

Touch-trigger probe systems - TP1, TP2, TP6, TP6A, PH1, PH6, PH6M

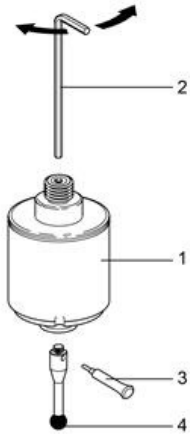
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TP6 touch-trigger probe

The TP6 touch-trigger probe illustrated below combines the accuracy, flexibility and M8 mounting thread of the TP2-5-way probe with the rugged construction and generous overtravel of the TP1(S).

The larger diameter of the TP6 (25 mm) allows the probe to carry longer and heavier styli configurations than the TP2-5-way, allowing it to be used successfully on both universal DCC and manual CMMs.

It incorporates an M3 stylus mount which allows compatibility with Renishaw's extensive M3 and M2 stylus and accessory range using the appropriate stylus adaptor where necessary.



1	TP6 probe
2	1.5 mm AF Allen key to adjust trigger force
3	S7 stylus tightening tool
4	Stylus (not supplied)

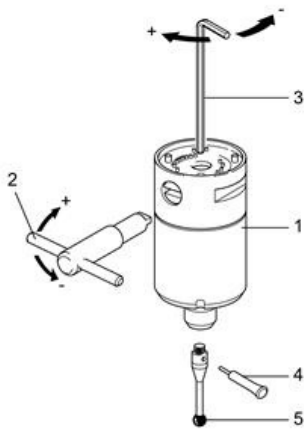
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TP6A touch-trigger probe

The TP6A touch-trigger probe has all the features of the TP6 with the added benefit of the Renishaw autojoint. This is a highly repeatable kinematic joint which allows rapid probe exchange without the need to requalify the probe tip. It can be operated either manually, using an S10 autojoint key, or automatically, using the autochange rack system.

This probe can be used successfully on both universal DCC and manual CMMs. It incorporates an M3 stylus mount which offers compatibility with all Renishaw's extensive M3 and M2 stylus and accessory range.



1	TP6A probe
2	S10 autojoint key
3	1.5 mm AF Allen key to adjust trigger force
4	S7 stylus tightening tool
5	Stylus (not supplied)

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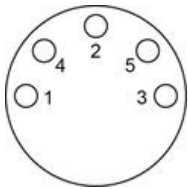
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Installation

Electrical installation

TP1(S)

The 5-pin DIN socket on the TP1(S) probe provides the connections (shown below) to the probe interface.



Pin	Function
1	LED cathode
2	Screen
3	LED anode
4	Probe circuit
5	Probe circuit

TP2 and TP6

Connections to the probe interface are made through the M8 mounting joint.

TP6A

Connections to the probe interface are made through the autojoint.

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Fitting a stylus



To fit a stylus to a Renishaw touch-trigger probe, insert the correct threaded stylus or stylus adaptor into the stylus mount and tighten the stylus securely using the S7 stylus tool provided. Tightening the stylus by any means other than the stylus tool provided (e.g. spanners, drill bits, etc.) may cause internal damage to the probe mechanism.



NOTE: All stylus joints should be clean and free from dirt or debris.

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Applications guide

Stylus selection

In the majority of probing applications, to maximise accuracy we recommend that you:

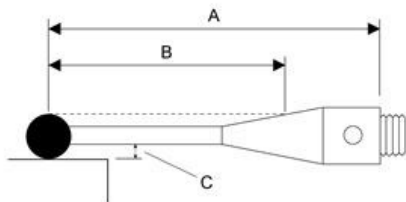
- Keep styli short and stiff

The more the stylus bends or deflects, the lower the accuracy. Probing with the minimum stylus length for your application is recommended and where possible the use of one piece styli is suggested. Probing with excessive styli / extension combinations should therefore be avoided.

- Keep the stylus ball as large as possible

This will ensure maximum ball / stem clearance whilst providing a greater yet rigid effective working length (EWL). Using larger ruby balls also reduces the effect of surface finish of the component being inspected.

EWL is the penetration that can be achieved by any ruby ball before its stem fouls against the feature. Generally, the larger the ball diameter, the greater the EWL (see figure below).



A	Overall working length
B	EWL
C	Ball / stem clearance

EWL can also be affected by assembly tolerances. For this reason, Renishaw styli are assembled to exacting standards in controlled conditions.

