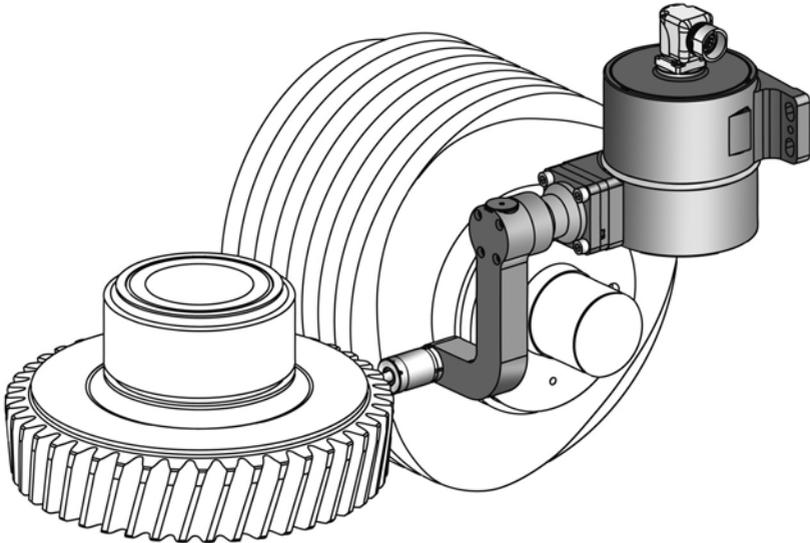


HPGA high precision generic arm



English (EN)
Deutsch (DE)
Italiano (IT)
中文 (简体) (ZH)
日本語 (JA)

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Renishaw part no: H-5616-8500-04-A

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GB

This guide is also available in electronic format on the mini-CD in the pocket inside the back cover. To view this guide, insert the mini-CD into the CD drive of your PC and follow the on-screen instructions. This file can also be printed if required. If you are unable to read the CD, please contact your local Renishaw office.

DE

Dieses Handbuch ist ebenfalls in deutscher Sprache in elektronischem Format auf der Mini-CD in der Tasche im Rückumschlag erhältlich. Legen Sie zur Ansicht des deutschen Handbuchs die Mini-CD in das CD-Laufwerk Ihres PCs und folgen Sie der Anleitung auf dem Bildschirm. Diese Datei kann bei Bedarf ebenfalls gedruckt werden.

IT

Questo manuale è disponibile anche in formato elettronico all'interno del mini CD incluso nella tasca della terza di copertina. Per visualizzare tale manuale, inserire il mini CD nell'unità CD ROM del PC e seguire le istruzioni visualizzate sullo schermo. Se necessario, è possibile stampare il file. Nel caso risulti impossibile leggere il CD, contattare l'ufficio Renishaw più vicino.

ZH

本手册也供有电子文档，请见封三所附的小光盘。要查看电子文档，请将光盘插入PC机内，然后按照屏幕上的说明进行操作。如果需要也可打印该文档。如果无法读取光盘，请与您当地的 Renishaw 办事处联系。

JA

本取扱説明書は、裏表紙内側ポケットに入っているCD内の電子データでもご利用いただけます。本取扱説明書を閲覧するには、CDをご使用のパソコンのCDドライブに挿入し、画面表示に従って操作して下さい。また、このファイルは必要に応じて印刷もできます。CDが読めない場合は、お国のレニショーまでご連絡下さい。

GB - Safety

Remove power before performing any maintenance operations.

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. Pinch hazards exist between moving parts and between moving and static parts.

BG - Раздел по безопасност

Преди извършване на всякакви операции по поддръжката да се изключва захранването

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

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

Съществуват рискове от притискане между движещи се части и между движещи се и неподвижни части.

CZ - Bezpečnost

Před započetím jakékoliv údržby zařízení odpojte napájení.

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.

Mezi pohyblivými součástmi a mezi pohyblivými a statickými součástmi hrozí nebezpečí přiskřípnutí.

DE - Sicherheitsanweisungen

Vor Wartungsarbeiten muss die Stromversorgung getrennt werden.

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 Sicherheitsvorrichtungen und Verriegelungen eingebaut sind.

Es kann passieren, dass der Messtaster fälschlicherweise eine Ruhestellung des Messtasters signalisiert. Verlassen sie sich nicht alleine auf das Messtastersignal, um Maschinenbewegungen zu stoppen.

Zwischen zwei beweglichen und zwischen beweglichen und statischen Teilen besteht Einklemmgefahr.

DK - Sikkerhed

Afbryd strømforsyningen, før der foretages vedligeholdelse.

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

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

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.

EL - Ασφάλεια

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

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

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

Υπάρχει κίνδυνος πιασίματος μεταξύ των κινούμενων μερών όπως και μεταξύ των κινούμενων και στατικών μερών.

ES - Seguridad

Quitar la corriente antes de emprender cualquier operación de mantenimiento.

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.

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

Existe el peligro de atraparse los dedos entre las distintas partes móviles y entre partes móviles e inmóviles.

ET - Ohutusosa

Enne hooldustoimingute teostamist ühendage seade alati voluvõrgust lahti.

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 ekslikult näidata, nagu oleks sond paigale asetunud.

Ärge lähtuge masina liikumise peatamisel sondi signaalidest.

Masina liikuvad osad võivad põhjustada muljumisohtu.

FI - Turvallisuus

Katkaise virta ennen huoltotoimenpiteiden suorittamista.

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 mitta-anturi on lepotilassa (=ei-kosketuksessa). Älä pysäytä koneen liikettä mittapään signaalien perusteella.

Liikkuvien osien sekä liikkuvien ja staattisten osien välillä on olemassa puristusvaara.

Älä pidä kiinni anturin päästä sen liikkuessa tai vaihtaessasi anturia käsin.

FR - Sécurité

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

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

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

L'effet de pincement dû au mouvement des pièces mobiles entre elles ou avec des pièces fixes présente des dangers.

GA - Rannóg sábháilteachta

Bain an chumhacht de sula ndéantar aon oibríochtaí cothabhála.

Is í freagracht sholáthraí an mheaisín í 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 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.

Tá guaiseacha liomóige ann idir codanna gluaiستهacha agus idir codanna gluaiستهacha agus statacha.

HU - Figyelem

Mielőtt bármilyen karbantartási művelet végezne, kapcsolja ki a berendezést.

A gép szállítója felelős azért, hogy felhívja a felhasználó figyelmét az üzemeltetéssel kapcsolatos veszélyforrásokra, ideértve az illető Renishaw termék dokumentációjában ismertetetteket is, és hogy gondoskodjon a megfelelő védőburkolatok és biztonsági reteszelések meglétéről.

Bizonyos körülmények között a mérőtapintó azt jelezheti, hogy a mérőtapintó felfeküdt a mérendő objektumon, noha ez nincs így. Ezért a gép mozgásának leállításakor nem szabad a mérőtapintó jeleire hagyatkozni.

Fennáll a veszélye, hogy a keze beszorulhat mozgó alkatrészek valamint mozgó és álló alkatrészek közé.

LV - Drošības sadaļa

Atvienojiet no strāvas pirms jebkuru apkalpošanas darbu veikšanas.

Lekārtas piegādātājs atbild par to, lai lietotājs būtu iepazīstināts ar jebkuriem draudiem, kas saistīti ar tās darbību (ieskaitot tos, kas minēti Renishaw izstrādājuma dokumentācijā), un lai būtu nodrošinātas atbilstošas aizsargierīces un aizsargbloķētāji. Noteiktos apstākļos tausta signāls var nepareizi norādīt tausta stāvokli. Nepaļaujieties uz tausta signālu, lai apturētu iekārtas kustību.

Starp kustīgajām daļām, kā arī kustīgajām un nekustīgajām daļām iespējams saspiešanas risks.

LT - Saugos skyrius

Prieš atlikdami tehninę priežiūrą, išjunkite elektros srovės tiekimą.

Įrenginio tiekėjas atsako už tai, kad naudotojas būtų įspėtas apie pavojus, susijusius su įrenginio naudojimu, taip pat pavojus, minimus Renishaw prietaiso techninėje dokumentacijoje, ir kad būtų sumontuoti atitinkami apsauginiai įrenginiai bei blokatoriai. Susiklosčius tam tikroms aplinkybėms, zondo signalas gali neteisingai informuoti, kad jo reikšmės nustatytos į pradinę būseną. Nepasikliaukite zondo signalais ir iš karto nestabdykite įrenginio.

Tarp judančių detalių bei tarp judančių ir statiškų detalių pakliuvę daiktai gali būti suspausti.

MT - Taqsima tas-sigurtà

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

Hija r-responsabbiltà tal-fornitur tal-makna li jiżgura li l-utent ikun magħmul konxju ta' kwalunkwe perikli involuti fit-tħaddim, inklużi dawk imsemmija fid-dokumentazzjoni tal-prodott ta' Renishaw, u li jiżgura li hemm provdut l-ilqugh u l-interlocks ta' sigurtà adegwati.

Taħt ċerti ċirkostanzi s-sinjal tas-sonda jista' b'mod falz jindika kundizzjoni ta' sonda mhux attiva. Tiddependix fuq sinjali tas-sonda sabiex twaqqaf il-moviment tal-makna. Hemm il-periklu li wieħed jinqaras bejn biċċiet li jiċċaqilqu u bejn biċċiet li jiċċaqilqu u biċċiet statiči.

