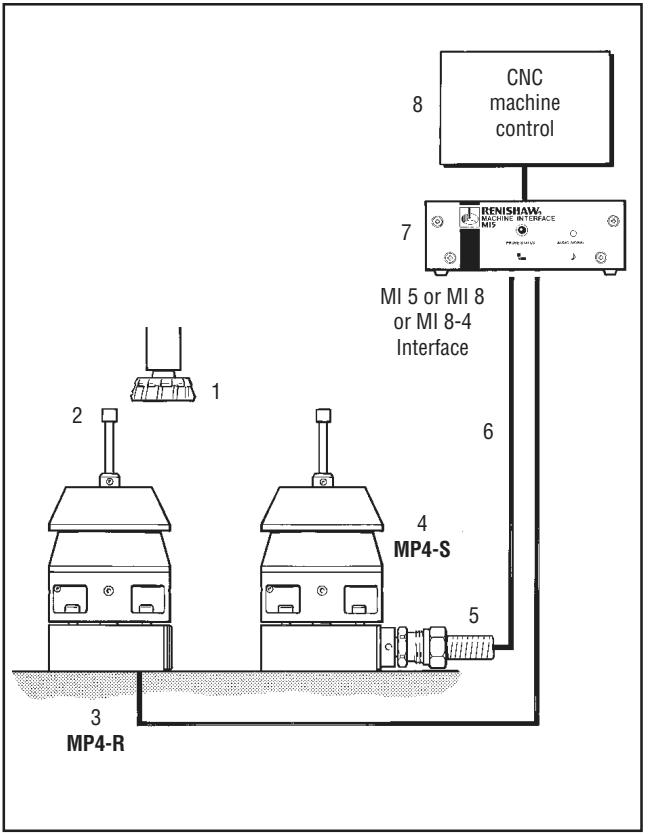
Contents

MP4 Probe

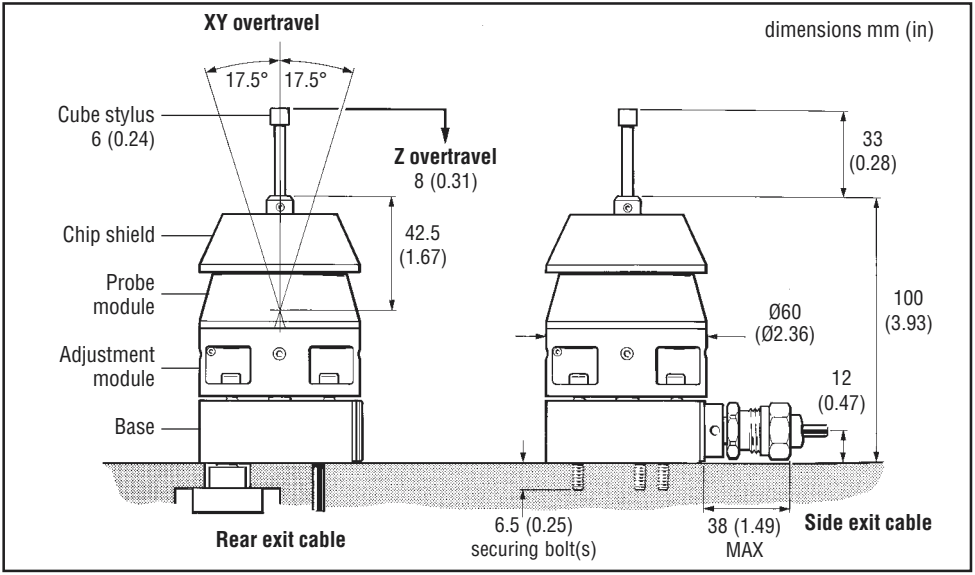
There are two versions of the MP4 probe. The **MP4-R** with rear exit cable and the **MP4-S** with side exit cable.

1. Tool tip.
2. Cube stylus.
3. MP4-R.
4. MP4-S.
5. Conduit for cable protection.
6. Cable.
   Signals are transmitted between the probe and CNC machine control via the interface unit.
7. Interface.
   The interface processes signals between the probe and CNC machine control.
8. CNC machine control.

