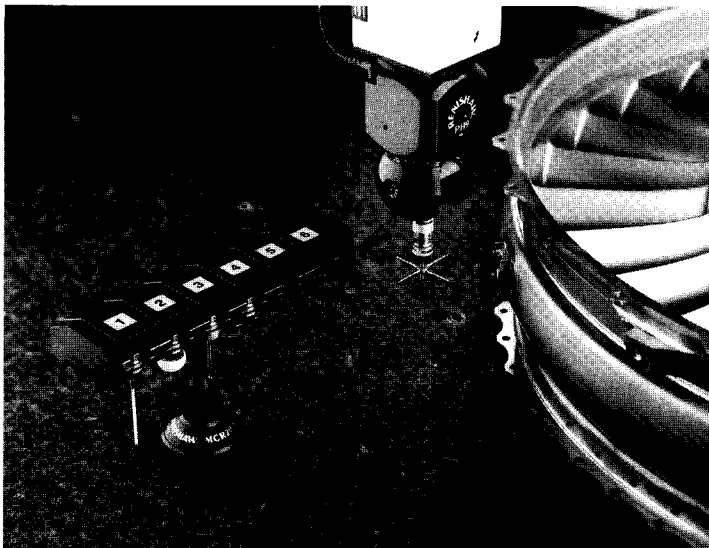

TP20

Touch-Trigger Probe with Probe Module Changing and MCR20

Probe Module Change Rack

- ☐ Detachable Probe Module(s), available in three trigger force options, provide fast stylus changing without the need for requalification.
- ☐ Direct replacement for the Renishaw TP2-5way Touch-Trigger Probe.
- ☐ Optional MCR20 Probe Module Change Rack provides automatic stylus changing using simple move commands.
- ☐ Simple to retrofit.
- ☐ Direct mounting to all Renishaw Probe Heads incorporating a standard M8 probe connector.
- ☐ Mounting to Renishaw Autojoint Probe Heads using PAA adaptors/extensions.
- ☐ Compatibility with existing Probe Interfaces.
- ☐ Design based on the industry-proven TP2-5way touch sensor.



The TP20 is a 5-way kinematic touch-trigger probe. It's two-piece design, comprising a Probe Body and detachable Probe Module(s), provides the facility to change stylus configurations without the need for requalification. The TP20 is a direct replacement for the industry-proven Renishaw TP2 Touch-Trigger Probe, and may be retrofitted to existing TP2 applications to add the benefits of stylus changing to both manual and DCC co-ordinate measuring machines (CMM's).

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Data Sheet

H-1000-2064-01-A

System Overview

The TP20 Probe Module Changing Touch Trigger Probe System (see Figure 1) comprises:

- The TP20 Touch-Trigger Probe.
- The MCR20 Probe Module Change Rack (optional).

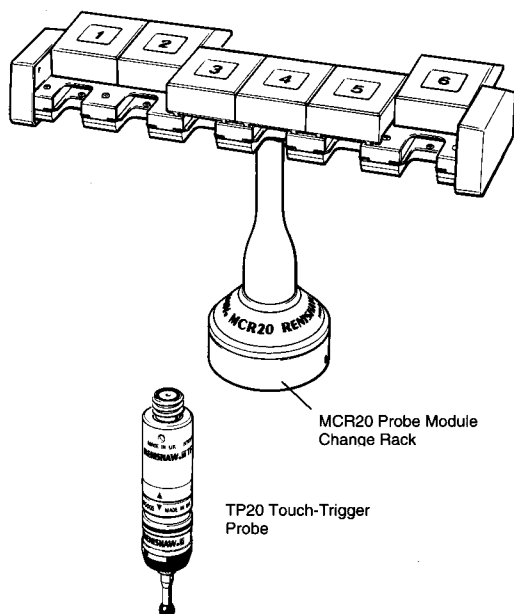


Figure 1 – The TP20 Probe System

The TP20 Touch-Trigger Probe

The TP20 Probe Touch-Trigger Probe is supplied as a kit, comprising:

- TP20 Probe Body.
- TP20 Standard Force Probe Module.
- TP20 Medium Force Probe Module.
- S1 'C' Spanner.
- S9 Double-Ended 'C' Spanner.
- S7 Stylus Tools (2).
- CK200 Cleaning Kit.

The Probe Body

The Probe Body (see Figure 2) houses the mating half of the Probe Module's kinematic coupling and contains a magnetic proximity switch to inhibit triggering of the probe during automatic changing of Probe Modules using the MCR20 Probe Module Change Rack.

The Probe Body incorporates a standard Renishaw threaded connector mount and is fully compatible with all standard Renishaw Probe Heads. It may also be mounted to Probe Heads incorporating the Renishaw® Autojoint with the PAA range of adaptors and extension bars. If required, probe reach may also be increased by use of the PEL range of extension bars. Further information on these products may be obtained by reading the **Probing Systems for Co-ordinate Measuring Machines Technical Specifications Leaflet (Part No. H-1000-5050)**, available through your supplier.