NL - Veiligheid

Schakel de stroom uit, voordat u onderhoudswerkzaamheden verricht.

De leverancier van de machine is ervoor verantwoordelijk dat de gebruiker op de hoogte wordt gesteld van de risico's die verbonden zijn aan het gebruik, waaronder de risico's die vermeld worden in de productdocumentatie van Renishaw. De leverancier dient er tevens voor te zorgen dat de gebruiker 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.

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.

PL - Bezpieczeństwo

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

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.

Występuje niebezpieczeństwo zakleszczenia pomiędzy częściami ruchomymi oraz częściami ruchomymi i nieruchomymi.

PT - Segurança

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

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

Existe perigo de esmagamento entre as partes móveis/estáticas do equipamento.

RO - Secțiune de protecția muncii

Înainte de orice intervenție pentru întreținere, opriți alimentarea cu energie electrică. Este sarcina furnizorului mașinii să se asigure că utilizatorul cunoaște toate riscurile ce pot apărea pe durata utilizării echipamentului respectiv, inclusiv riscurile menționate în documentația produsului Renishaw, și să se asigure că au fost prevăzute și furnizate toate apărătorile și sistemele de protecție necesare.

În anumite condiții, pot apărea semnale false de la palpator indicând un contact. Nu vă bazați pe semnalul transmis de palpator pentru oprirea mașinii.

Există pericolul prinderii pielii între elemente aflate în mișcare sau între elemente fixe și cele mobile.

SK - Bezpečnostná časť

Pred každým vykonávaním údržby odpojte napájanie.

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

Signál sondy môže za určitých okolností nesprávne indikovať parkovaciú polohu sondy.

Pri zastavovaní pohybov stroja sa nespoliehajte na signály sondy.

Medzi pohyblivými časťami a medzi pohyblivými a statickými časťami vzniká riziko pomliaždenia.

SL - Varnostni napotki

Pred kakršnikoli vzdrževanjem odklopite napajanje.

Odgovornost dobavitelja stroja je, da uporabnika opozori na vse nevarnosti, ki nastopajo med delovanjem, vključno s tistimi, ki so omenjene v Renishaw-ovi produktni dokumentaciji, in da zagotovi, da so dobavljene vse potrebne zascite in varnostne zapore.

Pod določenimi pogoji lahko signal sonde napacno nakazuje, da je sonda v lezecem položaju. Ne zanasajte se na signale sonde za ustavitev premikanja stroja.

Pazite, da se ne uscipnete med gibajocimi deli ter med gibajocimi in staticnimi deli.

SV - Säkerhet

Koppla bort strömmen innan underhåll utförs.

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

Under vissa omständigheter kan probsignalen felaktigt ange att en prob är monterad.

Lita inte på prob signaler för att stoppa maskinens rörelse.

Det finns risk för klämning mellan rörliga delar och mellan rörliga och stillastående delar.

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1-0

Installation and user's guide
HPGA



English

2-0

Installations und
Benutzerhandbuch
HPGA



Deutsch

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1

English

Installation and user's guide

HPGA high precision generic arm

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Before you begin

Disclaimer

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Warranty

Equipment requiring attention under warranty must be returned to your equipment supplier. No claims will be considered where Renishaw equipment has been misused, or where repairs or adjustments have been attempted by unauthorised persons. Prior consent must be obtained in instances where Renishaw equipment is to be substituted or omitted. Failure to comply with this requirement will invalidate the warranty.

Changes to equipment

Renishaw reserves the right to change equipment specifications without notice.

CNC machines

CNC machine tools must always be operated by fully trained personnel in accordance with the manufacturer's instructions.

Patent notice

Features of the Renishaw HPGA, and other related products, are subject of one or more of the following patents and/or patent applications:

EP 0757194	JP 3,627,855
EP 1092890	JP 3930589
DE P4413968	US 5,446,970
IT 1273643	US 5,647,137
JP 3,561,289	US 6,519,863 B1

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EC DECLARATION OF CONFORMITY

Renishaw plc declares that the product: -

Name: HPGA

Description: High Precision Generic Arm

Part nos. A-5616-0301 A-5616-0303
A-5616-0330 A-5616-0340
A-5616-0351 A-5616-0353

Serial no.

Affix serial no. label here

Complies with directives:

2006/42/EC Machinery

2004/108/EC Electromagnetic compatibility (EMC)

and complies with standards:

BS EN 61326-1:2006 Electrical equipment for measurement, control and laboratory use — EMC requirements — Part 1: General requirements
Immunity to Table 2 - industrial locations.
Emissions to Class A - industrial locations.

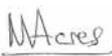
BS EN ISO 12100-1:2003 + A1:2009 Safety of machinery - Basic concepts, general principles for design: -
BS EN ISO 12100-2:2003 + A1:2009 Part 1. Basic terminology, methodology.
Part 2. Technical principles.

The person authorised to compile the technical file and issue the declaration of conformity is:

Mark Acres

Compliance Manager

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

Signed: 

Dated: 22nd June 2010

Place: Wotton-under-Edge

Reference no. ECD 2010-60

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 harmful interference.
2. This device may 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.

WEEE directive



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

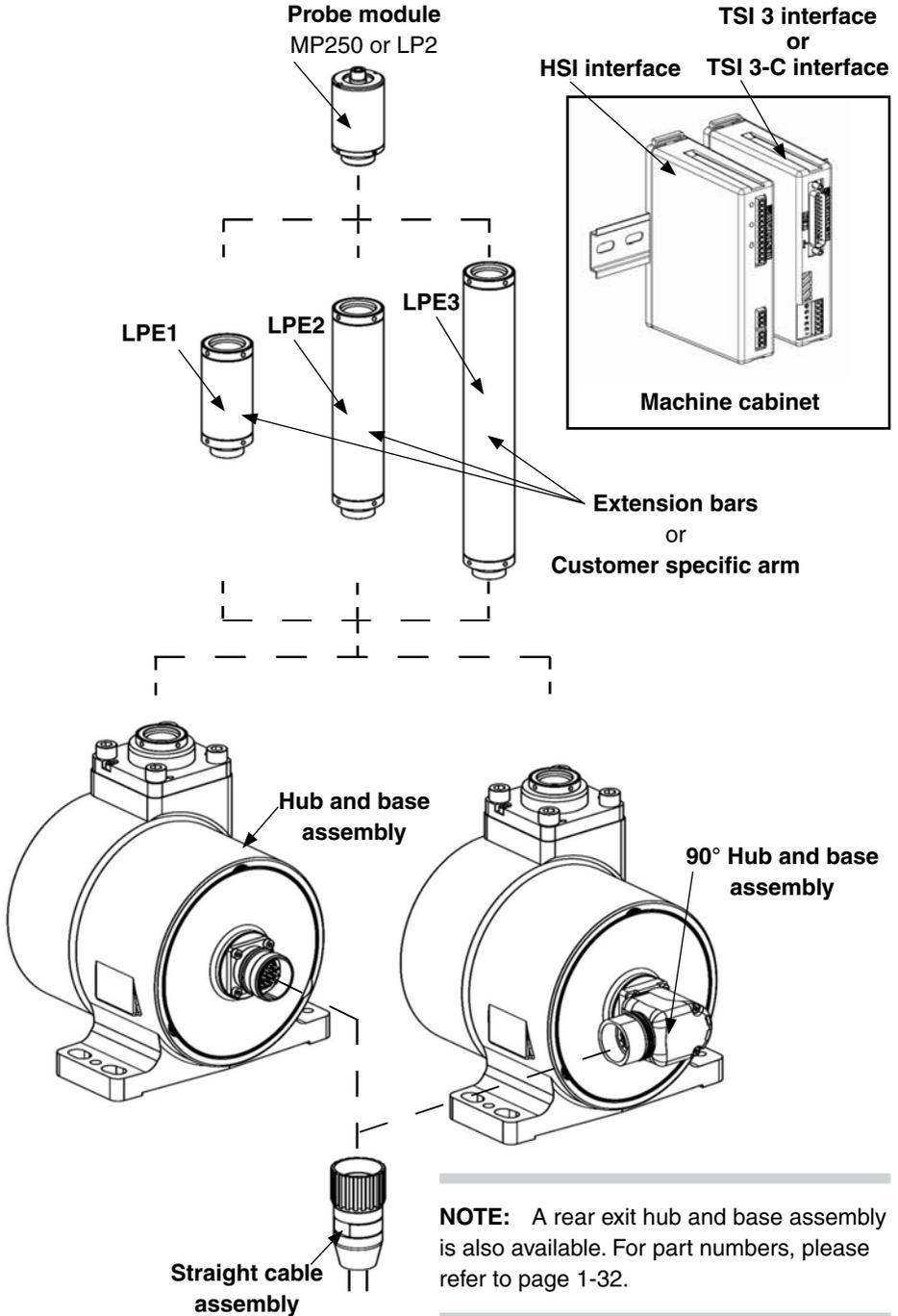
Primary application	Workpiece inspection and tool setting on cutter grinder machines and CNC lathes.
Sense directions	Probe $\pm X$, $\pm Y$, $+Z$
Arm sweep angle	90° (typical)
Weight	3.9 kg (137.57 oz), typical hub and base only.
Uni-directional repeatability	3.0 μm 2 sigma*
ARO to MRO**	2 seconds, typical
MRO to ARO**	2 seconds, typical
Power supply approvals	BS EN/ISO 60950-1
Cable protection	The installer is responsible for ensuring adequate protection of the HPGA cable during normal use in the machining environment.
Probe §	LP2 or MP250
Interface	TSI 3 (or TSI 3-C) and HSI
Environment:	
IP rating	IPX8 (static)
Storage temperature	-25 °C to 70 °C (-13 °F to 158 °F)
Operating temperature	5 °C to 55 °C (41 °F to 131 °F)

* The system includes the hub/base, arm and probe.

