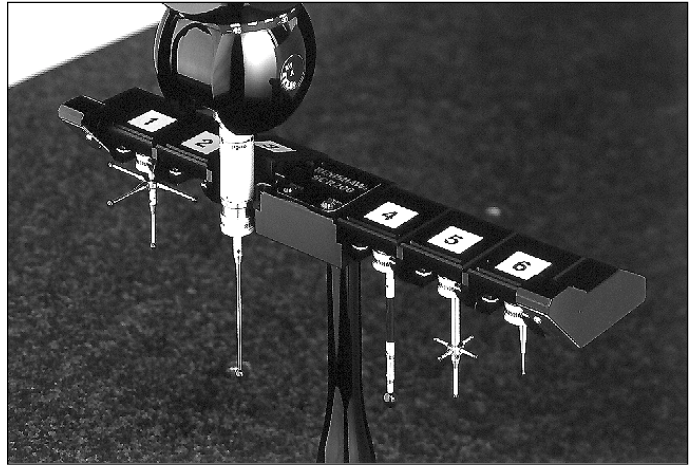


TP200

Precision Touch Trigger Probe System with Stylus Changer

- ❑ High speed stylus changing
- ❑ Precision measuring performance with stylus lengths up to 100mm
- ❑ 10 million trigger module life
- ❑ Compatible with the full range of Renishaw probe heads and accessories



SYSTEM DESCRIPTION

The TP200 Probe System comprises the **Probe Sensor**, with detachable **Stylus Module**, the **PI 200 Interface** and the optional **SCR200 Stylus Changing Rack**.

TP200 Probe

High precision repeatability and 3D form measurement with long styli is achieved by employing a novel type strain gauge structure to detect small displacements of the stylus tip. The strain gauge output is processed and converted into the Renishaw 2-wire system format using an ASIC electronic chip and hybrid microcircuit technology.

The Stylus Module is located on the Probe Sensor body by a highly repeatable, magnetically retained kinematic coupling. This allows rapid manual or automatic stylus changing without the need to requalify the stylus tips. The Module incorporates overtravel protection and a feature on the coupling to ensure correct orientation. Alignment marks are provided to visually aid manual stylus changing. The Stylus Modules are available in a choice of two overtravel force options. The Standard Force Module is suitable for the majority of applications with styli up to 100mm long. The Low Force Module is intended for use with small diameter stylus balls or in applications where minimum force is essential.

PI 200 Interface

The PI 200 is a dedicated interface unit which powers and services the TP200 Probe (or TP2/TP6) and up to two SCR200 Stylus Changing Racks. The PI 200 automatically recognises the probe type, determines the status of the probe and transmits debounced trigger signals to the CMM controller.

During high speed position moves, probe sensitivity must be reduced to prevent unwanted triggers due to CMM vibration. The PI 200 is able to minimise sensitivity such that vibration triggers are prevented but a trigger is transmitted in the event of a collision. This function is known as "probe damping" and requires the PDAMP control signal to be provided by the CMM controller. Switchable configuration options are provided to allow fitment to a wide range of controllers.

SCR200 Stylus Changing Rack

The SCR200 provides automatic, high speed changing of up to 6 stylus assemblies. The Rack is easy to set up due to its close tolerance design which requires only 8 probing points to datum the installation. The probe is automatically inhibited during the change cycle which is fully managed by the PI 200 so that no additional communications or special software are necessary. A choice of operating Modes permits either direct, high speed entry to the rack ports or fully tamper resistant operation as required. In the event of rack overtravel a stop signal is transmitted to the CMM controller. A self-test Mode is provided for System diagnosis.

