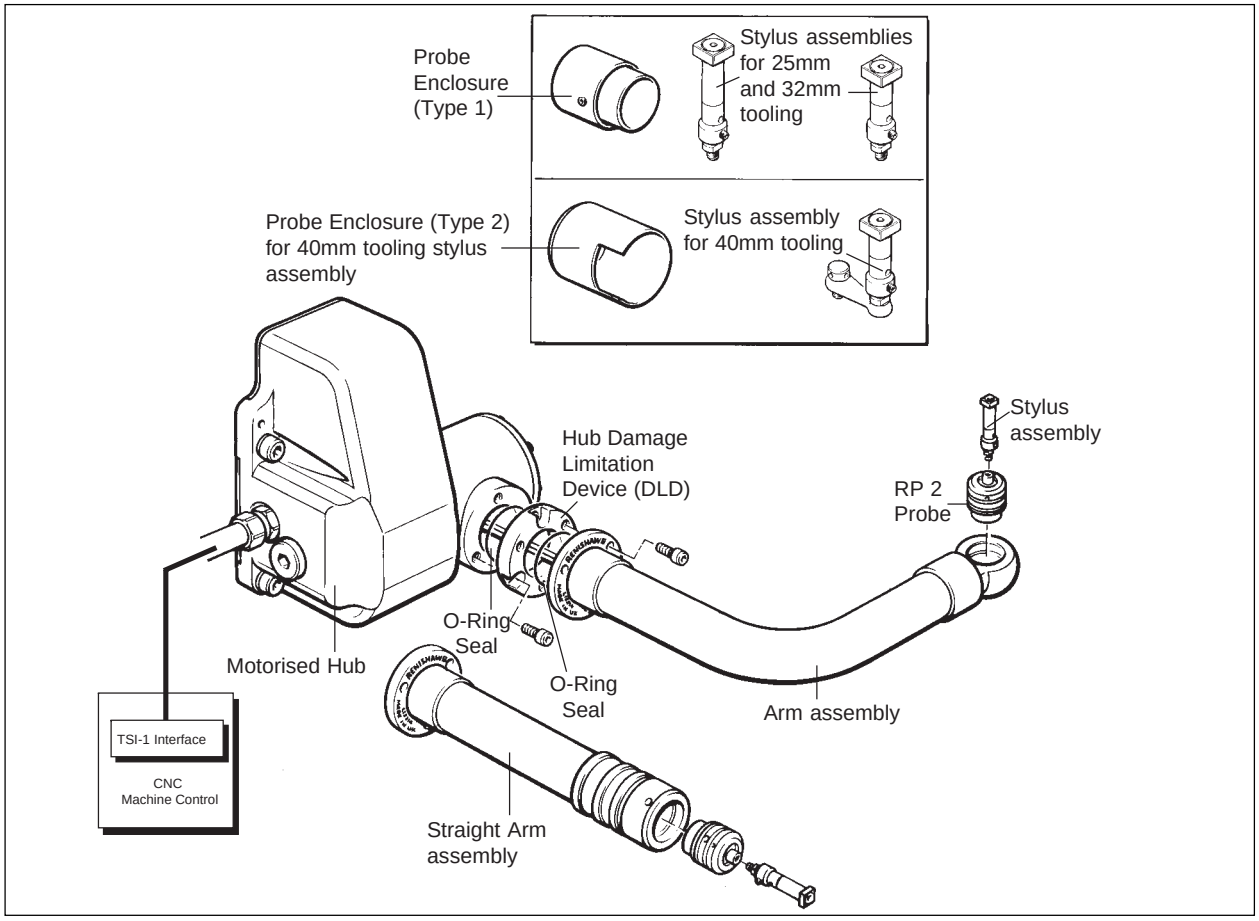
TSA Motorised Toolsetting Arm

COST EFFECTIVE AUTOMATIC TOOLSETTING ON CNC LATHES



SYSTEM FEATURES

The universal motorised arm incorporates a dedicated three axis touch trigger probe (RP2).

- ❑ Toolsetting times up to 90% faster than traditional methods.
- ❑ Offset calculation is automatic and reliable.
- ❑ Toolsetting and/or In-cycle tool breakage detection.
- ❑ Unique design ensures highly repeatable probe positioning each time the arm swings from the parked to the 'Probe Active' position. System positional repeatability is typically 3µm 2σ (0.00012in).
- ❑ Modular components enable simple installation on a wide range of machines.
- ❑ Rugged Renishaw design for consistent trouble free operation in hostile lathe environment.
- ❑ Stylus weak link protects the probe, if stylus overtravel limits are exceeded.
- ❑ Arm damage limitation device protects the drive, if the arm is involved in a collision.
- ❑ Sealed to IP X8.
- ❑ Cycle time = 2 seconds maximum in each direction.

SYSTEM COMPONENTS

Motorised Hub
Each Motorised Hub is configured for rear or side exit cable.

Arm with Probe
The arm is available either as a 90° arm (standard) or straight arm, in an extensive range of sizes.
A probe enclosure protects the 90° probe, when the arm is moved to the stowed position, two types are available.
Type 1 for 25mm and 32mm tooling.
Type 2 for 40mm tooling.