Maximum 2 sigma value in any direction. Performance specification is for 10 points at 48 mm/min trigger speed using an LP2 probe with a 20 mm long stylus and a 15 mm square tip.

§ Please refer to Data Sheets H-2000-2100 (LP2) and H-5500-8200 (MP250) for more details.

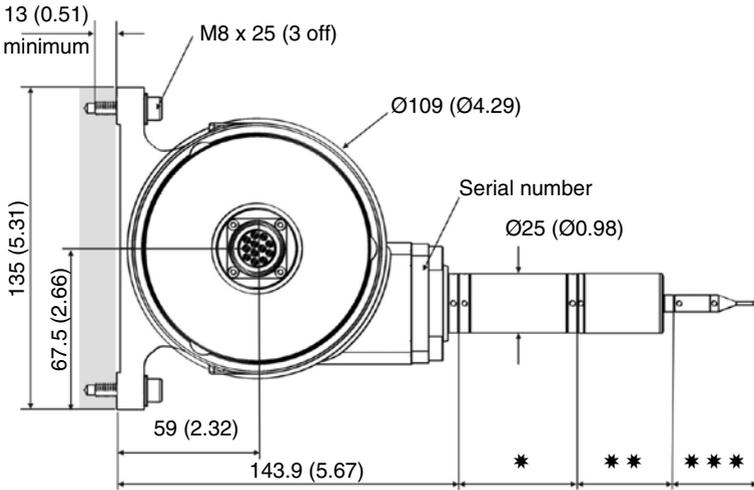
** MRO = Machine Ready Output
ARO = Arm Ready Output



NOTE: A rear exit hub and base assembly is also available. For part numbers, please refer to page 1-32.

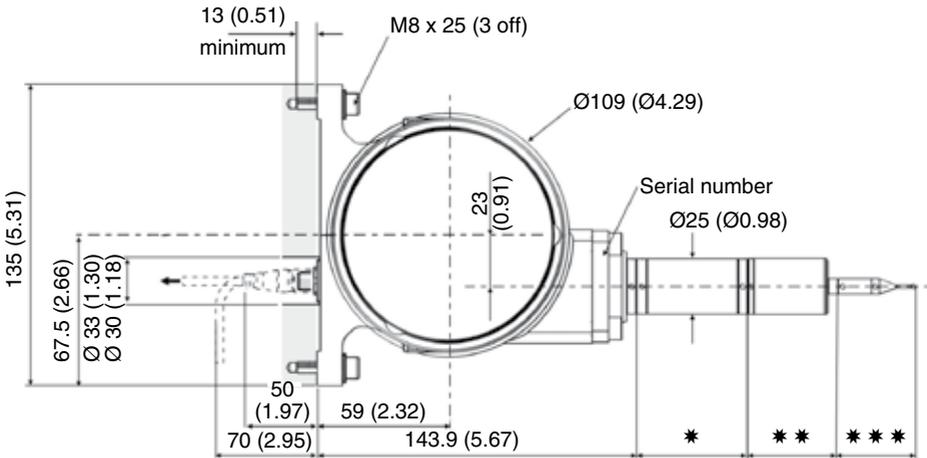
HPGA dimensions (side exit, side view)

dimensions mm (in)



HPGA dimensions (rear exit, side view)

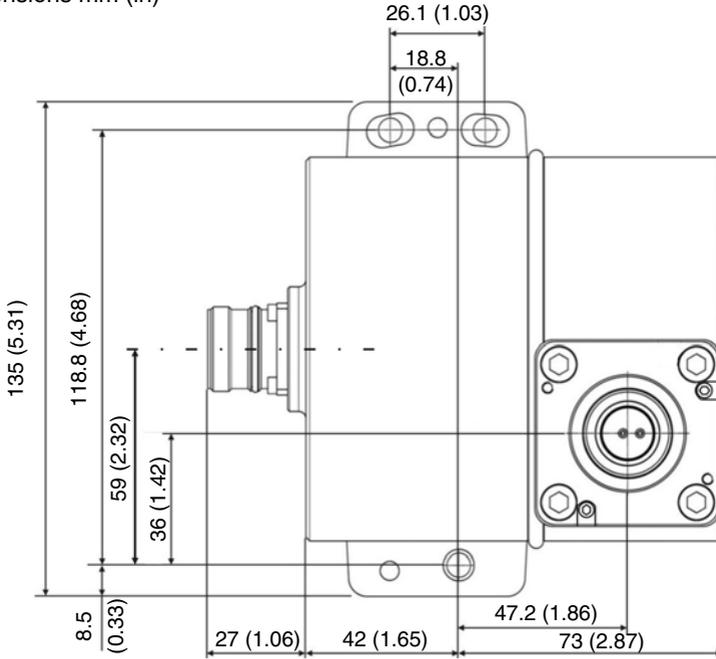
dimensions mm (in)



- * LPE1 = 50 (1.97), LPE2 = 100 (3.94), LPE3 = 150 (5.91)
- ** LP2 probe = 40.8 (1.6), MP250 = 40.7 (1.6)
- *** For a full range of stylus please contact Renishaw plc

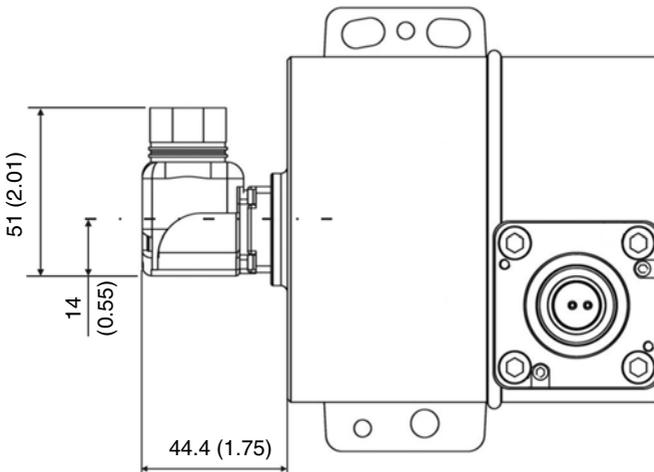
HPGA dimensions (top view) with straight connector

dimensions mm (in)

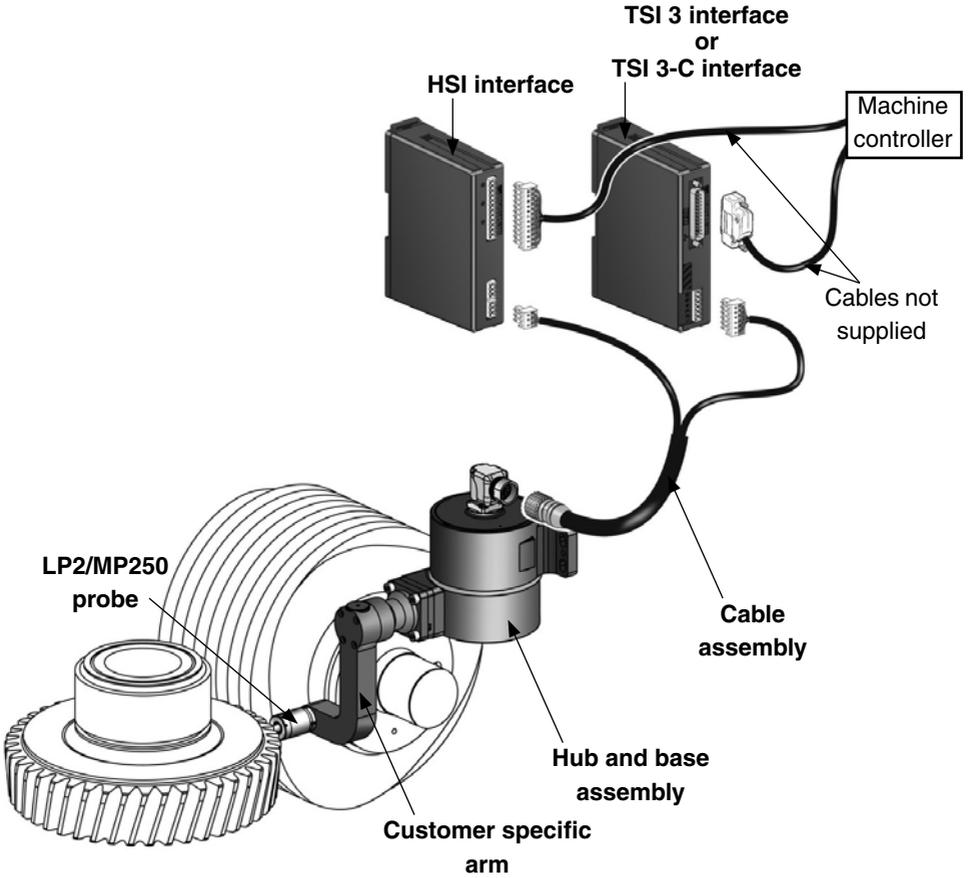


HPGA 90° connector dimensions

dimensions mm (in)