MP4 PROBE SYSTEM



MP4 SPECIFICATION



SENSE DIRECTIONS ±X ±Y +Z

STYLUS OVERTRAVEL X and Y directions 17.5°
Z direction 8 mm (0.31 in)

PROBE REPEATABILITY

Maximum 2 Sigma (2σ) Value

Repeatability of 1.0 µm (40 µ in) is valid for test velocity of 480 mm/min (1.57 ft/min) at stylus tip, using stylus 50 mm (1.97 in) long.

STYLUS TRIGGER FORCE

X and Y trigger forces vary around the stylus seating.

X and Y direction -	lowest force
	0.75 N / 75 gf (2.64 ozf).
X and Y direction -	highest force
	1.4 N / 140 gf (4.92 ozf).
Z direction	4.9 N / 490 gf (17.28 ozf).

MOUNTING ON THE MACHINE

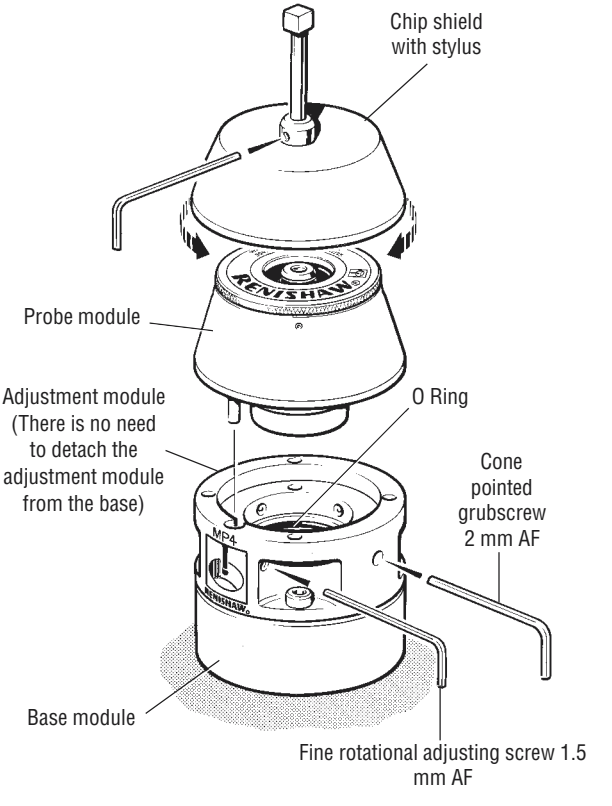
REMOVING THE PROBE MODULE

The probe module must be removed from the adjustment module, to gain access to the probe module stylus spring force adjusting screw and the base mounting screws.

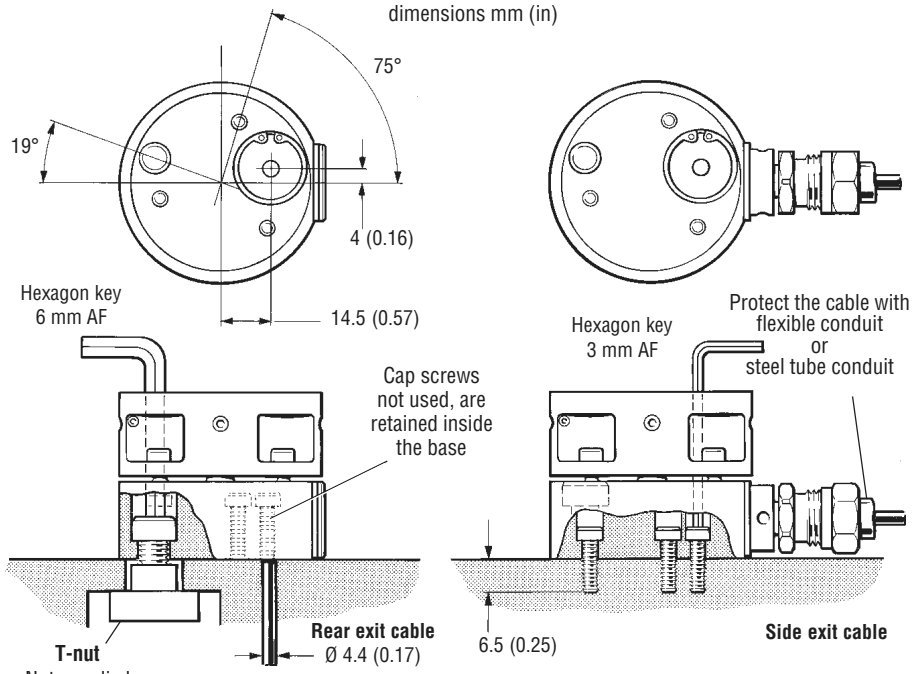
1. Remove the chip shield and stylus by unscrewing the chip shield anti-clockwise
2. Slacken the two fine rotational adjusting screws.
3. The probe module is clamped to the adjustment module by three cone pointed grubscrews. Slacken each screw sufficiently to remove the probe module with a slight twisting action.