TSI 1 Interface
The interface processes signals between the probe and machine control, and allows simple integration with the machine control.

Installation
The Motorised Hub and arm are shipped independantly, assembly requires joining the two components together.

The Motorised Hub requires a rigid location on the machine, and the cable from the probe to machine control must be routed away from sources of strong electrical current such as electric motors.

RENISHAW®

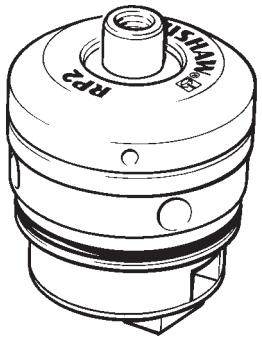
DATA SHEET

Modular Components

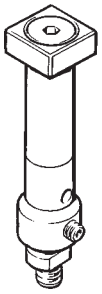
dimensions mm (inches)

The modular range of components

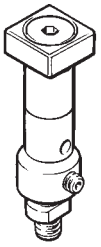
RP2 PROBE ASSEMBLY



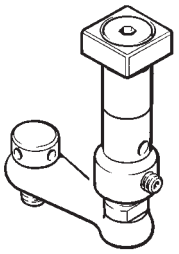
STYLUS OPTIONS



A-2116-0118
32mm Tooling
Stylus Assembly

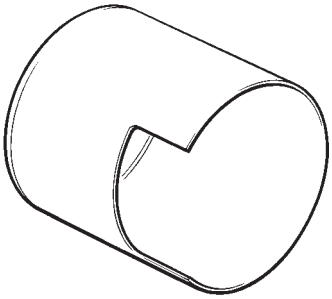


A-2116-0117
25mm Tooling
Stylus Assembly

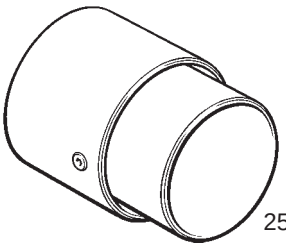


A-2116-0119
40mm Tooling
Stylus Assembly

PROBE ENCLOSURES

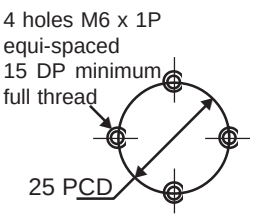


40mm Tooling
Stylus

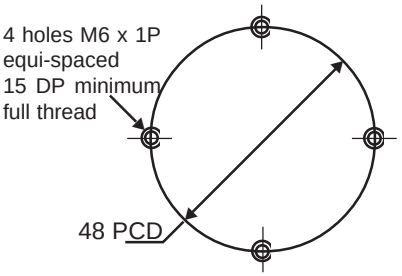


25mm and
32mm
Tooling Styli

PROBE ENCLOSURE ATTACHMENT TO MACHINE FOR TYPE 1 AND TYPE 2 ENCLOSURES

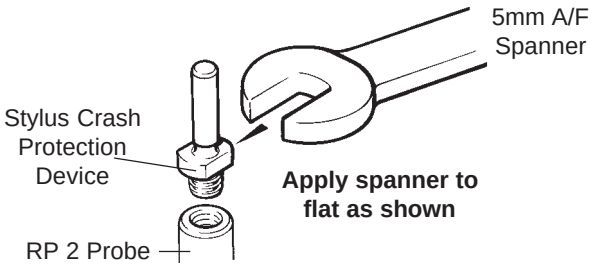


To suit Type 1 probe enclosure for 25mm and 32mm tooling styli. Orientation **un-important**

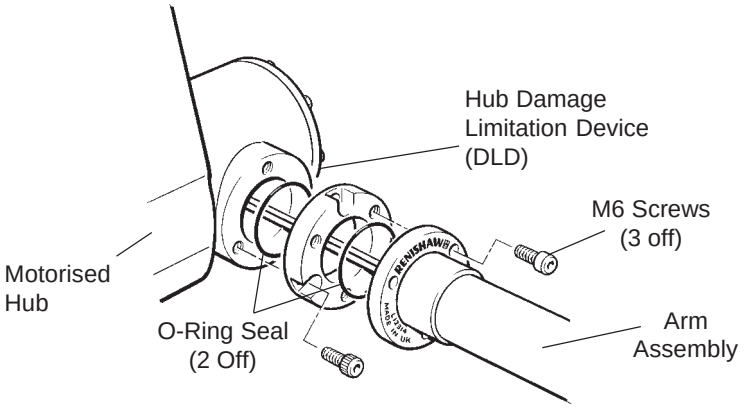


To suit Type 2 probe enclosure for 40mm tooling stylus. Orientation to arm **important** (clearance slot for arm in enclosure)