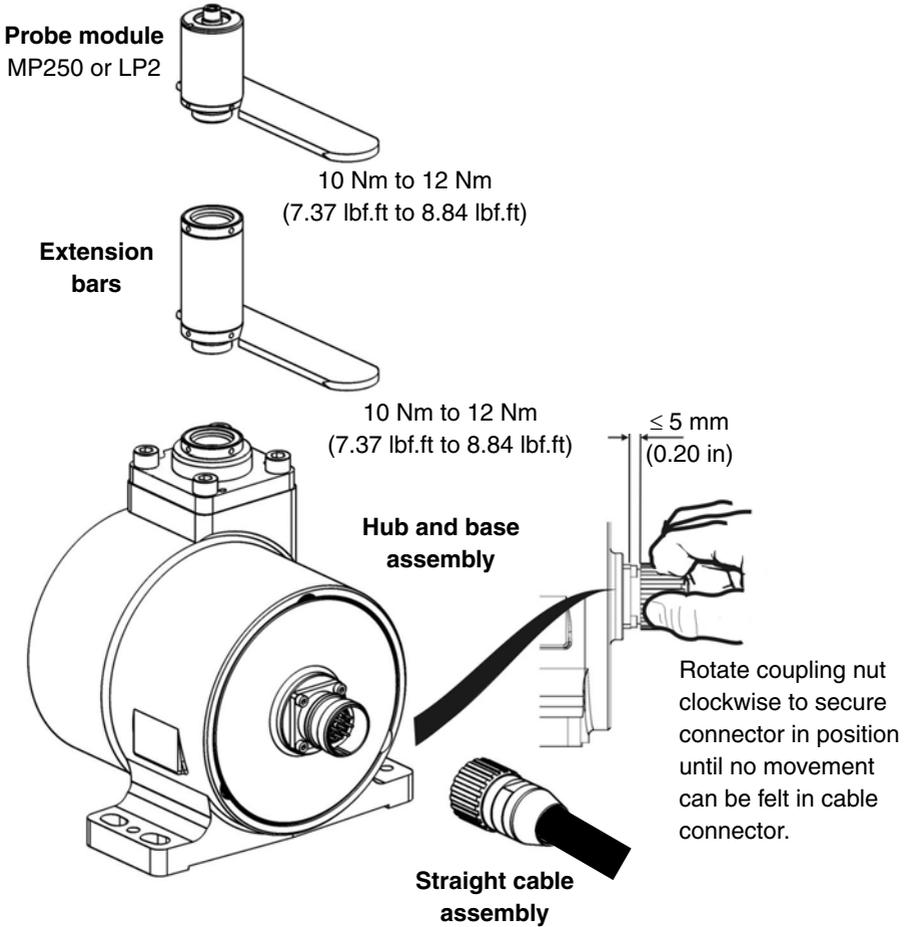


Installing the HPGA with TSI 3 (or TSI 3-C) and HSI interfaces

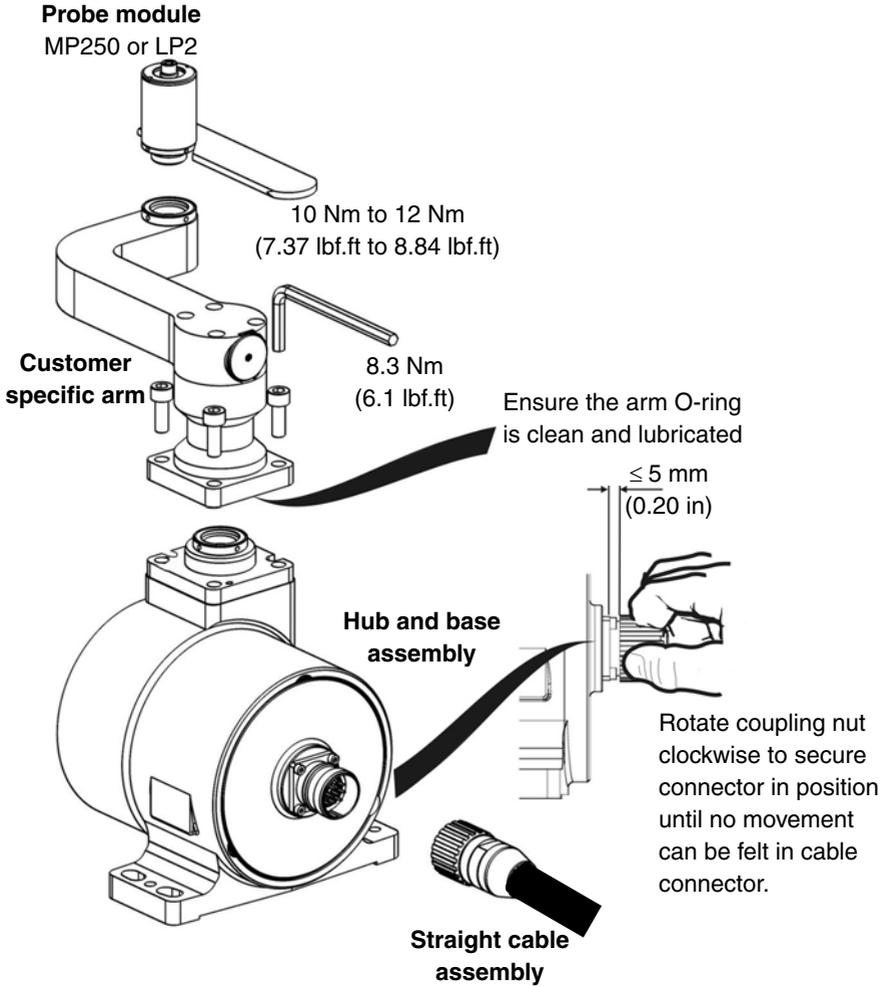


NOTE: For part numbers, please refer to page 1-32.

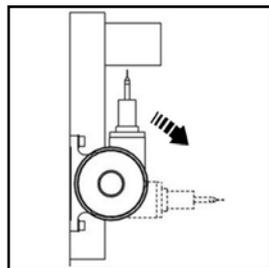
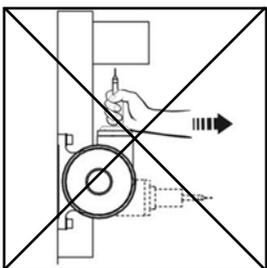
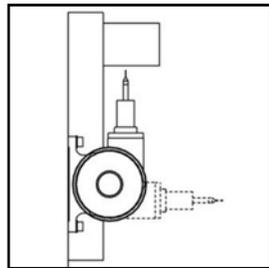
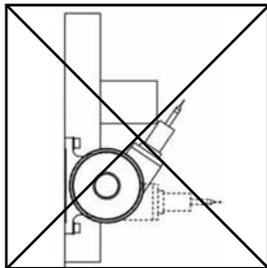
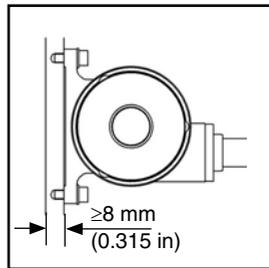
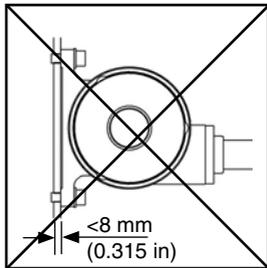
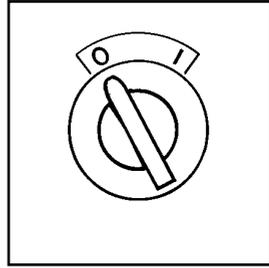
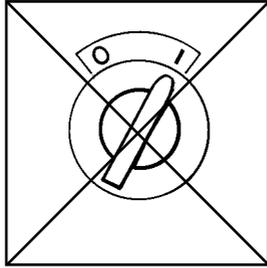
Installing a straight arm to the hub and base assembly



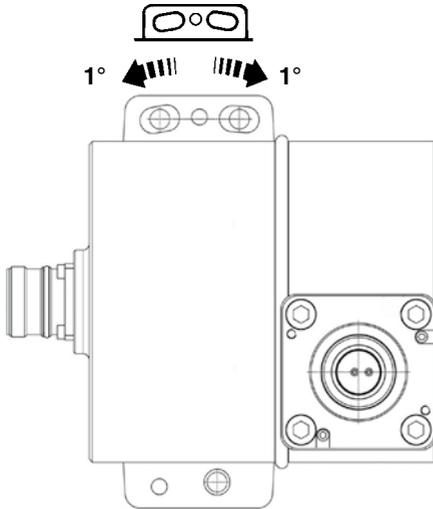
Installing a 90° arm to the hub and base assembly



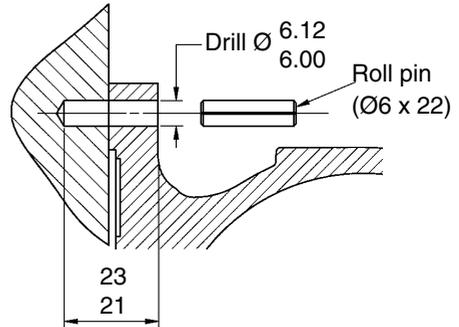
Installing the HPGA



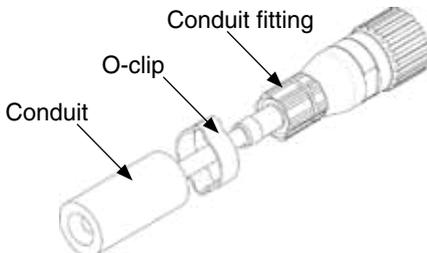
Hub and base adjustment



1. Rotate arm on bottom mounting screw to set stylus alignment.
2. Tighten all screws to 10 Nm.
3. Check that stylus alignment has not moved after tightening.
4. If required, dowel base in position. Drill through base into mounting using pilot holes as a guide. Fit roll pins supplied in base fixing kit. Apply corrosion inhibitor to pins after fitting.