REFITTING THE PROBE MODULE

1. Ensure the 'O ' ring is correctly seated. (Lubricate with Molyslip or similar, if probe is not new).
2. Push probe onto adjustment module with adjustment pin correctly aligned. The 'O' ring may cause some resistance, push module down until mating faces touch.
4. Fit chip shield onto probe module.
5. It may be necessary to re-align the stylus faces with the machines X/Y axes. The cone pointed screws and fine adjustment screws are tightened during this procedure - see page 1-9.



MOUNTING OPTIONS



OPTION 1
One M8 x 16 cap screw on a
42 (1.65) PCD, for use with standard T-nut.
Max tightening torque 17 Nm (12.5 lbf.ft)

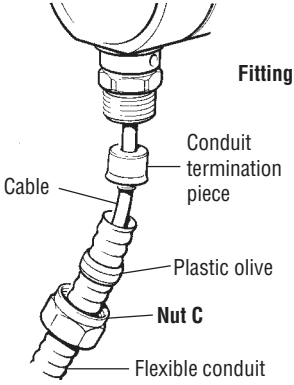
OPTION 2
Three equi-spaced cap screws
M4 x 16 on a 38 PCD (1.50).
Max tightening torque
2.1 Nm (1.59 lbf.ft).

CABLE SEALING and PROTECTION

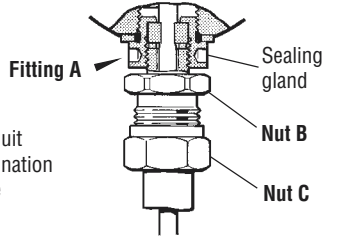
The conduit adaptor seals cable entry to the MP4-S probe to BS5490: (IEC529:1976) 1P68.
To protect the cable against physical damage, fit conduit (not supplied by Renishaw).
The conduit adaptor accepts either Ø11 mm flexible conduit or Ø12 mm rigid conduit.

When tightening or loosening **Nut C** ensure that torque is only applied between **Nut B** and **Nut C**.
If **Fitting A, Nut B** or **Nut C** become loose, the sealing gland will be ineffective.
Before fitting **Nut C**, grease the adaptor with a general purpose grease e.g. Shell Alvania grease.

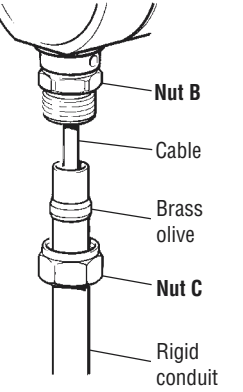
FLEXIBLE CONDUIT



CONDUIT ADAPTOR



RIGID CONDUIT



CAUTION :
Failure to protect the cable can result in system failure due to cable damage and coolant entering the probe through the cable. Inadequate protection will invalidate the warranty.

CONDUIT ADAPTOR and CABLE CONNECTION to INTERFACE

Fitting Flexible Conduit
(Ø11 flexible conduit)

Recommended flexible conduit is Thomas and Betts SHURESEAL 1/4in, Part No. TBEF 0250-50 or equivalent. Use the plastic olive when fitting flexible conduit.

Tighten **Nut C** onto the conduit until it is finger tight. Then tighten an additional 1.5 to 2.5 turns.

This will produce a seal to BS 5490 (IEC 529) to IP67, between the flexible conduit and the conduit adaptor.

Cable Specification

Four core screened cable, each core 7/0.2 mm insulated.

Core colours:
Green, blue, red and yellow.
Only blue and red are used.
Foil screen insulated.

Overall diameter 4.4 mm (0.17 in).
Length 4.8 m (15 ft 9 in).

Maximum permitted length 30 m (98 ft).

Route cable away from sources of electrical interference. e.g. motors.