The Probe Module

The Probe Module (see Figure 2), houses the kinematic switching touch sensor mechanism, carries the Stylus Assembly and provides overtravel in the X, Y and + Z axes.

The Probe Module is held in position on the Probe Body by a magnetically retained, highly repeatable, kinematic coupling. Electrical contact pins conduct the probe sense voltage through the coupling. Features are also included which minimise the possibility of a misaligned Probe Module generating a probe 'seated' signal. The stylus mounting thread accepts styli from the Renishaw M2 range.

Trigger Force Options

The following trigger force options are available to allow the TP20 to be used where acceleration forces or vibration would otherwise result in spurious triggers. This is similar in effect to adjusting the TP2 trigger force, but the fixed force TP20 modules provide more predictable performance. The trigger force of each Probe Module is clearly marked on the module's front ring. In addition, each Probe Module carries a colour-coded protection cover as follows:

The Standard Force (SF) Probe Module: identified by a black protection cover, is suited to the majority of applications when used with the following range of styli:

- Steel and carbide styli up to 40mm in length.
- Renishaw graphite fibre (GF) type styli up to 50mm in length.
- Star and cranked styli with offsets of 5mm to 20mm, extended by up to 20mm from the stylus mounting face.

The Medium Force (MF) Probe Module: identified by a grey protection cover, is recommended for use with the following range of styli:

- Any stylus type up to 60mm in length.
- Star and cranked styli with offsets of 5mm to 20mm, extended by up to 30mm from the stylus mounting face.

The Extended Force (EF) Probe Module: identified by a brown protection cover, will only be required with large stylus assemblies and where spurious triggers due to vibration and acceleration preclude the use of either the SF or MF modules.

The following Probe Module Kits are available through your supplier:

Part Description	Part Number
Standard Force (SF) Probe Module Kit	A-1371-0270
Medium Force (MF) Probe Module Kit	A-1371-0271
Extended Force (EF) Probe Module Kit	A-1371-0272

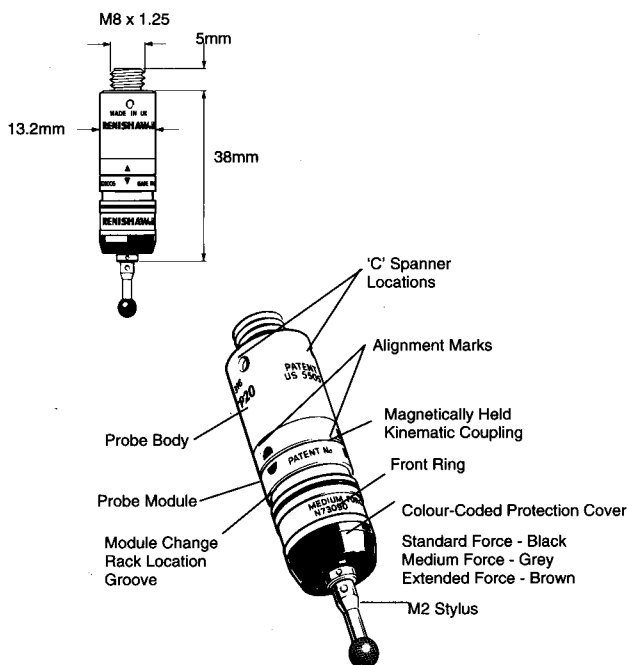


Figure 2 – The TP20 Touch-Trigger Probe

TP20 Probe – Technical Data

Note...

For further information on the TP20 Probe, refer to the TP20 Probe Module Changing Touch-Trigger Probe and MCR20 Module Change Rack Installation and User's Guide (H-1000-5008) available through your supplier.

Measuring Performance

Note...

The following data is derived from high accuracy test rig measurements and may not represent the performance achievable on a CMM. Please consult your CMM supplier for overall system accuracy information.

Performance at 10mm Stylus Length

Parameter	Probe Module Type		
	Standard Force	Medium Force	Extended Force
Unidirectional Repeatability* (2σ)	0.35µm	0.50µm	0.65µm
2D (XY) Form Measurement Deviation*	±0.8µm	±1.0µm	±2.0µm

* Measured at a trigger speed of 8mm/s
Test stylus ball diameter 4mm

Probing Forces and Overtravel Limits

Parameter		Probe Module Type And Stylus Length		
		Standard Force 10mm	Medium Force 25mm	Extended Force 50mm
Trigger Force (Nominal at stylus tip)	XY Z	8g 75g	10g 190g	10g 320g
Overtravel Force (Max. at stylus tip)	XY Z	20g - 30g 350g	20g - 40g 700g	20g - 50g 1000g
Overtravel Displacement	XY* Z	±14° 4.0mm	±14° 3.7mm	±14° 2.4mm

*Note: The module may detach if this value is exceeded.

Note: The trigger force setting of the Standard Force Probe Module is the same as that of the TP2 Probe when set at its factory setting.

