

# MH20 and MH20i

## Manual adjustable probe heads with module changing

### MH20



- Incorporates TP20 kinematic mount with two axis adjustable swivel.
- $\pm 300^\circ$  B axis rotation.
- $\pm 93^\circ$  A axis rotation.
- Infinite positioning within the movement envelope of the head.
- Repeatable TP20 stylus module changing, providing head adjustment has not taken place.
- Up to 94.5mm (3.72in) extension module capacity.

### MH20i



- Incorporates TP20 kinematic mount with two axis indexing.
- $\pm 180^\circ$  rotation in B.
- $90^\circ$  rotation in A.
- 168 repeatable positions in  $15^\circ$  increments.
- Repeatable TP20 stylus module changing in each pre-qualified position without the need for re-qualification.
- Up to 94.5mm (3.72in) extension module capacity.

**RENISHAW** 

**DATA SHEET**

## MH20 & MH20i family

The MH20 and MH20i are manually operated probe heads that articulate to provide orientation of the probing axis.

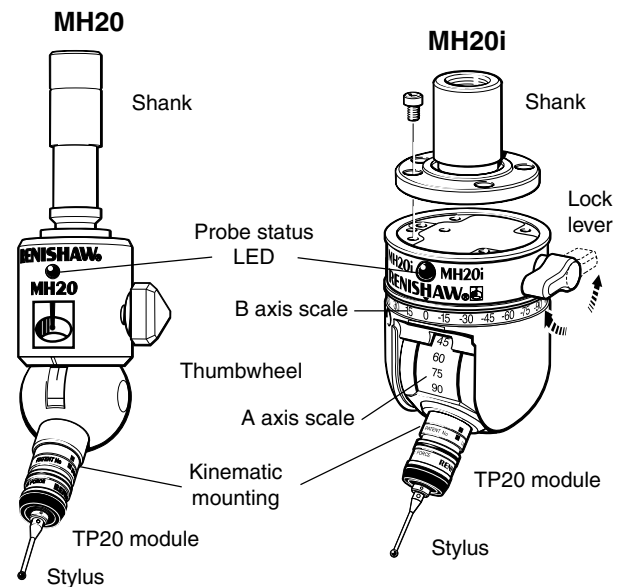
MH20 provides non-repeatable orientation, while MH20i permits repeatable indexing in 15° increments.

Both heads feature TP20 kinematic probe module mounting, allowing repeatable stylus module changes.

MH20 and MH20i are compatible with the full range of TP20 stylus modules, which comprises 5-way versions with length or trigger force options and a 6-way version.

Both heads feature a red LED, which indicates probe status, controlled by either the CMM or a Renishaw probe interface.

A range of shanks is available to suit most CMM quills, these are pre-mounted and are ordered with the head.



### MH20

The MH20 incorporates the TP20 kinematic mount with 2 axis adjustable swivel. The TP20 module is carried on the A axis swivel and rotates through  $\pm 93^\circ$  in the Z plane. The B axis rotates through  $\pm 300^\circ$  in the X-Y plane. A thumbwheel locks the swivel in any position within the movement envelope of the head.

After each adjustment qualification must take place, while repeatable module changing is possible without re-qualification, providing adjustment has not taken place.

The head is pre-mounted with a customer-specified shank to suit the CMM, the correct specification is vital because the shank cannot be removed from the MH20.

(See back page of Data Sheet for order information).

### MH20 specification

#### Technical data

Range of articulation	...	A axis $\pm 93^\circ$ B axis $\pm 300^\circ$
Dual axis lock	...	Single rotary thumbwheel
Mounting	...	MS/T range of shanks
Cable connection	...	5 pin DIN socket
Probe status indication	...	1 LED
Maximum load	...	EM2 extended module - 94.5mm (3.72in)
Operating temperature range	...	+10° to +40°C (+50 to +104°F)
Storage temperature range	...	-10° to +70° (+14 to +158°F)
Probe mount	...	TP20 kinematic
Weight - without shank	...	100g

**Note: MH20 and MH20i are not compatible with the MCR20 module change rack.**

**For further information on both products please refer to the MH20 and MH20i User's Guide (H-1000-5195-01-A) which is available through your supplier.**

### MH20i

The MH20i incorporates the TP20 kinematic mount with 2 axis indexing. The TP20 is carried on the A axis swivel and rotates through  $90^\circ$  in the Z plane. The B axis rotates through  $\pm 180^\circ$  in the X-Y plane.