Accessories

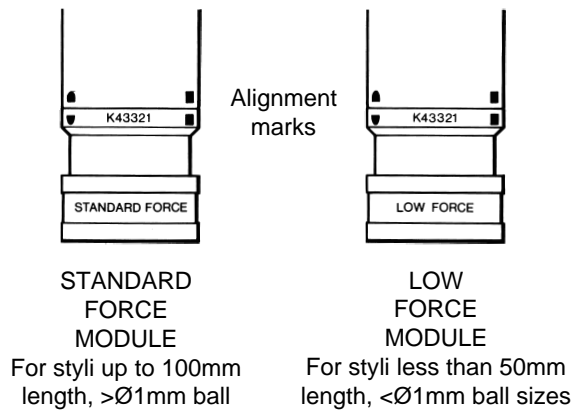
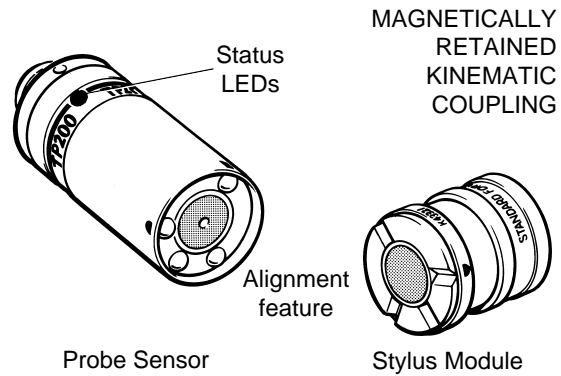
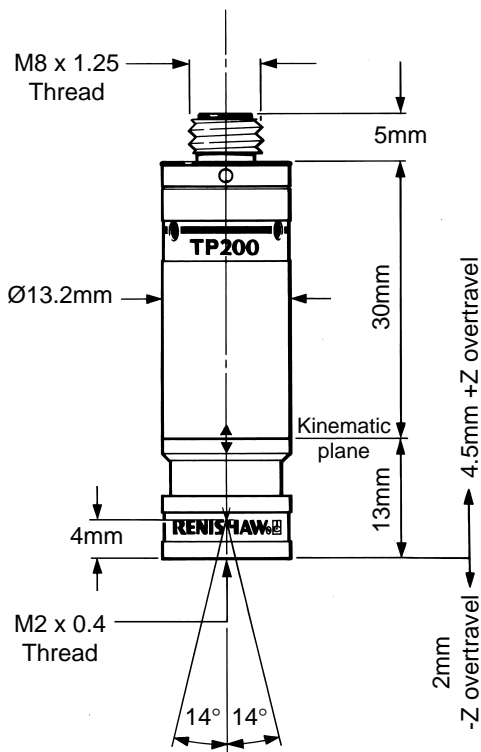
The Renishaw "GF" range of styli and extension pieces, incorporating carbon fibre reinforced plastic (CFRP) stems, are available for applications requiring high performance and long reaches.

The TP200 is supplied with specialised material for cleaning the kinematic coupling faces.