Fitting Rigid Conduit
(Bundy Tube - Ø12 hydraulic pipe)

An alternative brass olive is supplied to enable rigid conduit to be fitted.

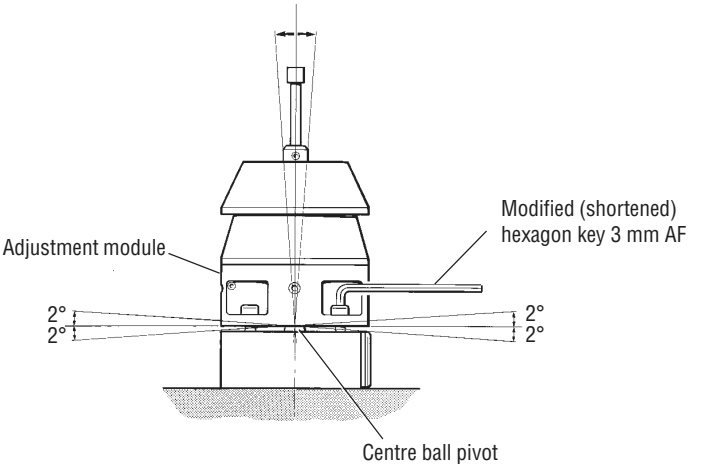
1. Remove **Nut C**, the conduit termination piece and plastic olive, by sliding them to the free end of the cable.
2. Discard the conduit termination piece and plastic olive.
3. Feed the brass olive and **Nut C** onto the cable.
4. Feed the conduit onto the cable, and engage the end of the conduit into the conduit adaptor.
5. Tighten **Nut C** to 25-75 Nm (18.55 - 19.91 lbf.ft), ensuring that the torque is resisted on the flats of **Nut B**. This will produce a seal to BS 5490 (IEC 529) to IP67, between the rigid conduit and the conduit adaptor.

CABLE CONNECTIONS PROBE TO INTERFACE

MP4 CABLE	MI 5 TERMINAL	MI 8 TERMINAL	MI 8-4 TERMINAL
Screen	20	A3	A1
Blue	22	A1	A2
Red	21	A2	A3

STYLUS - VERTICAL ALIGNMENT

STYLUS TILT



Stylus vertical alignment

Stylus vertical alignment with the machine spindle, is set by adjusting four adjustment module scews which allow the adjustment module to pivot on a centre ball.

To adjust, use the modified (shortened) hexagon key provided, to slacken and tighten opposing screws, until the correct alignment is achieved.

Finally tighten all screws.

STYLUS - X and Y AXES ALIGNMENT

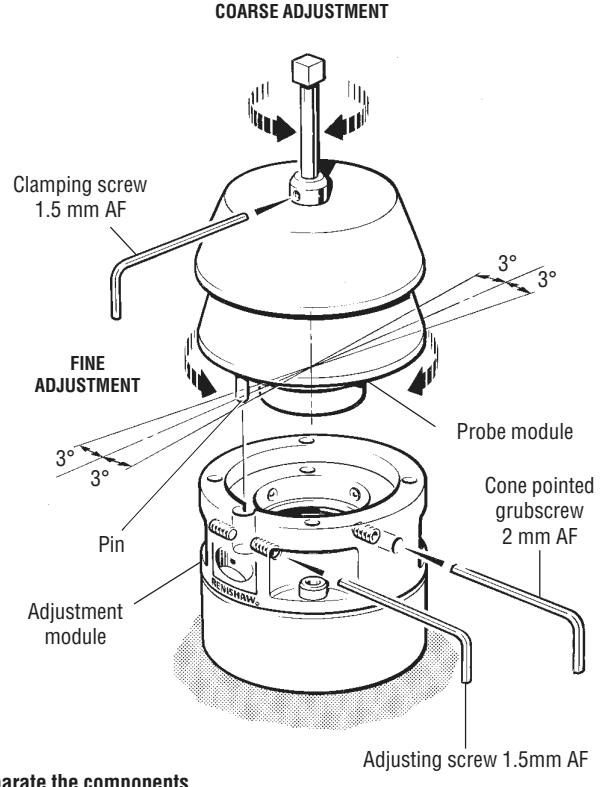
Stylus alignment in X and Y axes
The stylus is rotated, to align the faces of the stylus cube in the machine's X and Y axes.
The probe is provided with both coarse and fine stylus rotational adjustment.