Conduit installation



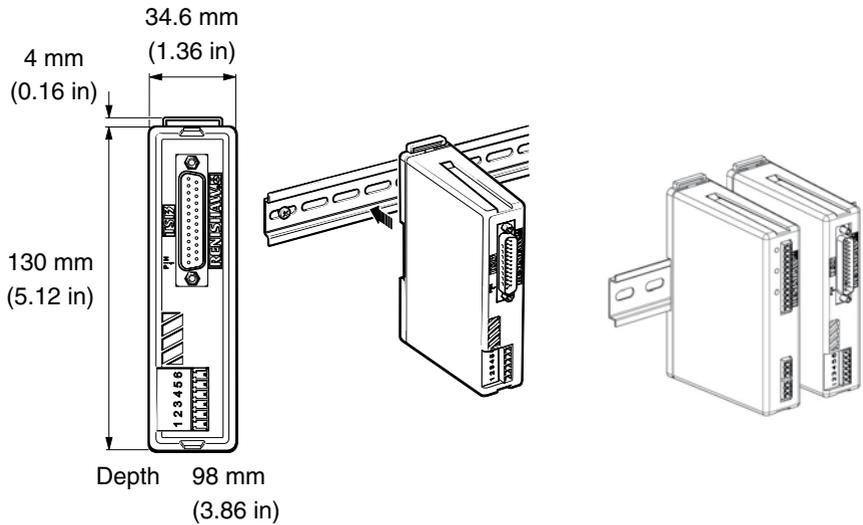
1. Loosely fit the O-clip over the conduit.
2. Push the conduit over the barbed conduit fitting and position the O-clip.
3. Pinch the O-clip onto the conduit using pincers.

NOTE: The procedure is similar for conduit installation on 90 degree connectors.

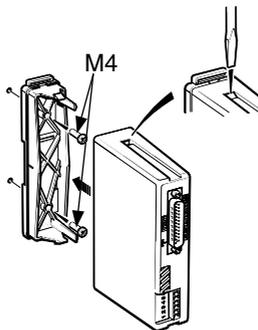
Installing the TSI 3 (or TSI 3-C) and HSI interface units

The TSI 3 (or TSI 3-C) and HSI interface units should be installed in the CNC control cabinet. Where possible, site the units away from potential sources of interference such as transformers and motor controllers.

dimensions mm (in)

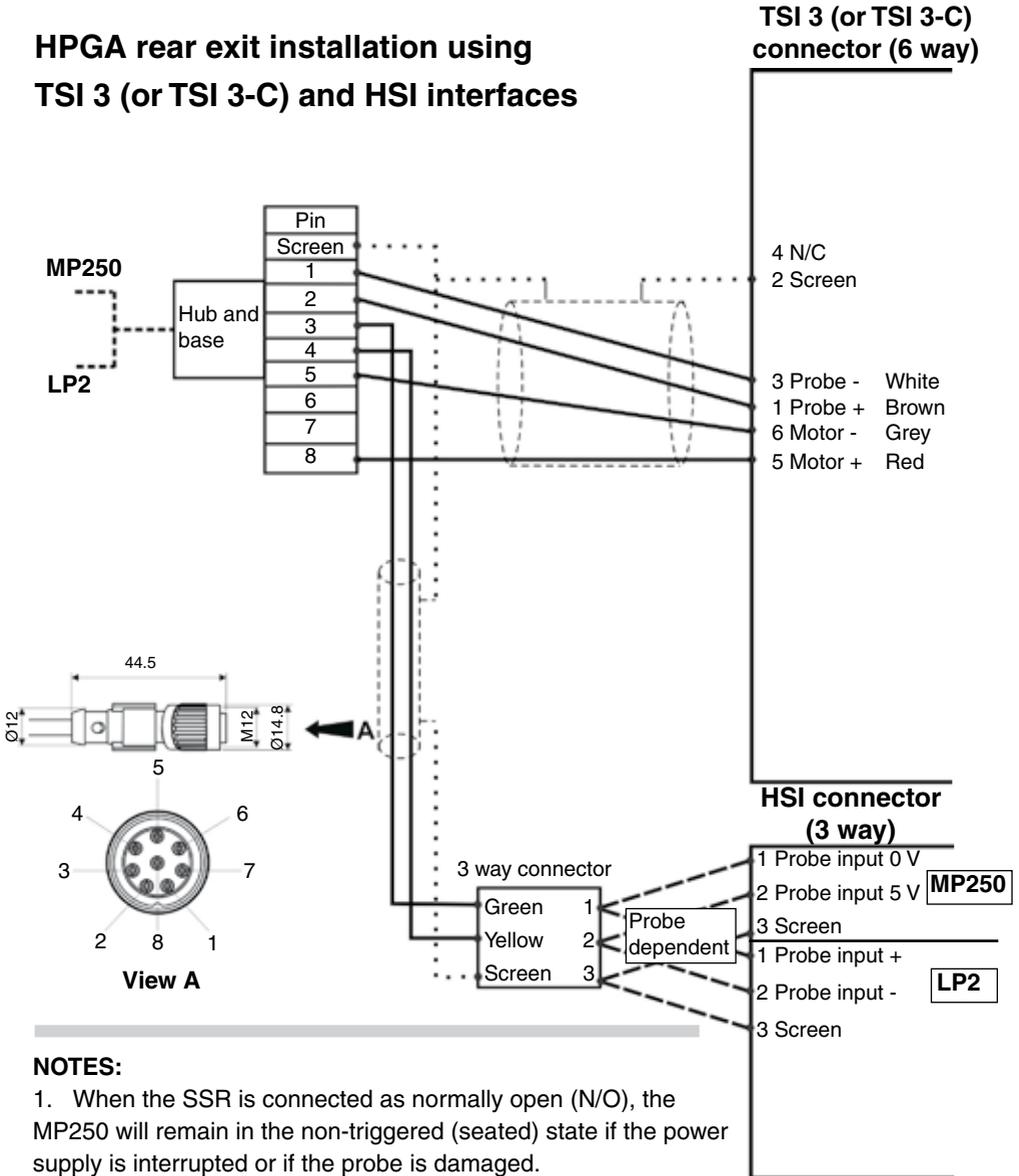


Alternative mounting



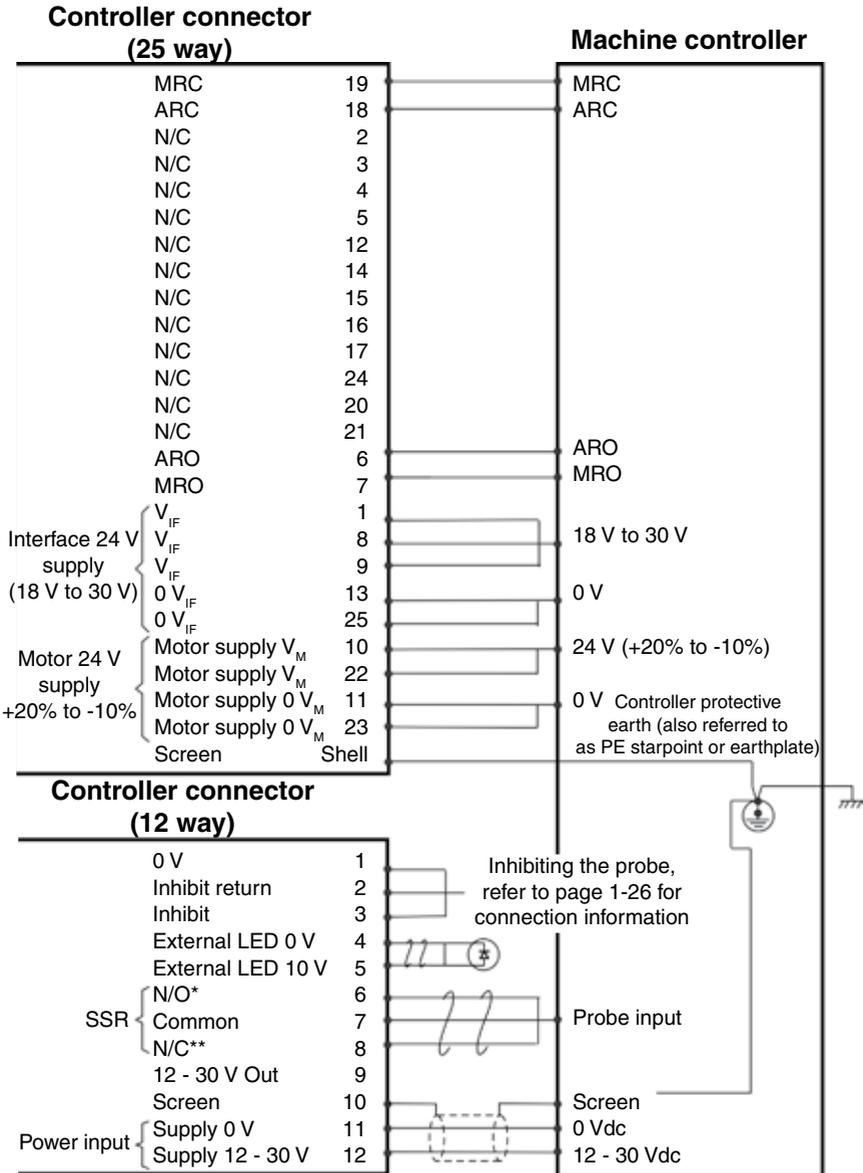
CAUTION: The HPGA arm must only be used with the TSI 3 (or TSI 3-C) and HSI interfaces.