The axes are unlocked by releasing the locking lever allowing rotation to each position. Positions are set at angular increments of  $15^\circ$  in each axis, providing a total of 168 repeatable positions.

When the head orientation is locked the probe is fully kinematically constrained in a highly repeatable spatial position. This means, that after initial qualification of the stylus tip in the required positions, the probe can be moved to any of the qualified positions without the need for re-qualification.

Repeatable module changing is possible in each pre-qualified position, provided initial qualification of each stylus configuration has taken place.

### MH20i specification

#### Measuring performance

Positional repeatability ( $2\sigma$ )	...	1.5 $\mu$ m (0.00006in) (At stylus tip with TP20 standard force module & 10mm styli)
Positional repeatability ( $2\sigma$ )	...	2.5 $\mu$ m (0.0001in) (At stylus tip with EM2 extended module & 10mm styli)

#### Technical data

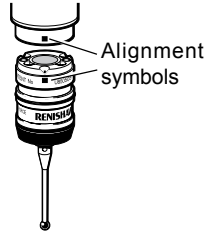
Range of articulation	...	A axis $0^\circ$ to $90^\circ$ in $15^\circ$ increments B axis $\pm 180^\circ$ in $15^\circ$ increments
Dual axis lock	...	Single lock lever
Mounting	...	MS range of shanks
Cable connection	...	5 pin DIN socket
Probe status indication	...	1 LED
Maximum load	...	EM2 extended module 94.5mm (3.72in)
Operating temperature range	...	+10° to +40°C (+50 to +104°F)
Storage temperature range	...	-10° to +70°C (+14 to +158°F)
Probe mount	...	TP20 kinematic
Weight - without shank...	...	210g (7.04oz)

## TP20 probe module

The TP20 probe module houses the kinematic switching touch mechanism, carries the stylus assembly and provides overtravel in the X, Y, and +Z axes.

The probe module is held in position on the head by a 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 mis-aligned probe module generating a probe-seated signal. The M2 stylus mounting is compatible with Renishaw's comprehensive range of M2 styli.



## TP20 range

Within the TP20 range there are four trigger force options, two length options and a 6-way version. The trigger force options comprise the standard force (SF) identified by a black cap, medium force (MF) identified by a grey cap and extended force (EF) identified by a brown cap. Both MF and EF are used to overcome the effects of acceleration forces or vibration, which would otherwise result in spurious triggers. There is also a low force version (LF) which is used to measure delicate objects, identified by a green cap.

The EM1 (69.5mm) and EM2 (94.5mm) extended modules are used to allow access to otherwise inaccessible workpiece features. Both operate using standard force and offer better measuring performance than using long styli with SF, MF or EF modules.

The TP20 6-way, identified by a blue cap, senses in the +Z and -Z directions allowing the measurement of undercuts.