Coarse adjustment is obtained by slackening the stylus holder grubscrews and rotating the stylus manually.

Fine adjustment is obtained by first slackening the three probe module cone pointed grubscrews, which clamp the probe module to the adjustment module.

Two opposing screws act against the pin protruding from the base of the probe module. These are adjusted incrementaly to provide fine adjustment.

When the correct stylus orientation is achieved, tighten the three cone pointed grubscrews, and completely tighten the two adjusting screws.



Do not separate the components.
The illustration is an exploded view for clarity.

TOOL SETTING

The MP4 is usually mounted is a fixed position on the machine table, providing tool access to the stylus, but with minimum intrusion into the working area of the machine.

Method

It is necessary for tools to be rotated during measurement to ensure that the highest point of the cutter teeth is found, unless static setting (usually length only) where a single cutter tooth can accurately be positioned for measurement. Cutting tools are normally rotated in the reverse direction against the stylus while setting tools.

Rotating tools feeds and speeds

The ratio of spindle speed (rpm), to feed rate (feed/min) has to be calculated to give a suitable measuring resolution. Typically 0.005 mm (0.000 2in) per revolution is desirable.

Optimised feeds and speeds must be established for a range of tools to avoid problems. The impact and frequency of cutter teeth hitting the stylus must be considered, slow feeds and speeds usually avoid conditions where stylus chatter may occur causing damage (typical 60 m/min cutting speed).
It is good practice to calibrate and set tools using the same basic method (see opposite), measuring touch points, and feed rates on the stylus.
The trigger points found during calibration are permanently stored in machine registers and used as a comparison during subsequent tool setting.

Setting/calibration for length

It is necessary to establish a reference trigger point for length measurement on top of the stylus.

Setting/calibration for cutter radius

Method 1 - Setting on one side of stylus

A reference trigger point on one side of the stylus. This can be used where speed of tool setting, or access to both sides of the stylus is restricted.

Method 2 - Setting on two sides of a stylus

A reference trigger point on two sides of the stylus can be used where access to both sides of the stylus is possible. It is better to use this method for consistent results, because it relies on the difference between the two trigger points to represent the radius, and is not dependant on absolute stylus positioning variance due to thermal effects etc.

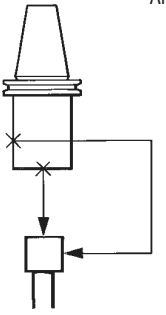
Setting/calibration method

The reference trigger points are found by using a reference arbor of known length and diameter, however the arbor must run true in the spindle.

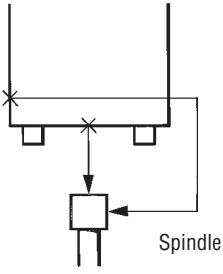
Alternatively, the spindle nose can be used where access is possible, and the length and diameter of the spindle nose is known.