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Trigger force

Trigger force is the amount of pressure applied by the helical compression spring onto the pivotal plate and bearing points to hold the stylus mount in place.

The trigger force is preset by Renishaw but can be altered for any of the following reasons:

- to permit the use of longer styli on the probe
- to permit the use of heavier styli on the probe
- if the preset trigger force has decreased due to probe use
- if the acceleration of the CMM is causing illegal triggers



NOTE: Changing the probe trigger force will affect the probe's measurement performance. It is important to requalify the probe configuration and check the measurement performance of the probe system after any adjustment has been made to the trigger force.

All Renishaw's touch-trigger probes have an optimum trigger force setting for general purpose applications as detailed in the table below.

Trigger force:

CMM probes	Stylus length (typical)	Optimum trigger force (preset by Renishaw)	Trigger force range
TP1(S)	31 mm (PS1-1R)	0.15 N	0.1 N - 0.5 N
TP2-5 way	10 mm (PS12R)	0.07 N - 0.08 N	0.07 N - 0.15 N
TP6 / TP6A	21 mm (PS1-12R)	0.11 N - 0.13 N	0.11 N - 0.3 N

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Manual probe heads product overview

Renishaw manual probe heads detailed in this user's guide are designed to suit any CMM and this specifically covers:

- PH1
- PH6
- PH6M

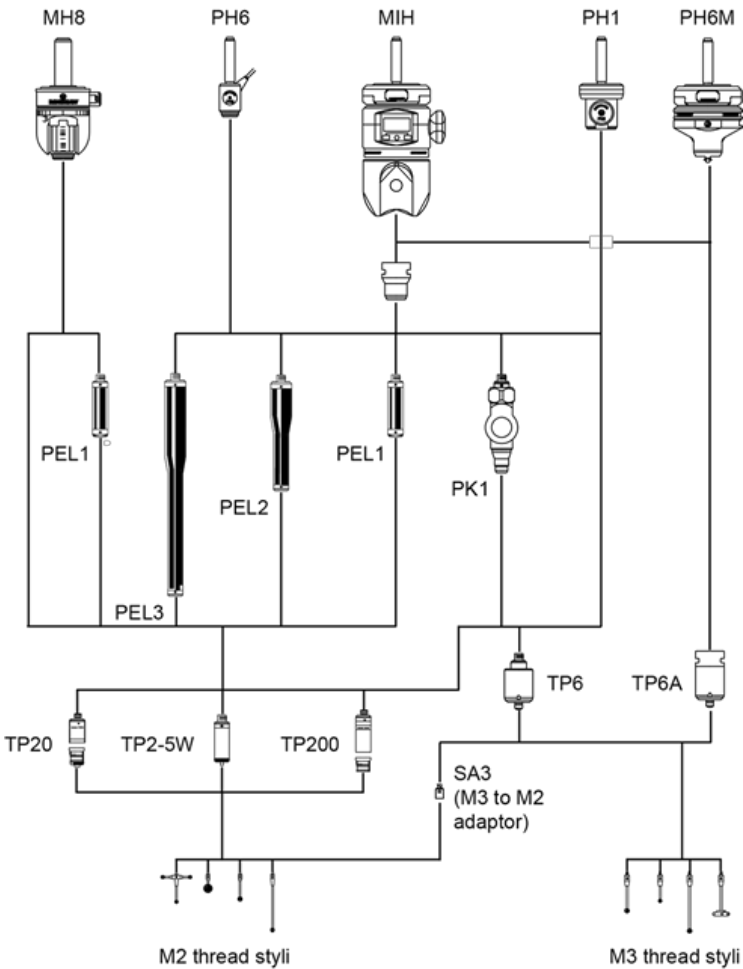
Each is designed for a specific application and purpose. The figure below explains the product interconnections and both include the MH8 and MIH for completeness.

Probe head / touch-trigger probe compatibility:

Probe head	Number of probes carried	Orientation - A-axis	Orientation - B-axis	Orientation - Repeatability	Probe joint
PH1	1	✓	✓	✗	M8 bush
PH6	1	✗	✗	✗	M8 bush
PH6M	1	✗	✗	✓	Autojoint
MIH	1	✓	✓	✓	Autojoint
MH8	1	✓	✓	✓	M8 bush

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* This probe head can only connect one electronic probe (e.g. TP200).