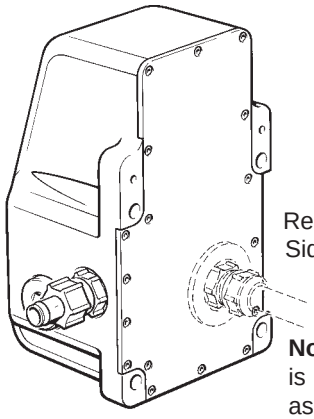
STYLUS CRASH PROTECTION



HUB DAMAGE LIMITATION



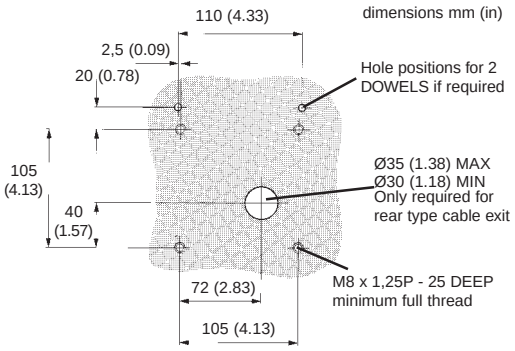
MOTOR HUB



Part Numbers
Rear Exit A-2116-0200
Side Exit A-2116-0201

Note: TSI -1 interface is included with this assembly.

MOTOR HOUSING ATTACHMENT TO MACHINE



TSI-1

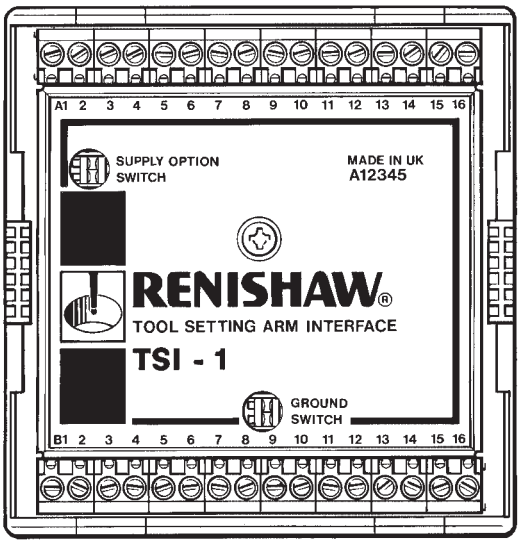
The default setting of the TSI-1 requires it to be supplied with separate power supply connections to the Motor Supply (B1 and B2) and to the I/O supply (B3 and B4). This allows isolation to be maintained between the power and the control voltage supplies.
For installations where the same voltage supply is to be used for both the Motor Supply and the I/O Supply the TSI-1 can be set to internally common the supplies. This eliminates the I/O Supply wiring.

Inputs

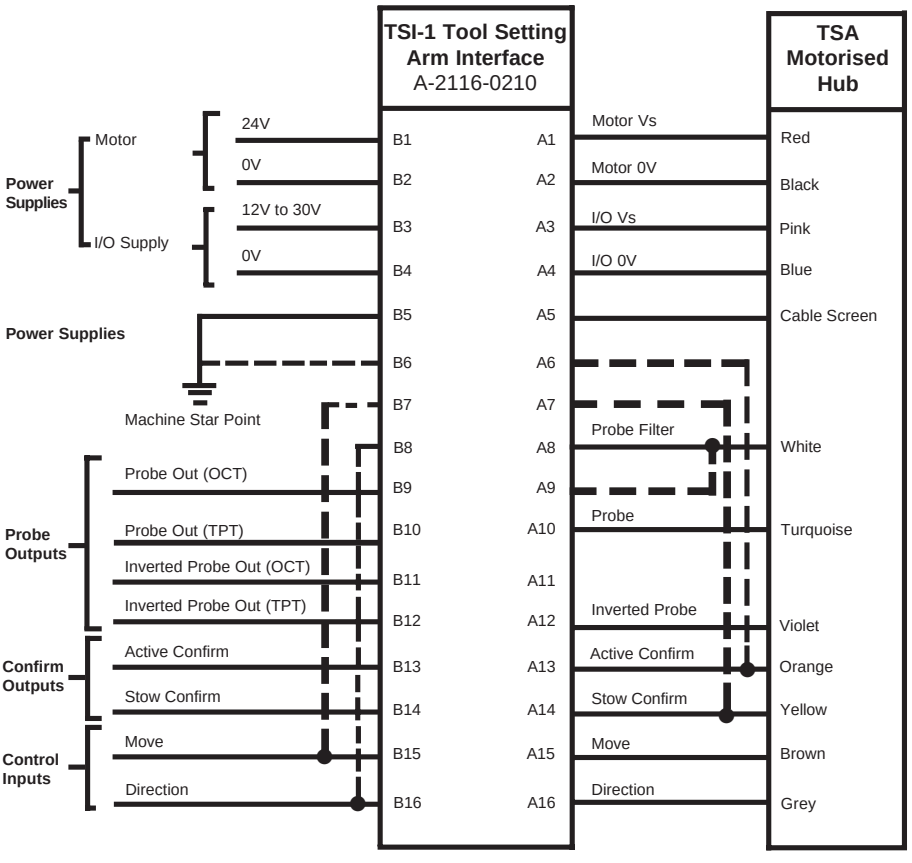
Two Control Inputs (Move and Direction) which are configurable Active : High or Low. When the Move command is activated the arm will move to the position commanded by the Direction input. When the Direction command is activated the arm will move to the active position, and when deactivated it will move to the stow position.