METHOD 1

SETTING ON ONE SIDE
AND TOP OF THE STYLUS



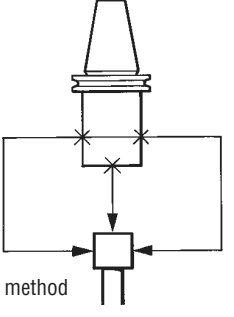
Reference arbor method



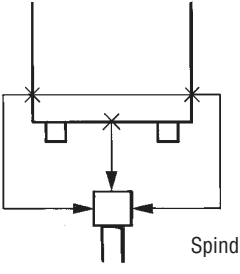
Spindle nose method

METHOD 2

SETTING ON TWO SIDES
AND TOP OF THE STYLUS



Reference arbor method



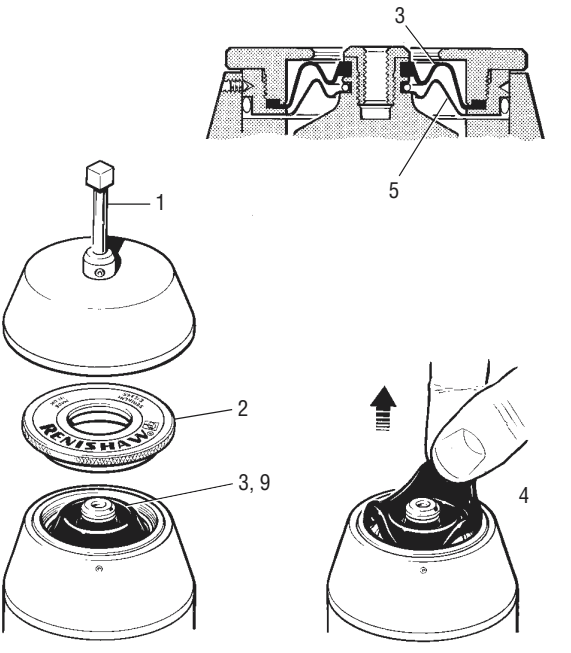
Spindle nose method

MAINTENANCE

THE PROBE IS A PRECISION TOOL HANDLE WITH CARE.
ENSURE THE PROBE IS FIRMLY SECURED IN ITS MOUNTING.
SWITCH POWER OFF WHEN MAKING ELECTRICAL CONNECTIONS.

Although Renishaw probes require little maintenance, the performance of the probe will be adversely affected if dirt, chips or liquids are allowed to enter the sealed working parts. Therefore, keep all components clean and free from grease and oil.
Periodically check cables for signs of damage, corrosion or loose connections.

PROBE DIAPHRAGM INSPECTION.
The probe mechanism is protected by two diaphragms, these provide adequate protection under normal working conditions.
The user should periodically check the outer diaphragm, for signs of damage and coolant leakage.
If this is evident replace the outer diaphragm.
The outer diaphragm is resistant to coolant and oils. However if the outer diaphragm is damaged, the inner diaphragm could become weakened with prolonged immersion in certain coolants and oils.
The user must not remove the inner diaphragm. If damaged, return the probe to your supplier for repair.



CAUTION
NEVER ATTEMPT TO REMOVE DIAPHRAGM WITH METAL OBJECTS

OUTER DIAPHRAGM INSPECTION

1. Unscrew the shield and stylus.
2. Unscrew the front cover.
3. Inspect outer diaphragm for damage.
4. To remove outer diaphragm, grip near the middle and pull upwards.

INNER DIAPHRAGM INSPECTION

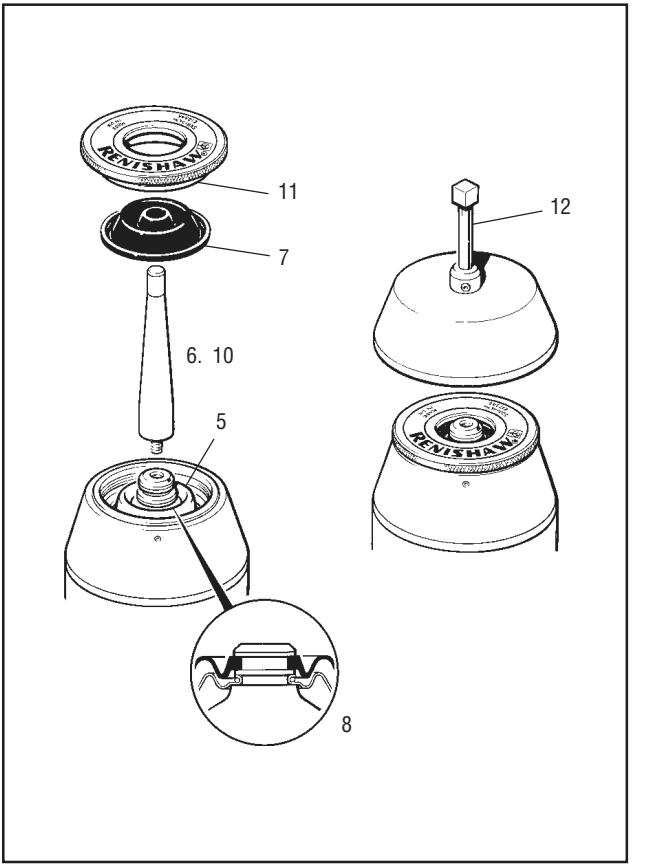
5. Inspect inner diaphragm for damage.

If damaged, return the probe to your supplier for repair.