**HPGA rear exit installation using
TSI 3 (or TSI 3-C) and HSI interfaces**



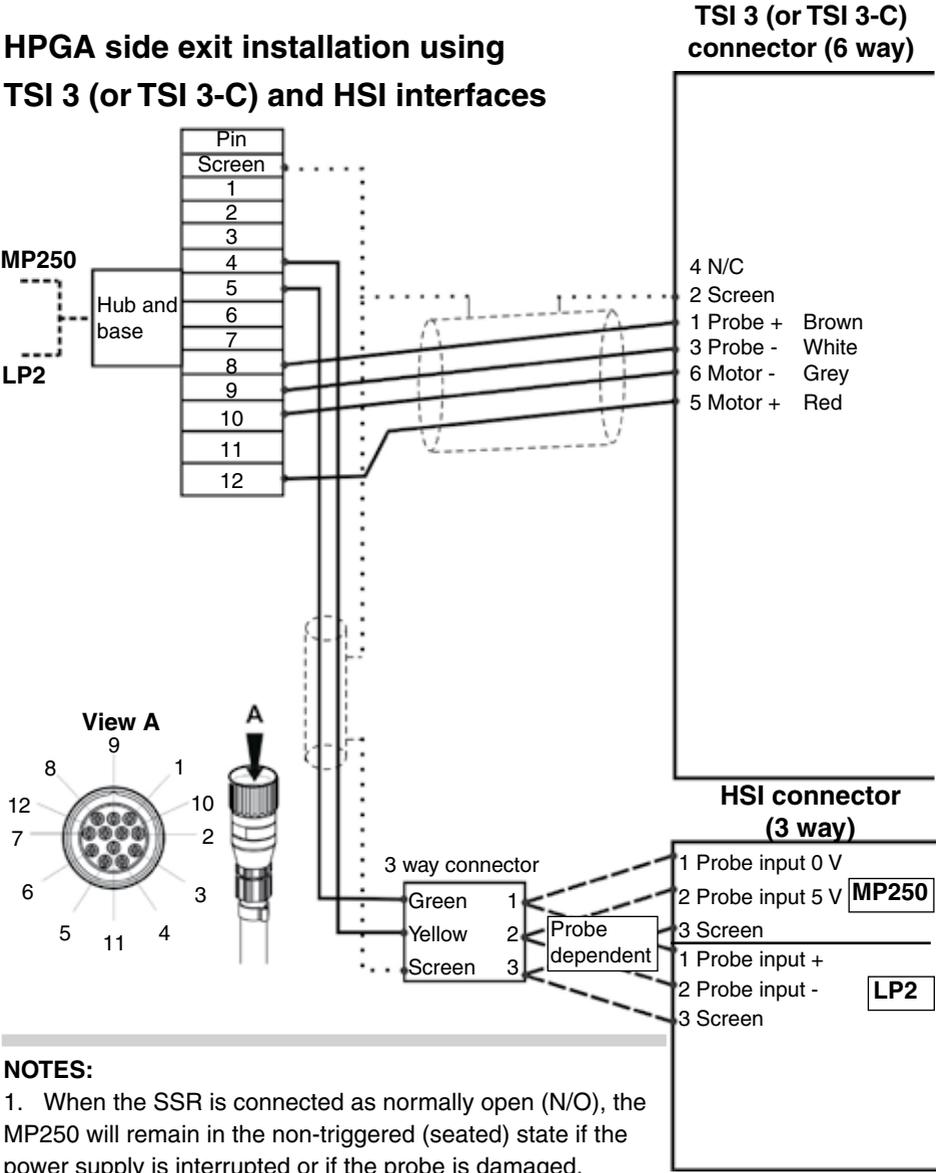
NOTES:

1. When the SSR is connected as normally open (N/O), the MP250 will remain in the non-triggered (seated) state if the power supply is interrupted or if the probe is damaged.
2. The TSI 3 (or TSI 3-C) interface will show a probe open condition whatever the status of the MP250 probe. For this reason the TSI 3 (or TSI 3-C) interface probe output must be ignored and the probe status from the HSI interface used.
3. The HSI probe output remains active in the machine ready position. To disable the probe output use the HSI inhibit function (refer to page 1-26).



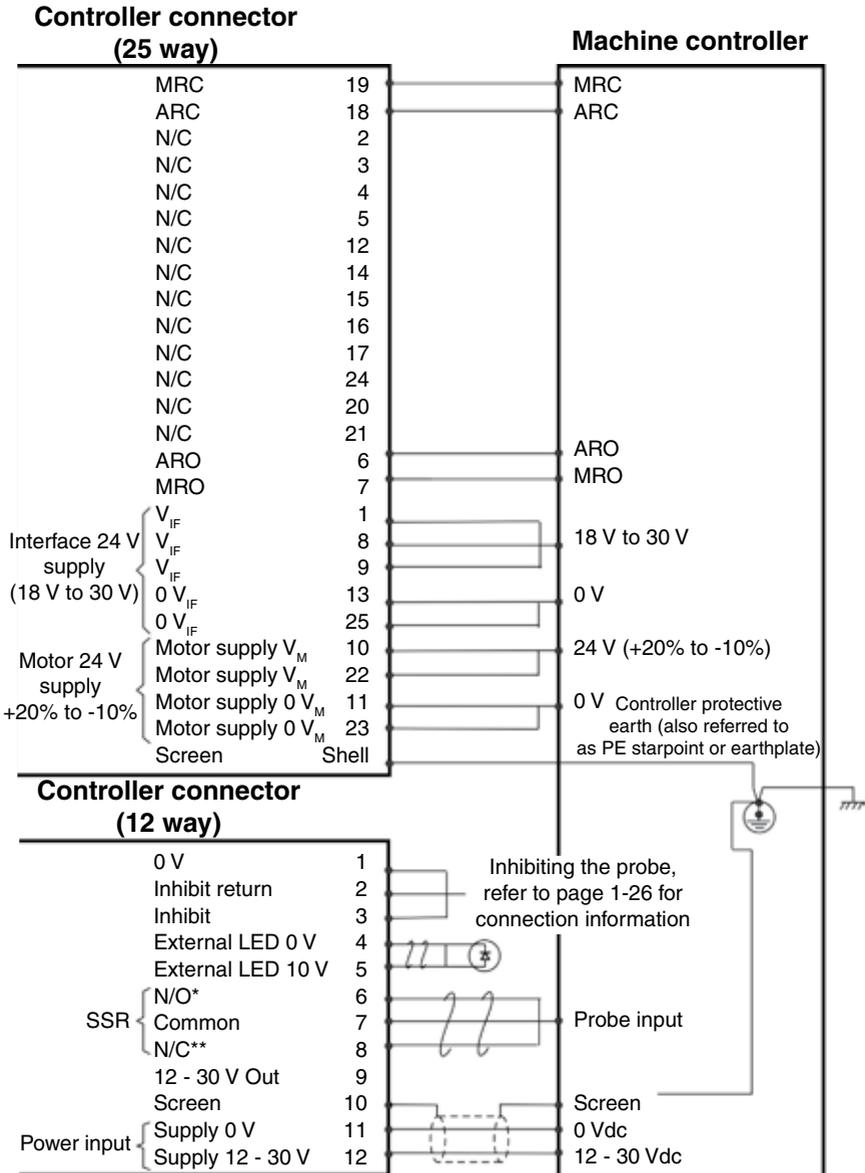
Status	*Normally open (N/O)	**Normally closed (N/C)
Probe triggered	Closed	Open
Probe seated	Open	Closed

HPGA side exit installation using TSI 3 (or TSI 3-C) and HSI interfaces



NOTES:

1. When the SSR is connected as normally open (N/O), the MP250 will remain in the non-triggered (seated) state if the power supply is interrupted or if the probe is damaged.
2. The TSI 3 (or TSI 3-C) interface will show a probe open condition whatever the status of the MP250 probe. For this reason the TSI 3 (or TSI 3-C) interface probe output must be ignored and the probe status from the HSI interface used.
3. The HSI probe output remains active in the machine ready position. To disable the probe output use the HSI inhibit function (refer to page 1-26).