## Probing forces and overtravel limits

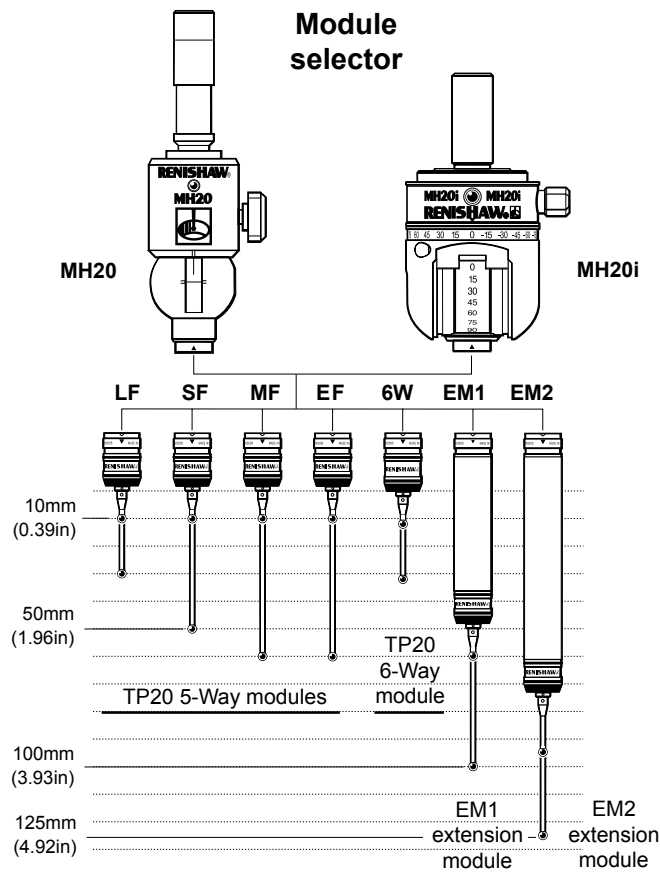
Parameter	Probe module stylus length			
	LF 10mm	SF 10mm	MF 25mm	EF 50mm
Trigger force Nominal at stylus tip XY	0.055N 5.5gf 0.19ozf	0.08N 8gf 0.28ozf	0.1N 10gf 0.35ozf	0.1N 10gf 0.35ozf
	Z	0.65N 65gf 2.29ozf	0.75N 75gf 2.64ozf	1.9N 190gf 6.70ozf
Overtravel force Max at stylus tip XY	0.09N 9gf 0.31ozf	0.2-0.3N 20-30gf 0.7-1.1ozf	0.2-0.4N 20-40gf 0.7-1.4ozf	0.2-0.5N 20-50gf 0.7-1.8ozf
	Z	1.15N 115gf 4.05ozf	3.5N 350gf 12.35ozf	7.0N 700gf 24.71ozf
Overtravel displacement XY *	±14°	±14°	±14°	±14°
	+Z	3.1mm 0.12in	4.0mm 0.16in	3.7mm 0.14in
Length (excluding stylus)	19.5mm 0.77in	19.5mm 0.77in	19.5mm 0.77in	19.5mm 0.77in
	Module changing			
Changed manually probe module repeatability is 2.0µm				