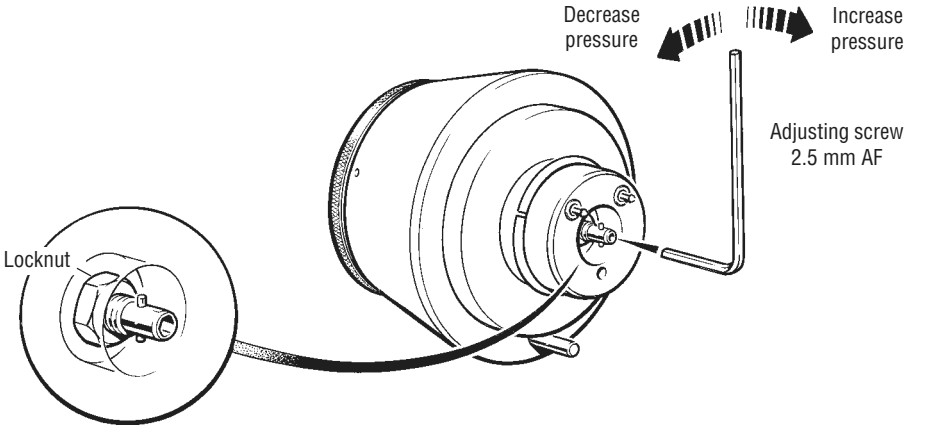
DO NOT REMOVE INNER DIAPHRAGM

OUTER DIAPHRAGM REPLACEMENT

6. Screw tool fully into stylus holder. Oil surface lightly.
7. Fit new diaphragm.
8. The diaphragm must locate centrally in the stylus holder groove.
9. Press diaphragm to expel trapped air.
10. Remove tool.
11. Lightly smear medium grease on front cover lower surface. Then refit cover and tighten.
12. Refit shield with stylus.



STYLUS TRIGGER FORCE ADJUSTMENT - Gauging force



The stylus spring pressure is set by Renishaw and should only be changed in special circumstances, e.g. when heavier styli are used or excessive machine vibration is present.

It is advisable to make adjustments in small increments, and test the results at each stage, until a satisfactory result is obtained.

To adjust pressure, slacken the locknut using a 7 mm AF socket.

Using a 2.5 mm hexagon key turn the adjusting screw clockwise to increase spring pressure. Turn anti-clockwise to reduce spring pressure and increase touch sensitivity. Then tighten the locknut. Adjustment is limited in both directions by end stops.

STYLUS TRIGGER FORCE ADJUSTMENT AND USE OF STYLI OTHER THAN CALIBRATION STYLUS TYPE, MAY CAUSE PROBE REPEATABILITY TO DIFFER FROM THE CALIBRATION CERTIFICATE RESULTS.

COMPLETE FAILURE

POSSIBLE CAUSE	REMEDY
Loose mounting.	Check all bolted or screwed connections for tightness.
Interface LED does not light up.	Check fuses.
Poor electrical connection.	Check connectors.
Cable screen broken.	Replace cable.
Incorrect voltage.	Check supply.
Probe failure.	No continuity through probe circuit.
Probe spring pressure too low.	Tighten stylus spring pressure.
Probe mounting DIN plug pins bent or broken.	Return to your supplied for repair.

IF THESE CHECKS DO NOT ELIMINATE THE FAULT,
CONSULT YOUR PROBE SUPPLIER.

FAULT FINDING

POOR REPEATABILITY

POSSIBLE CAUSE	REMEDY
Loose mounting.	Check all bolts and screwed connections for tightness.
Loose stylus.	Tighten.
Poor electrical connections.	Check connectors.
Excessive machine vibration.	Tighten stylus spring pressure.

SPURIOUS READING

Cable screen broken.	Replace cable.
Poorly regulated supply voltage.	Regulate correctly.
Excessive machine vibration	Eliminate vibration or adjust stylus spring pressure.

POOR RE-ARMING

The probe is armed when the stylus mounting is seated, the electrical circuit is complete and readings can be taken.

Spring pressure too low.	Adjust spring pressure.
Diaphragms pierced or damaged.	Return to supplier for repair.

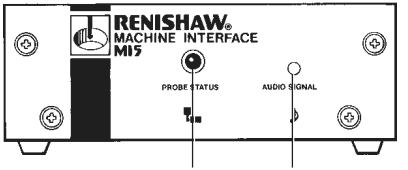
IF THE PROBE OR INTERFACE CONTINUES TO MALFUCTION, RETURN TO YOUR SUPPLIER FOR REPAIR.