Outputs

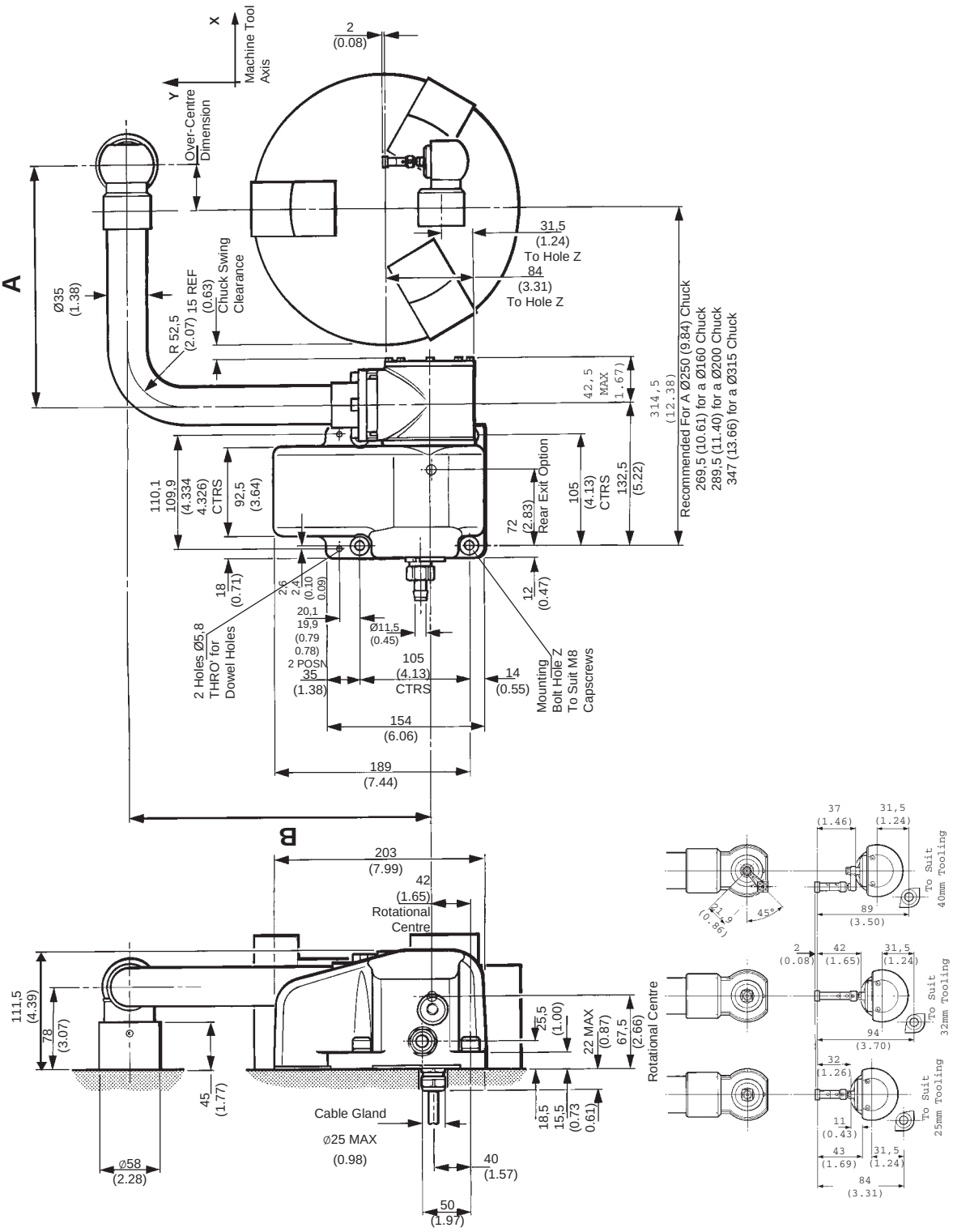
Two Confirm Outputs configurable Active : High or Low.
Two sets of complementary Probe outputs i.e. Open Collector Transistor (OCT) and Totem Pole Transistor (TPT).