RENISHAW 
Data Sheet

Part No. H-1000-2130-03-A

TP200 DIMENSIONS



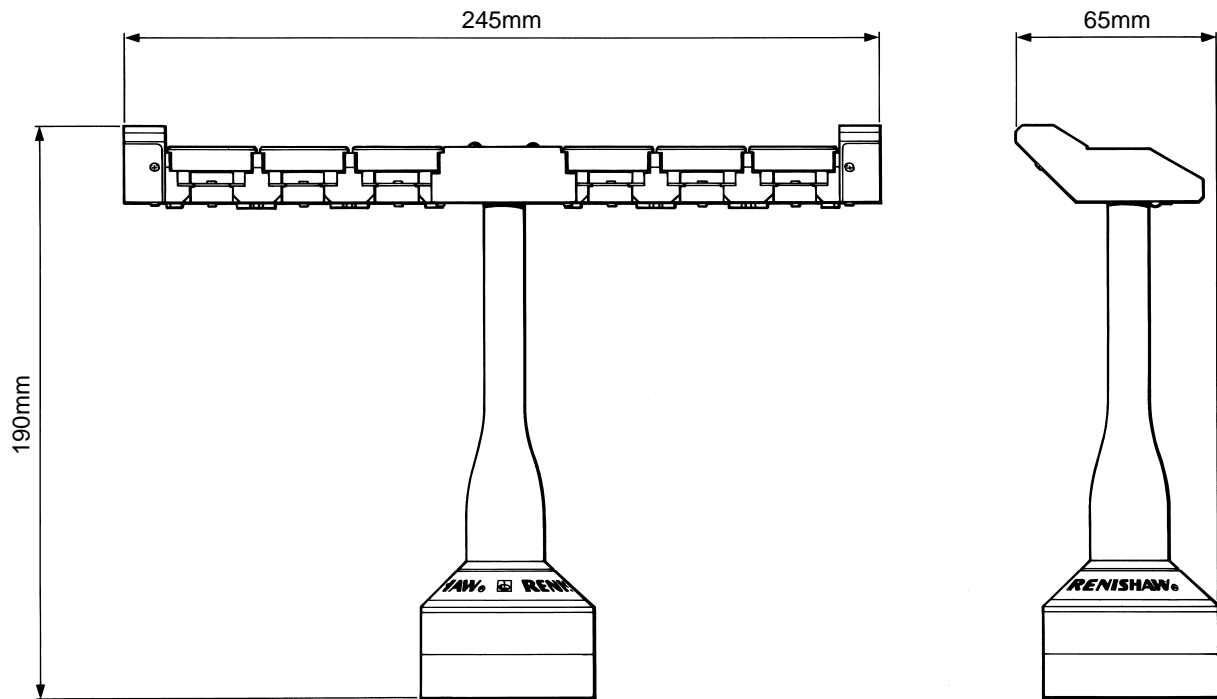
SPECIFICATION

Application	Universal CMM precision touch trigger probe																																						
Sense directions	6Way: ±X, ±Y, ±Z																																						
Measuring performance *	<table border="0"> <tr> <td></td> <td colspan="2"><u>10mm stylus</u></td> <td colspan="2"><u>50mm stylus</u></td> </tr> <tr> <td>2σ Unidirectional repeatability (µm)</td> <td>TP200</td> <td>(TP2)</td> <td>TP200</td> <td>(TP2)</td> </tr> <tr> <td>2D Form measurement deviation (µm) †</td> <td>±0.40</td> <td>(±0.80)</td> <td>±0.80</td> <td>(±2.50)</td> </tr> <tr> <td>3D Form measurement deviation (µm) †</td> <td>±0.65</td> <td>(±1.00)</td> <td>±1.00</td> <td>(±4.00)</td> </tr> </table>					<u>10mm stylus</u>		<u>50mm stylus</u>		2σ Unidirectional repeatability (µm)	TP200	(TP2)	TP200	(TP2)	2D Form measurement deviation (µm) †	±0.40	(±0.80)	±0.80	(±2.50)	3D Form measurement deviation (µm) †	±0.65	(±1.00)	±1.00	(±4.00)															
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Module operational life	10 x 10 ⁶ measurement points minimum																																						
Trigger force (at 50mm) *:	<table border="0"> <tr> <td></td> <td colspan="2"><u>Standard Force Module</u></td> <td colspan="2"><u>Low Force Module</u></td> </tr> <tr> <td>XY</td> <td colspan="2">15g to 35g</td> <td colspan="2">5g to 10g</td> </tr> <tr> <td>+Z</td> <td colspan="2">400g to 1400g</td> <td colspan="2">100g to 1000g</td> </tr> <tr> <td>-Z</td> <td colspan="2">800g</td> <td colspan="2">800g</td> </tr> <tr> <td>Overtravel:</td> <td colspan="2">XY: ±14°</td> <td colspan="2">XY: ±14°</td> </tr> <tr> <td></td> <td colspan="2">+Z: 4.5mm</td> <td colspan="2">+Z: 4.5mm</td> </tr> <tr> <td></td> <td colspan="2">-Z: 2.00mm</td> <td colspan="2">-Z: 2.00mm</td> </tr> </table>					<u>Standard Force Module</u>		<u>Low Force Module</u>		XY	15g to 35g		5g to 10g		+Z	400g to 1400g		100g to 1000g		-Z	800g		800g		Overtravel:	XY: ±14°		XY: ±14°			+Z: 4.5mm		+Z: 4.5mm			-Z: 2.00mm		-Z: 2.00mm	
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	+Z: 4.5mm		+Z: 4.5mm																																				
	-Z: 2.00mm		-Z: 2.00mm																																				
Maximum recommended stylus length:	Steel		50mm																																				
	Renishaw GF		100mm																																				
Maximum stylus mass	8g at 50mm		3g at 20mm																																				
Probing speeds:	Operational 0.5mm/s to 50mm/s																																						
	Optimum 1.00mm/s to 15mm/s																																						
Trigger rate	5 points per second																																						
Weight	22g (Sensor 15g, Stylus module 7g)																																						
Stylus mounting	M2 x 0.4 thread																																						
Probe mounting	M8 bush (polarity sensitive)																																						
Probe interface	PI 200 only																																						

* Specified at Trigger Level 1 at 8mm/s probing speed for standard force and low force modules

† Systematic errors contributed by the Probe when used for 2D circular and 3D spherical measurement