APPENDIX 1
MI 5 INTERFACE UNIT

The MI 5 is fully described in
User's guide H-2000-5014

The MI 5 interface is used with inductive and/or hard wired signal transmission systems. System status is presented visually in a continuously updated form, on the front panel diagnostic LED display, and by outputs available from the MI 5 to the CNC control.

Front view



Probe status LED
Lit when probe is at rest or interface is inhibited.

LED off indicates probe stylus is deflected or power is off.

Audible Indicator
A tone is emitted each time stylus is defected or returns to rest.

INTERFACE UNIT

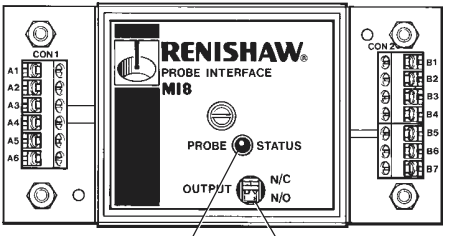
Interface units convert probe signals into an acceptable form for the CNC machine control.

APPENDIX 2
MI 8 INTERFACE UNIT

The MI 8 is fully described in
User's guide H-2000-5015

The MI 8 interface is used with hard wired signal transmission systems. System status is presented visually in a continuously updated form on the front panel diagnostic LED display, and by outputs available from the MI 8 to the CNC control.

Front view



Probe status LED
Lit when probe is at rest or interface is inhibited.

LED off indicates probe stylus is deflected or power is off.

Switch SW1
Output N/C
(Normally closed)

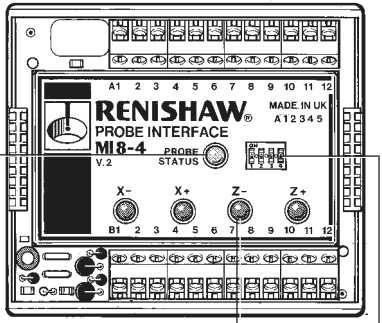
Output N/O
(Normally open)

APPENDIX 3
MI 8-4 INTERFACE UNIT

The MI 8-4 is fully described in
User's guide H-2000-5008

The MI 8-4 is used with hard wired signal transmission systems. it connects to the machine control input, or it connects into the 4 wire Fanuc 'Automatic Length Measurement' input (XAE, ZAE).

Front view



Bi-colour Probe Status LED
Green when probe is at rest or interface is inhibited.

Red when probe stylus is deflected.

LED off indicates power is off.

Diagnostic LEDs
Indicate direction of machine movement

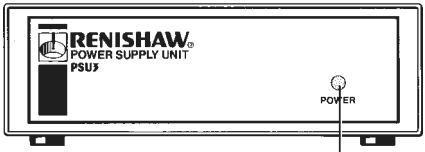
Switch SW1
Output high
or
output low

APPENDIX 4
PSU3 POWER SUPPLY UNIT

The PSU3 is fully described in
User's guide H-2000-5057

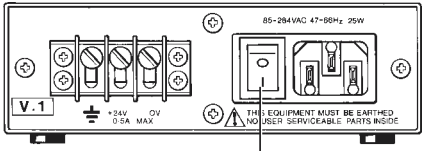
The PSU3 provides a +24 V supply for Renishaw interface units when a power supply is not available from the CNC machine control.

Front view



Power LED
When the green LED is lit, the power supply is on.

Rear view



Mains switch
On/off

PARTS LIST Please quote the Part no. when ordering equipment

Type	Part no.	Description
MP4-S	A-2054-3968	MP4-S probe (side exit) with conduit adaptor, and cable 4.8 m (15ft 9 in) long and tool kit.
MP4-R	A-2054-6373	MP4-R probe (rear exit) with cable 4.8 m (15ft 9 in) long and tool kit.
PSI-14	A-5000-6701	Cube stylus 43 mm (1.69 in) long.
DK1	A-2051-7105	Probe outer diaphragm replacement kit.
Tool kit	A-2054-6496	Probe head tool kit comprising : Stylus tool Ø1.98 and hexagon keys 1.5 mm AF, 2.0 mm AF, 2.5 mm AF, 3.0 mm AF, 4.0 mm AF, 6.0 mm AF, and modified (shortened) hexagon key 3.0 mm AF.

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