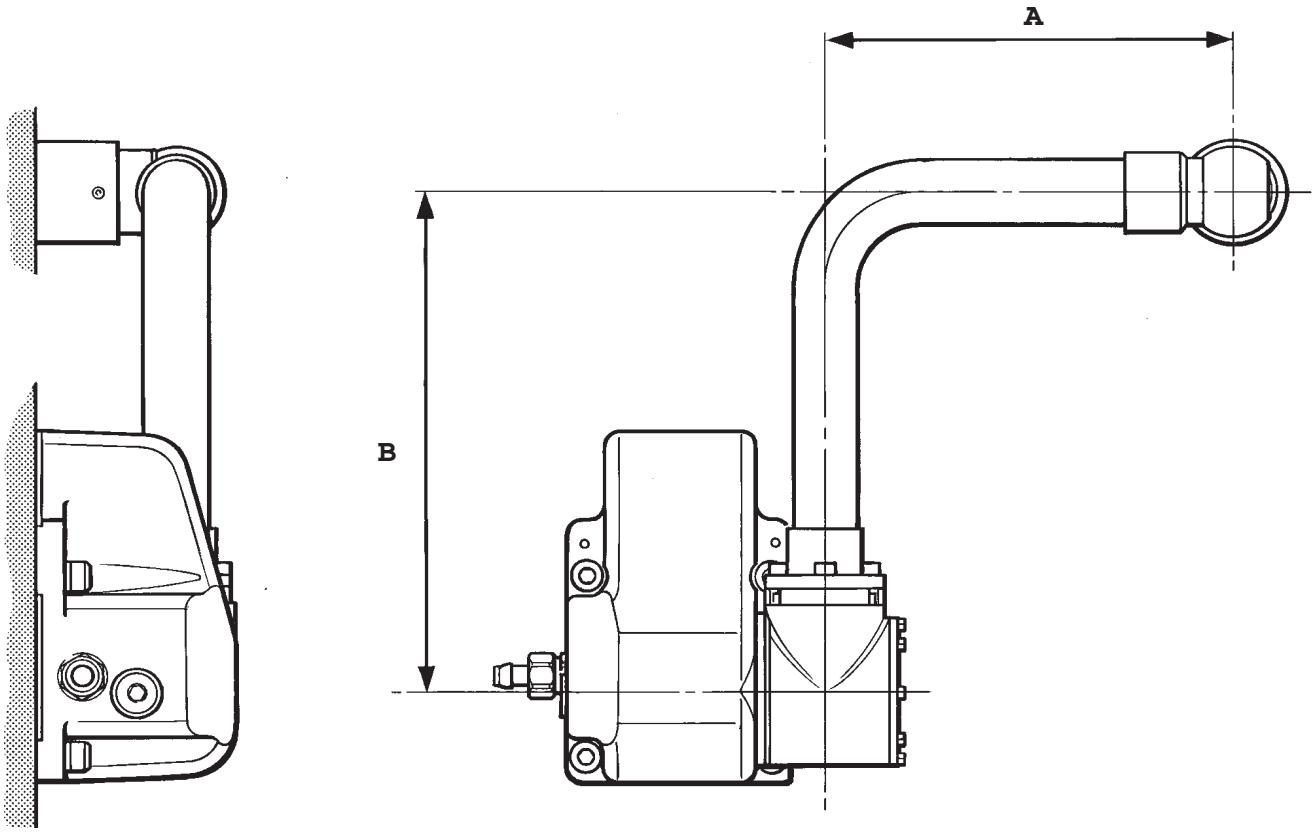
ELECTRICAL CONNECTIONS



90° Arm - General Arrangement



90° Arm Assembly - Selection



The 90° Arm Kit is ordered by selecting the individual Part Numbers for each of the following components:

1 Motor Hub Assembly - side or rear exit - page 3.

2 Stylus Assembly - 3 options - page 2.

PLUS

3 An Arm Assembly which should be specified with 'A' and 'B' dimensions as shown above. The minimum and maximum lengths for 'A' and 'B' are as follows:-