SCR200 DIMENSIONS



SPECIFICATION

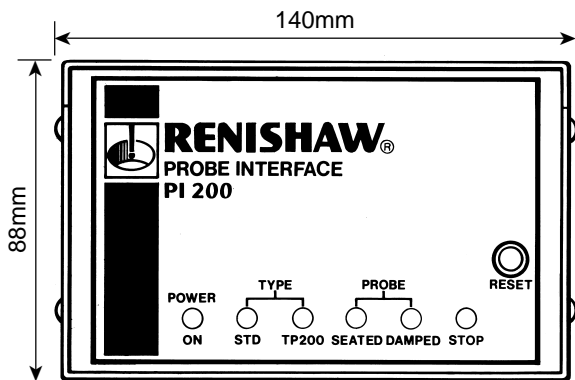
Weight	0.75kg
Mounting orientation	Vertical or horizontal
Mounting fixture	Single stud (M8, M10)
Number of ports	6
Repeatability of stylus change (2σ) at 50mm	Automatic: $\leq 1\mu\text{m}$ Manual: $\leq 2\mu\text{m}$
Entry speed	Unrestricted
Module pull-off force	800g maximum
Overtravel protection	Electromechanical (5° minimum deflection)
LED indicators	Power: Green Status: Red (Flashing during probe inhibit)
Change cycle detection	Optoelectronic beam system with Hall effect proximity sensor
Multi-rack usage	Up to 2 SCR200 units (12 ports) may be connected with a special cable

INSTALLATION

All alignment requirements and port docking coordinates can be established with only 8 probing points. No control signals from the CMM are required.

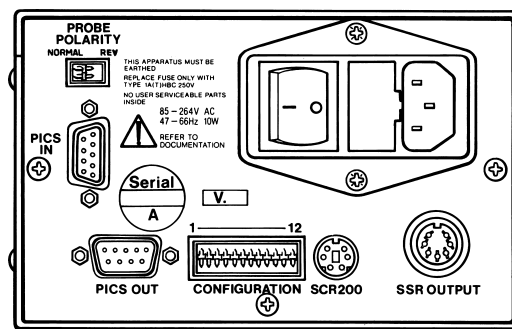
Alignment adjustment	XY rotational only $\pm 0.1\text{mm}$
Docking tolerance	$\pm 0.17\text{mm X}$, $\pm 1.5\text{mm Y}$, $\pm 2\text{mm Z}$
Power supply/control	PI 200 Interface
Cable length	20m maximum (PI 200 to SCR200)
Cable connection	6 pin miniature DIN socket
Set up time	<30 minutes

PI 200 DIMENSIONS



FRONT PANEL

DEPTH: 183mm



REAR PANEL

SPECIFICATION

Size	1/3 19" rack wide x 2U high (140mm x 88mm x 183mm)
Mounting	19" rack mounting or freestanding
Weight	1.6kg
Power supply	Universal: 85 - 264V, 50/60Hz
Probe compatibility	TP200 or TP2/TP6 Probes
Probe recognition	Automatic, ≤ 1.5s
Power connector	IEC 320
Probe input connector	9Way D socket (Renishaw PICS standard)
Probe output connector	9Way D plug (Renishaw PICS standard) or 7 pin DIN SSR socket
SCR200 connector	6 pin miniature DIN socket
Temperature range	Operating: 0°C to 50°C Storage: -10°C to +70°C
Probe signal cable	50m, maximum resistance 5Ω/conductor

SYSTEM INSTALLATION & COMPATIBILITY

The TP200 Probe System is compatible with all Renishaw M8 (2-wire) probe heads and extension bars. The probe may be installed on Renishaw multiwire systems using the PAA1 Autojoint Adaptor or PAA series extension bars. This will provide access to the ACR1 Autochange System. Integration of the TP200 Probe System with other Renishaw scanning, video or touch probe products for automatic or manual probe changing is possible but will require special connecting cables.

To obtain satisfactory performance with the full range of styli, the TP200 should be installed with CMM controllers which are able to service the

control signal PDAMP (Probe DAMPING) via the Renishaw Product Interconnection System (PICS). The control signal HALT (trigger confirmation) is available to aid the prevention of vibration induced triggers if required.

Some CMMs are manufactured with a TP2/TP6 type probe interface in-line with the probe head cable. It will be necessary to bypass such devices before TP200 can be installed.

For further advice and information about TP200 installation or product compatibility, please contact your CMM supplier or Renishaw.

Renishaw reserves the right to change specifications without notice.

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