\* Note The module may become detached if this value is exceeded

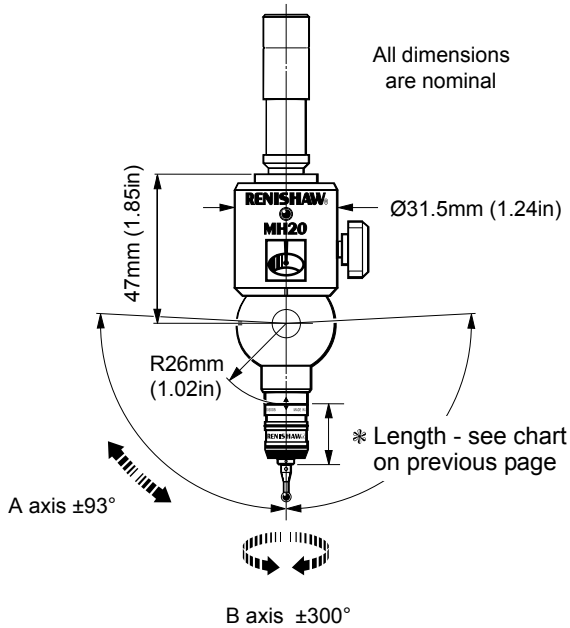
## Probing forces and overtravel limits

Parameter	Probe module stylus length		
	EM1 10mm	EM2 10mm	TP20 6-way 10mm
Trigger force Nominal at stylus tip XY	0.08N 8gf 0.28ozf	0.08N 8gf 0.28ozf	0.14N 14gf 0.49ozf
	Z	0.75N 75gf 2.64ozf	0.75N 75gf 2.64ozf
Overtravel force Max at stylus tip XY	0.2-0.3N 20-30gf 0.7-1.1ozf	0.2-0.3N 20-30gf 0.7-1.1ozf	0.25N 25gf 0.88ozf
	+Z	3.5N 350gf 12.35ozf	3.5N 350gf 12.35ozf
-Z	-	-	9.0N 900gf 31.8ozf
	Overtravel displacement XY *		
+Z	±14° 4.0mm 0.16in	±14° 4.0mm 0.16in	±14° 4.5mm 0.18in
-Z	-	-	1.5mm 0.06in
Length (excluding stylus)	69.5mm 2.74in	94.5mm 3.72in	24.5mm 0.96in
	Module changing		
Changed manually probe module repeatability is 2.0µm			

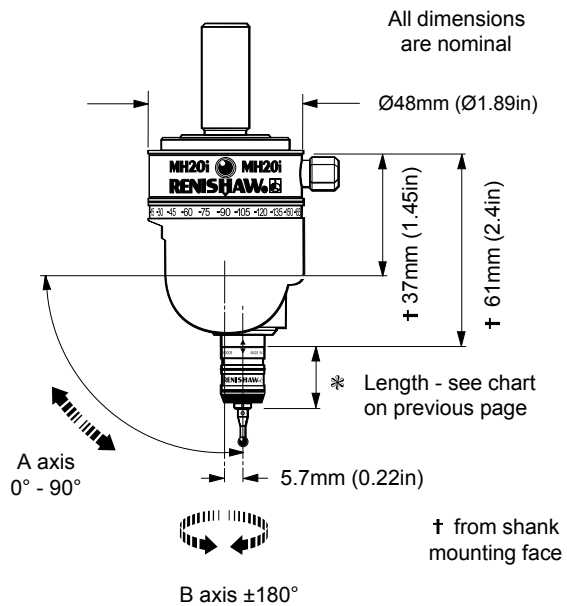
\* Note The module may become detached if this value is exceeded



## Overall dimensions MH20



## Overall dimensions MH20i



## Part numbers and ordering information

MH20 and MH20i are supplied with the shank fitted. To select the correct shank for your application please refer to H-1000-5050-14-A section 9, then follow the part number selection criteria detailed below.

### MH20

Description	Part number
MH20 + MS1/T shank ...	A-4043-xx01 *
MH20 + MS2/T shank ...	A-4043-xx02 *
MH20 + MS3/T shank ...	A-4043-xx03 *
MH20 + MS5/T shank ...	A-4043-xx05 *
MH20 + MS7/T shank ...	A-4043-xx07 *
MH20 + MS9/T shank ...	A-4043-xx09 *
MH20 + MS11/T shank ...	A-4043-xx11 *
MH20 + MS15/T shank ...	A-4043-xx15 *
MH20 + MS18/T shank ...	A-4043-xx18 *
* For LOW Force module in place of xx insert	00
* For STD Force module in place of xx insert	01
* For MED Force module in place of xx insert	02
* For EXT Force module in place of xx insert	03

e.g. For MH20 with STD force module and MS9/T shank the part number is: A-4043-0109.

### MH20i

Description	Part number
MH20i + MS1 shank ...	A-4099-xx01 *
MH20i + MS2 shank ...	A-4099-xx02 *
MH20i + MS4 shank ...	A-4099-xx04 *
MH20i + MS5 shank ...	A-4099-xx05 *
MH20i + MS7 shank ...	A-4099-xx07 *
MH20i + MS9 shank ...	A-4099-xx09 *
MH20i + MS10 shank ...	A-4099-xx10 *
MH20i + MS13 shank ...	A-4099-xx13 *
MH20i + MS15 shank ...	A-4099-xx15 *
MH20i + MS17 shank ...	A-4099-xx17 *
D Shank ...	A-4099-xx18 *
* For LOW Force module in place of xx insert	00
* For STD Force module in place of xx insert	01
* For MED Force module in place of xx insert	02
* For EXT Force module in place of xx insert	03

e.g. For MH20i with MED force module and MS7 shank the part number is: A-4099-0207.

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