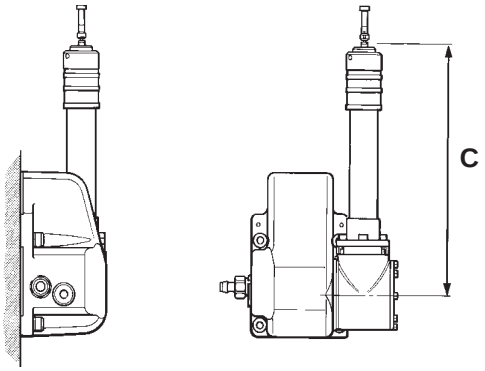
MIN 'A' = 175mm
MAX 'A'= 255mm

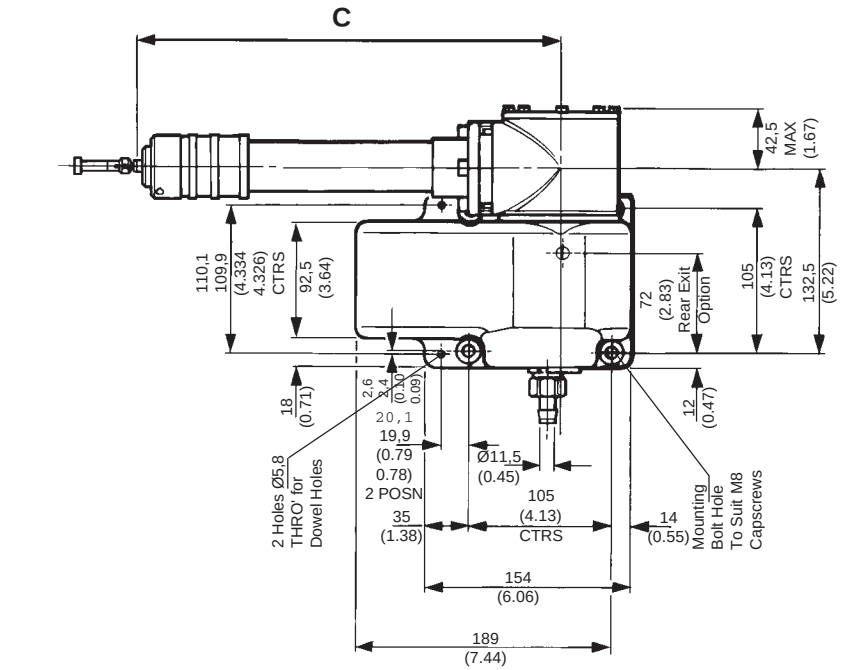
MIN 'B' = 235mm
MAX 'B'= 315mm

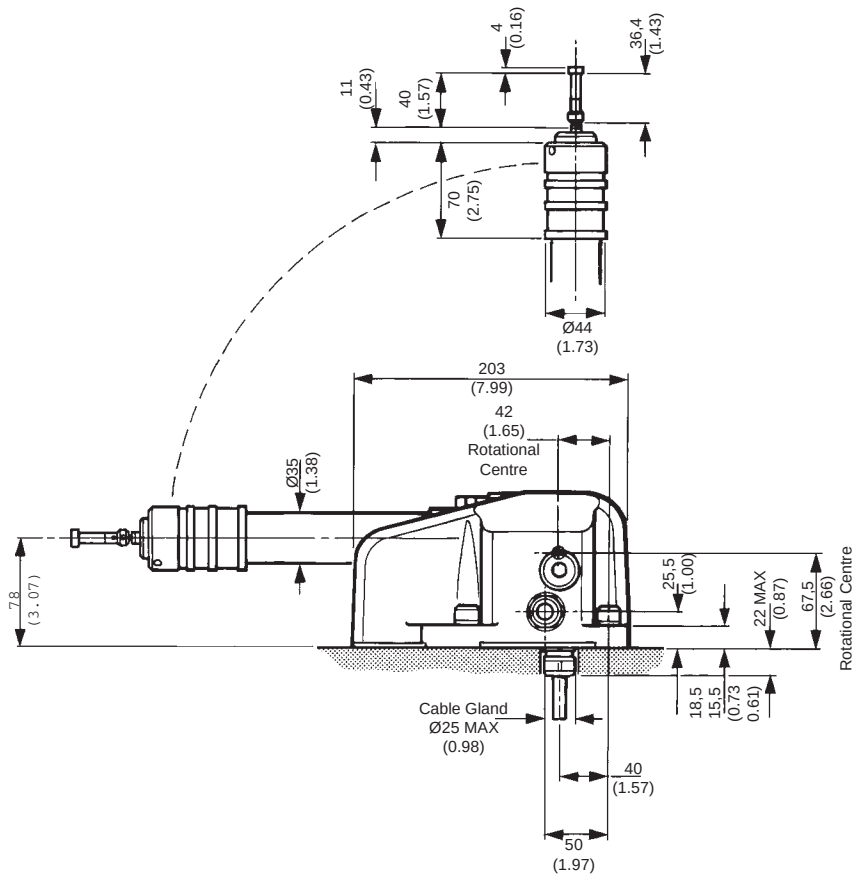
Once the Hub, Stylus and Arm options have been determined, the Custom Products group at Renishaw UK should be informed.
A quotation for the required arm will then be compiled.

90° Arm Assemblies are supplied with an Arm Tool Kit, Part No. A-2116-0175.

Straight Arm - General Arrangement and Arm Selection







The Straight Arm Kit is ordered by selecting the individual Part Numbers for each of the following components:-

1 Motor Hub Assembly side or rear exit - page 3.

2 Stylus Assembly
32 mm tooling stylus option is recommended.
Part No. A-2116-0118

PLUS

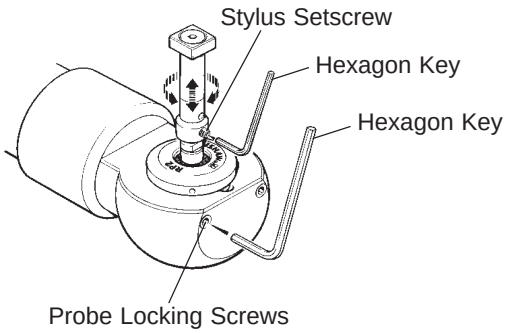
3 An Arm Assembly which should be specified by quoting the required 'C' dimension as shown above. The minimum and maximum lengths for 'C' are as follows:-

MIN 'C' = 195mm
MAX 'C' = 395mm

Once the Hub, Stylus and Arm options have been determined the Custom Product group at Renishaw UK should be informed. A quotation for the required arm will then be compiled.

Straight Arm Assemblies are supplied with an Arm Tool Kit,
Part No. A-2116-0175.