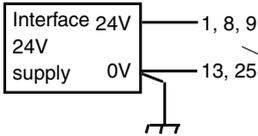


Status	*Normally open (N/O)	**Normally closed (N/C)
Probe triggered	Closed	Open
Probe seated	Open	Closed

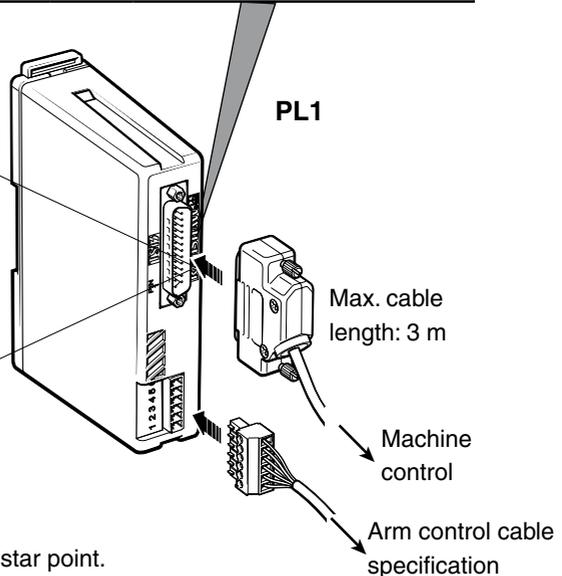
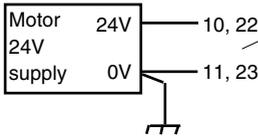
Connecting the TSI 3 (or TSI 3-C) to the machine controller

1 V _{IF}	Interface 24V supply 18 V to 30 V	14 SelX-	No connection
2 X-O	No connection	15 SelX+	No connection
3 X+O	No connection	16 SelZ-	No connection
4 Z-O	No connection	17 SelZ+	No connection
5 Z+O	No connection	18 ARC	Arm ready command
6 ARO	Arm ready output	19 MRC	Machine ready command
7 MRO	Machine ready output	20 NC	No connection
8 V _{IF}	Interface 24V supply 18 V to 30 V	21 NC	No connection
9 V _{IF}	Interface 24V supply 18 V to 30 V	22 V _M	Motor 24 V supply +20% to -10%
10 V _M	Motor 24 V supply +20% to -10%	23 0 V _M	Motor 0 V
11 0 V _M	Motor 0 V	24 INH	No connection
12 NC	No connection	25 0 V _{IF}	Interface 0 V supply
13 0 V _{IF}	Interface 0 V supply	Shell SCR	Screen*

BS EN61010 SELV



BS EN61010 SELV



* Shell to be connected to machine star point.



$V_{IF} = 24 \text{ Vdc } 18 \text{ to } 30 \text{ V}$

This supply powers the interface.

$I_{MAX} = 100 \text{ mA}$ (Not including output load currents)

$V_M = 24 \text{ Vdc } +20\% \text{ to } -10\%$

This supply powers the motor drive.

$I_{MAX} = 2.5 \text{ A}$ while motor is running (typical 2 seconds)

Circuit protection: Power supply protected against overcurrent and reverse connection.

Input specification

MRC
ARC



Internally pulled down (2K4) ACTIVE HIGH inputs

Output specification

ARO and MRO are current limited.

Arm ready (ARO) / Machine ready (MRO) outputs

ARO (PL1-6) MRO (PL1-7)

OCT ACTIVE HIGH outputs

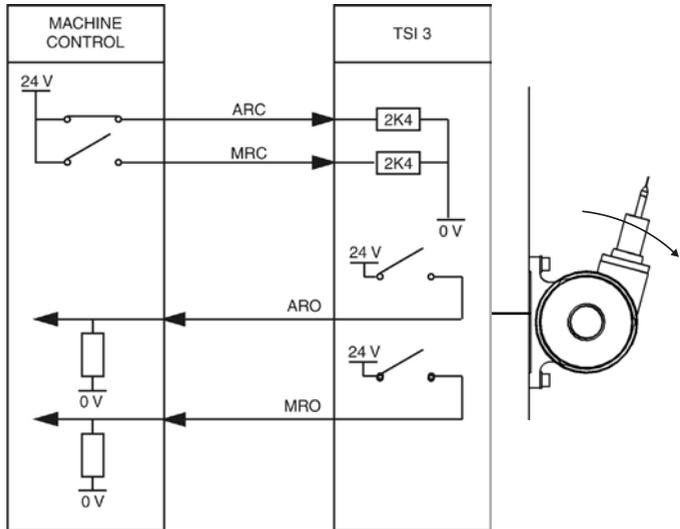
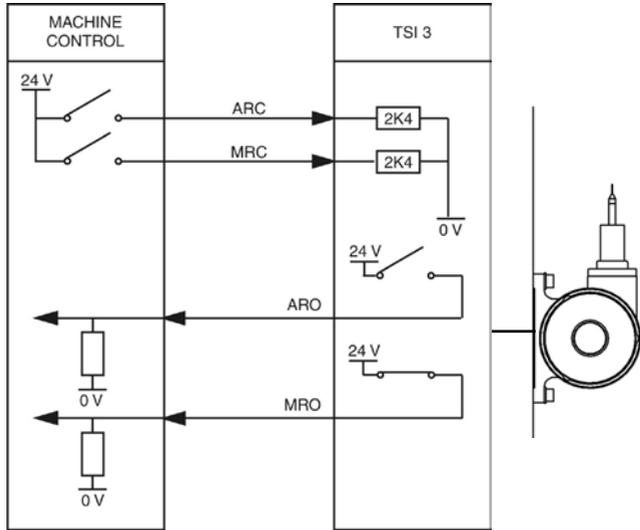
$V_{IF} - 2.4 \text{ V } @ 20 \text{ mA}$

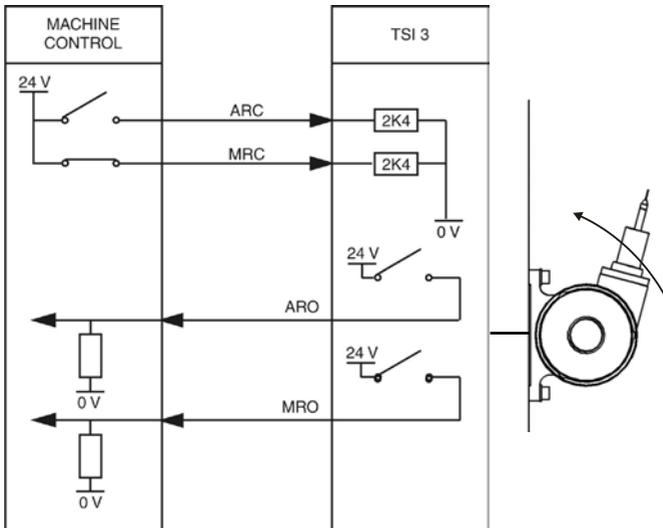
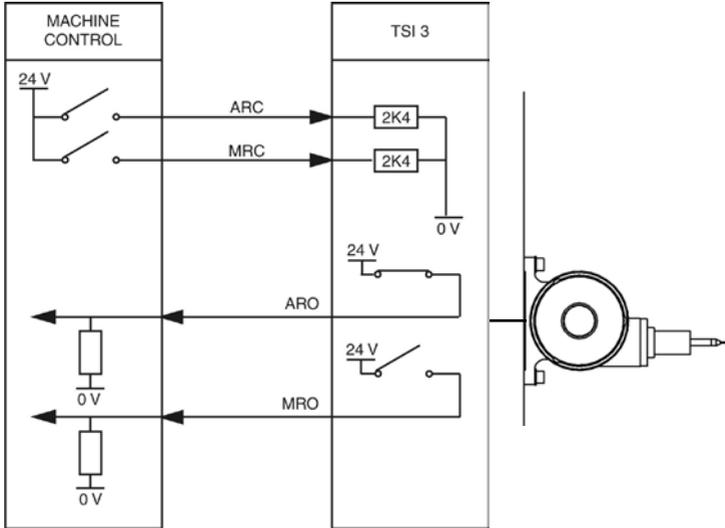
Arm control

Two separate machine tool control outputs are required to command the arm to move to “machine ready position” (MRC) and “arm ready position” (ARC). The user must ensure that both outputs are never active at the same time. There must be a minimum time delay of 0.1 seconds (100 ms) between one command being de-activated and the other being activated. If both outputs are active at the same time then the arm is unable to determine what to do and will stop. This condition can only be overcome by de-activating both outputs.

Two machine tool control inputs are required to receive arm position confirmation signals for “machine ready” (MRO) and “arm ready” (ARO).

All I/O are “ACTIVE HIGH” configuration.





HSI interface

The HSI is a hard-wired transmission interface which converts inspection probe signals into voltage-free solid state relay (SSR) outputs for transmission to the CNC machine controller. The maximum SSR output operating current is 50 mA.

Typically, installed within the CNC machine controller's cabinet, and located away from sources of interference such as transformers and motor controls, the HSI can draw its power from the machine's nominal 12 Vdc to 30 Vdc supply. Where such a supply is not available, the HSI can be powered using any 12 Vdc to 30 Vdc (minimum 0.5 A) power supply.