Probe Module Changing Repeatability

Probe Module Changing Method	Repeatability
Automatic changing (2σ)	1.0µm
Manual changing (2σ)	2.0µm

Technical Specification

Product Compatibility: The TP20 is suitable for use with all Probe Interfaces and Probe Heads which service the TP1, TP2, TP6, TP7 and TP200 Touch-Trigger Probes.

The TP20 is compatible with the PEL, PK, PAA and PEM series of probe extensions / adaptors.

Dimensions
Length: 38mm
Diameter: 13.2mm

Probe Mount: Thread M8 x 1.25 x 5mm

Stylus Mount: Thread M2 x 0.4

Weight: 22g (Probe Module and Body)

Sense Directions: 5 way, ±X ±Y +Z

Module Pull-off Force: 1 Kgf maximum

Sealing: IP30

Cable Length: 50m (24awg/0.2mm² conductors)

Probe Module Change Life: >25,000 changes

Probe Module Change Repeatability: Automatic Changing: 1.0µm
Manual Changing: 2.0µm

Inhibit System: Magnetic Proximity Switch in Probe Body

Inhibit Sensitivity: >500 Gauss (50mT)

Inhibit Range: Up to 50mm from the docking port centre

Notes...

The TP20 Probe uses a magnetically actuated inhibit system.

The TP20 will be automatically inhibited from triggering when it approaches the front of the MCR20 Probe Module Change Rack.

The TP20 may not be suitable for gauging magnetised parts, or parts held in magnetic fixtures.

The MCR20 Probe Module Changing Rack

Note...

Renishaw supplies six types of MCR20 Probe Module Changing Rack Kit, each kit providing a different combination of Probe Modules.

The MCR20 Probe Module Changing Rack (see Figure 3) is supplied as a kit, comprising:

- MCR20 Probe Module Changing Rack.
- SCR200 Mounting Kit.
- Location Piece.
- PS2R Datuming Stylus.
- Two TP20 Probe Modules (Probe Module types will depend on part number of kit).

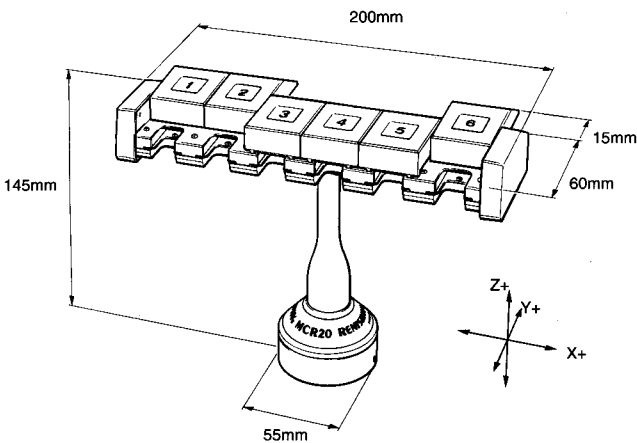


Figure 3 – The MCR20 Module Change Rack

The MCR20 Probe Module Changing Rack is designed to securely hold stored Probe Modules for automatic changing, and to protect them from airborne contaminants that may be present within the working environment.

Only seven datum points are needed to set the MCR20 rack alignment and probe module changing co-ordinates.

By generating a magnetic field about the front of each docking port lid, the MCR20 effectively 'closes' the probe's inhibit switch during a probe module changing cycle. Rack function is completely passive and no electrical input is required.

During automatic changing of Probe Modules, limited crash protection is provided by hinged overtravel mechanisms incorporated within both the Base and the Docking Port Assembly of the MCR20. Provided any collision occurs in the direction of overtravel, the hinged overtravel mechanisms can be manually reset and it should not normally be necessary to re-datum the Rack.

MCR20 Probe Module Changing Rack Kits are available with the following combinations of Probe Modules; these may be ordered through your supplier:

Probe Module Combination	Part Number
2 x Probe Modules (SF + SF)	A-1371-0261
2 x Probe Modules (SF + MF)	A-1371-0262
2 x Probe Modules (SF + EF)	A-1371-0263
2 x Probe Modules (MF + MF)	A-1371-0264
2 x Probe Modules (MF + EF)	A-1371-0265
2 x Probe Modules (EF + EF)	A-1371-0266

MCR20 – Technical Specification

Note...

For further information on the MCR20 Probe Module Change Rack, refer to the TP20 Probe Module Changing Touch-Trigger Probe and MCR20 Module Change Rack Installation and User's Guide (H-1000-5008) available through your supplier.

Dimensions

Length:	200mm
Width:	60mm
Height:	145mm

Port Entry Velocity: Maximum 800mm/s

Mounting Orientation: Unrestricted

Y Axis Overtravel: Hinged breakout from base
55mm travel at port height

Z Axis Overtravel: Hinged docking port assembly
90° travel in –Z axis

Inhibit Range: 50mm from port centre

Renishaw reserves the right to change specifications without notice.

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