Adjustments to Arm



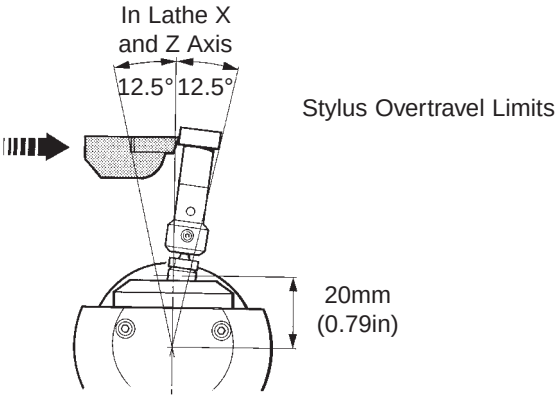
The stylus can be adjusted both rotationally and in height. This allows the user to align the stylus with the chuck centreline and machine axis. Rotational and height adjustment are achieved using the following procedure.

1. Loosen the stylus setscrew.
2. Rotate stylus assembly for approximate tip to machine axis alignment. Height adjustment is achieved by raising or lowering the stylus on its mounting within a 3mm (0.118in) limit.
3. Tighten the stylus setscrew.
4. Precise rotational alignment is carried out by alternately loosening and tightening the probe locking screws. Ensure both probe locking screws are tightened to approximately 4,5Nm (39.83lbf.in) at the end of adjustment.

Specification

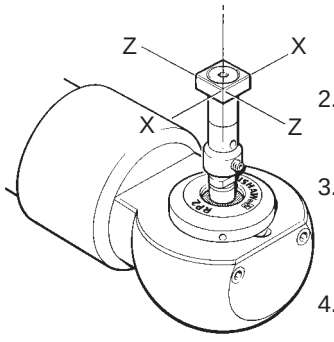
The RP2 probe is a 3 axis toolsetting probe.

Sense directions	5-way
Stylus overtravel	12.5° in lathe X and Z axis
(as shown below)	4mm (0.157in) in lathe Y axis
Probe repeatability (2σ)	1.0µm (with a 35mm (1.38in) stylus at 480mm/min)
Stylus trigger force	Factory set with a 35,0mm (1.38in) stylus.
Probe:- X Y	125g (4.4oz) maximum in high force direction,
	70g (2.5oz) minimum in low force direction
Probe:- Z	610g (21.5oz)
Operating temperature	5°C to 60°C (41°F to 140°F)
Storage temperature	-13°C to +60°C (9°F to 140°F)



NOTE: The standard stylus supplied with the TSA has only four probing faces suitable for toolsetting in the lathe 'X' and 'Z' axis.
If the probe 'Z' axis is to be used (ie in the Lathe 'Y' axis), then a five faced stylus is available to order from the Renishaw Custom Products Group at Renishaw in the UK.

Configuring the Arm



1. The probe stylus must be aligned with its square faces parallel to the machine's axes.
2. The probe stylus should be accessible to each tool and all cutting edges.
3. The Motorised Hub should be mounted on a firm rigid fixing, which is easily accessible to the operator.
4. The distance from the Motorised Hub to the stylus should be as short as possible, while avoiding contact with the turret, part catchers, or guard.

Software for Toolsetting

Renishaw have developed enhanced software to maximise the potential of your investment in machine tools.

The range is continually being expanded to suit the latest control systems, so please contact your Renishaw supplier for the most up to date information.