The HSI has a maximum input voltage range of 11 Vdc to 30 Vdc. The supply is protected by a 140 mA self-resetting fuse. To reset the fuse, remove the power then identify and rectify the cause of the fault.

An 'inhibit' function is included, and a facility to drive an external probe status LED.

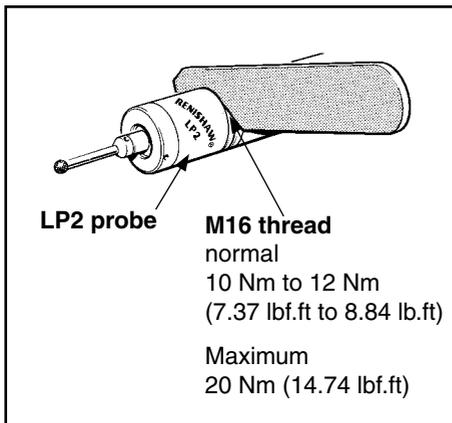
For information about probe inhibit function and probe status, please refer to the HSI Installation Guide (H-5500-8554).

You may undertake the maintenance routines described in these instructions.

Further dismantling and repair of Renishaw equipment is a highly specialised operation, which must be carried out at authorised Renishaw Service Centres.

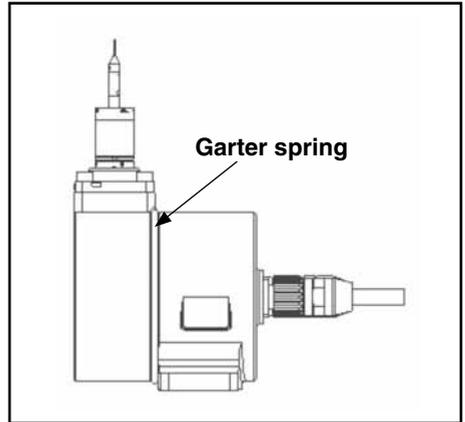
Equipment requiring repair, overhaul or attention under warranty should be returned to your supplier.

Probe removal



Cleaning the HPGA arm

Ensure garter spring and runner faces are kept clean and clear of swarf build up.



NOTE: For information on cleaning the LP2 probe, please refer to the LP2 probe system installation and user's guide, H-2000-5021 and for the MP250 probe, please refer to the MP250 probe installation guide H-5500-8504.

Calibrating the probe

The exact procedure adopted is specific to each machine, control system and software package. However certain rules are common.

Before setting tools, it is necessary to calibrate the stylus position to establish its trigger points in relation to a datum on the machine. This can be achieved by the use of a known reference tool.

Recalibration is necessary periodically (at least every 6 months), and in special circumstances e.g. if the arm has been subjected to a crash or if the stylus has been replaced.

The recommended frequency of normal recalibration is dependent on the frequency of usage of the arm. This may vary greatly depending on the application of the tool setting arm, i.e. a typical jobbing shop may want to set tools twice per day and have 8 tools to set. This would therefore result in 2 arm operations per day. A large volume manufacturer however, may only wish to check for broken tools, but with a typical cycle time of 5 minutes and 24 hour working days, would operate the arm 288 times per day.

The following table should therefore be used when deciding on frequency of recalibration:

Recommended frequency of arm recalibration	
Arms operations per day	Recalibrate every...
<50	6 months
<100	3 months
>100	1 month

Symptom	Cause	Action
Poor system repeatability	Mounting screws not fully tightened.	Tighten screws to specified torque.
	Loose probe.	Verify tightness of probe in arm assembly.
	Loose stylus.	Ensure tip of stylus is tight. Ensure M4 grub screw in stylus stem is tight. Ensure crash protection device is fully tightened into LP2 probe.
	Swarf on tool tip.	Remove swarf.
	Calibration and updating of offsets is not occurring.	Review software.
	Calibration and probing speeds are not the same.	Review software.
	Probing is being performed within the machine's acceleration/ deceleration zones.	Review software.
	Arm not mounted as recommended i.e. on sheet metal guards.	Mount on solid base.
	Probing feedrate is too high for the machine controller.	Perform repeatability trials at various feedrates.
	Temperature variation is causing excessive movement of the machine and the HPGA.	Minimise machine and HPGA temperature changes. Increase the frequency of calibration.
	Machine has poor repeatability due to loose encoders, backlash, tight slideways and/or accidental damage.	Perform health check on machine.

Symptom	Cause	Action
Poor system repeatability (continued)	Excess machine vibration.	Eliminate vibration.
	Minor collision.	Move arm to stow position and back to active position to reset arm to kinematic seating.
Symptom	Cause	Action
No probe output	Damaged or dirty probe contacts.	Check condition of probe contacts. If contacts are dirty, clean using compressed air and a clean lint-free cloth.
	Probe not connected.	Check wiring to machine. Check probe is fully screwed into holder.
	Probe has failed.	Remove probe and check probe for continuity across probe contacts (resistance should be less than 1 K Ω). NOTE: The action mentioned is only applicable to the LP2 probe.

Symptom	Cause	Action
Arm system not responding to commands	Power supply not connected.	Check electrical connections (ensure motor and I/O supplies are connected). Check power supply (supplies) for voltage and polarity.
	Command not received.	Check machine control electrical outputs. Check electrical connections.
	TSI 3 (or TSI 3-C) not responding.	Remove power from TSI 3 (or TSI 3-C) (power machine down or alternatively disconnect 25 way 'D' type connector for 5 seconds minimum and reconnect).
Symptom	Cause	Action
Arm system responds to commands but does not acknowledge completion of move (MRO, ARO)	Damaged or dirty probe contacts.	Check condition of probe contacts. If contacts are dirty, clean using compressed air and a clean lint-free cloth.
Symptom	Cause	Action
No probe output	Probe not connected.	Ensure probe is fully screwed into holder.
	Probe status (PS) not received by machine control.	Check machine control inputs / outputs. Check electrical connections.

Type	Part Number	Description
Medium HPGA S/E kit	A-5616-0401	Hub and base assembly, TSI 3 interface, HSI interface and installation and user's guide.
Medium HPGA 90° S/E kit	A-5616-0451	90° hub and base assembly, TSI 3 interface, HSI interface and installation and user's guide.
Medium HPGA S/E hub and base assembly	A-5616-0302	Hub and base assembly, installation and user's guide and packaging.
Medium HPGA 90° S/E hub and base assembly	A-5616-0352	90° hub and base assembly, installation and user's guide and packaging.
Medium HPGA R/E kit	A-5616-0430	Hub and base assembly, TSI 3 interface, HSI interface and installation and user's guide.
Medium HPGA R/E hub and base assembly	A-5616-0332	Hub and base assembly, installation and user's guide and packaging.
R/E cable	P-CN21-0043	HPGA R/E cable 1.5 m long.
R/E cable	P-CN21-0040	HPGA R/E cable 3 m long.
R/E cable	P-CN21-0041	HPGA R/E cable 5 m long.
R/E cable	P-CN21-0042	HPGA R/E cable 10 m long.
S/E cable	A-5616-0092	HPGA 90° S/E cable 2 m long.
S/E cable	A-5616-0091	HPGA 90° S/E cable 5 m long.
S/E cable	A-5616-0090	HPGA 90° S/E cable 10 m long.
S/E cable	A-5616-0082	HPGA straight S/E cable 2 m long.
S/E cable	A-5616-0081	HPGA straight S/E cable 5 m long.
S/E cable	A-5616-0080	HPGA straight S/E cable 10 m long.
HSI interface	A-5500-1000	HSI system interface with DIN rail mounting and three terminal blocks, quick-start guide and packaging.
TSI 3-C interface	A-2181-2239	TSI 3-C system interface with DIN rail mounting.
TSI 3 interface	A-2181-0465	TSI 3 system interface with DIN rail mounting.
MP250 probe	A-5500-1600	MP250 probe with tool kit (C spanner x 2 and stylus tool) and quick-start guide.
LP2 probe	A-2063-6098	LP2 probe complete with two C spanners and TK1 tool kit.
LPE1	A-2063-7001	LPE1 extension bar - 50 mm long.

Type	Part Number	Description
LPE2	A-2063-7002	LPE2 extension bar - 100 mm long.
LPE3	A-2063-7003	LPE3 extension bar - 150 mm long.
Cube stylus kit	A-5003-4715	Cube stylus kit 19 mm x 19 mm.
C spanner	A-2063-7587	C spanner.
Stylus tool	M-5000-3707	Tool for tightening/releasing styli.
Base fixing kit	A-2275-0113	HPGA base fixing kit.
Publications. These can be downloaded from our web site at www.renishaw.com		
Styli	H-1000-3200	Technical specification: Styli and accessories.
Software features	H-2000-2289	Data sheet: Probe software for machine tools - illustrated features.
Software List	H-2000-2298	Data sheet: Probe software for machine tools - list of programs
HSI	A-5500-8550	Quick-start guide: For rapid set-up of the HSI interface, includes CD with installation guides.
MP250	A-5500-8500	Quick-start guide: For rapid set-up of the MP250 probe, includes CD with installation guides.
TSI 3-C	H-2000-5246	User's leaflet: TSI 3-C interface unit.
LP2	H-2000-5021	Installation and user's guide: LP2 probe system.

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