Parts List - Please quote the Part No. when ordering equipment

Type	Part No.	Description
Motorised Hub R/H, R/E Kit	A-2116-0200	Motorised Hub (Right Hand Hub/Rear Exit, Assembly), Motorised Arm Tool Kit, Rear Face Seal, Installation and User's Guide, Mounting Screws and Washers.
Motorised Hub R/H, S/E Kit	A-2116-0201	Motorised Hub (Right Hand Hub/Side Exit Assembly), Motorised Arm Tool Kit, Installation and User's Guide, Mounting Screws and Washers.
Probe Kit for 25mm Tooling	A-2116-0117	RP2 Probe with Stylus for 25mm Tooling and Type 1 Probe Enclosure.
Probe Kit for 32mm Tooling	A-2116-0118	RP2 Probe with Stylus for 32mm Tooling and Type 1 Probe Enclosure.
Probe Kit for 40mm Tooling	A-2116-0119	RP2 Probe with Stylus for 40mm Tooling and Type 2 Probe Enclosure.
SPARE PARTS		
25mm Stylus Assy	A-2116-0140	Stylus Crash Protection Device (2off), Stylus Adaptor, Countersunk Screw, Square Tip and M3 Grubscrew (2 off).
32mm Stylus Assy	A-2116-0141	Stylus Crash Protection Device (2off), Stylus Adaptor, Countersunk Screw, Square Tip, SE9 Stylus Extension (10mm long x Ø7mm) and M3 Grubscrew (2 off).
40mm Stylus Assy	A-2116-0142	Stylus Crash Protection Device (2off), Stylus Adaptor, Countersunk Screw, Square Tip, Stylus Crank (21.9mm), SS3 Screw for Swivel Adaptor and M3 Grubscrew (2 off).
Motorised Hub	A-2116-0100	Motorised Hub R/H, R/E (includes TSI - 1 Interface).
Motorised Hub	A-2116-0101	Motorised Hub R/H, S/E (includes TSI - 1 Interface).
TSI - 1	A-2116-0210	Toolsetting Arm Interface
Seal Kit	A-2116-0113	Seal Kit.
RP2 Probe	A-2116-0149	RP2 Probe.
Hub Tool Kit	A-2116-0114	Motorised Hub Tool Kit.
Arm Tool Kit	A-2116-0175	Arm Tool Kit.
Stylus Tool Kit	A-2116-0177	Stylus Tool Kit.
Probe Enclosure	A-2116-0109	Type 1 Probe Enclosure (25 and 32mm Tooling).
Probe Enclosure	A-2116-0082	Type 2 Probe Enclosure (40mm Tooling).
DLD	A-2116-0112	Hub Damage Limitation Device (DLD) Kit.
C Spanner	A-2116-0153	C Spanner.
Spring Seal	M-2116-0124	Spring Seal.
Cable	M-2116-0128	3m Extension Cable.
Stylus Adaptor	M-2048-2092	Stylus Adaptor.
Stylus Protection	M-2048-2093	Stylus Crash Protection Device.
SE9	M-5000-7583	SE9 Extension, Length 10mm, Diameter 7mm.
SE4	M-5000-7585	SE4 Extension, Length 20mm, Diameter 7mm.
SS3	M-5000-7588	SS3 Screw for Swivel Adaptor.
CR1	M-5000-7589	CR1 Stylus Crank (21.9mm) (A).
Stylus Tip	M-2008-0237	Square Tip.
Countersunk Screw	P-SC02-0410	Countersunk Screw (M4 x 10mm).
Grubscrew	P-SC11-0304	Grubscrew for Stylus Adaptor.

ASSOCIATED PUBLICATIONS

Software	See H-2000-2289	Probe Software for Machine Tools
Styli	See H-1000-3200	Brochure for Standard M4 Styli and Accessories.
Probe	See H-2000-2025	Data Sheet for RP1 and RP2 Probes.
Probe	See H-2000-5006	Installation and Users Guide for RP1 and RP2 Probes.
TSA	See H-2000-5088	Installation and Users Guide for TSA Motorised Toolsetting Arm (English).
TSA	See H-2000-5089	Installation and Users Guide for TSA Motorised Toolsetting Arm (French).
TSA	See H-2000-5099	Installation and Users Guide for TSA Motorised Toolsetting Arm (German).

Renishaw plc
New Mills, Wotton-under-Edge,
Gloucestershire, GL12 8JR, UK
Tel +44 (0)1453 524524
[07000 RENISHAW]
Fax +44 (0)1453 524901
Telex 437120 RENMET G
email uk@renishaw.com

RENISHAW
www.renishaw.com

Renishaw Inc., USA
Tel +1 847 286 9953
Fax +1 847 286 9974
email usa@renishaw.com

Renishaw K.K., Japan
Tel +81 3 5332 6021
Fax +81 3 5332 6025
email japan@renishaw.com

Renishaw GmbH, Germany
Tel +49 7127 9810
Fax +49 7127 88237
email germany@renishaw.com

Renishaw S.A., France
Tel +33 1 64 61 84 84
Fax +33 1 64 61 65 26
email france@renishaw.com

Renishaw S.p.A., Italy
Tel +39 011 9 66 10 52
Fax +39 011 9 66 40 83
email italy@renishaw.com

Renishaw Iberica S.A., Spain
Tel +34 93 478 21 31
Fax +34 93 478 16 08
email spain@renishaw.com

Renishaw A.G., Switzerland
Tel +41 55 410 66 66
Fax +41 55 410 66 69
email switzerland@renishaw.com

Renishaw Latino Americana Ltda., Brazil
Tel +55 11 7295 2866
Fax +55 11 7295 1641
email brazil@renishaw.com

Renishaw (Hong Kong) Ltd., Hong Kong, The People's Republic of China
Tel +852 2753 0638
Fax +852 2756 8786
email hongkong@renishaw.com

Renishaw Metrology Systems Private Limited, India
Tel +91 80 5320 144
Fax +91 80 5320 140
email india@renishaw.com

Renishaw's Representative Offices

Australia
Tel +61 3 9553 8267
Fax +61 3 9592 6738
email australia@renishaw.com

Indonesia
Tel +62 21 428 70153
Fax +62 21 424 3934
email indonesia@renishaw.com

Singapore
Tel +65 897 5466
Fax +65 897 5467
email singapore@renishaw.com

Taiwan
Tel +886 4 2513665
Fax +886 4 2513621
email taiwan@renishaw.com

The People's Republic of China
Tel +86 10 641 07993
Fax +86 10 641 07992
email china@renishaw.com

Renishaw's Liaison Office

South Korea
Tel +82 2 565 6878
Fax +82 2 565 6879
email southkorea@renishaw.com

Issued 1100

Part no. H-2000-2008-01-C