

MH20i indexing probe head

Manual head with repeatable indexing and probe module changing

MH20i is a compact manually operated probe head that articulates to provide orientation of the probing axis, offering the significant advantage of repeatable indexing in 15° increments.

The integral TP20 probe mount makes MH20i compatible with the full range of TP20 modules. Repeatable interchange between qualified probe modules, coupled with repeatable indexing, vastly improves productivity for multi-orientation measurement applications.

The full range of TP20 modules comprises of a 6-way version and 5-way versions with a selection of trigger forces and directional sensing options, and also offers some crash protection in the event of accidental collision. Increased reach is made available via the EM1 and EM2 extension bars.

Initial qualification of each measuring position and stylus combination is all that is required.

The probe head also features a red LED, which indicates probe status, controlled by either the CMM or a Renishaw probe interface.

MH20i is best suited to manual CMMs and can be installed on new and existing measuring machines via a shank mounting, which is pre-mounted and ordered with the head.



Benefits

Indexing

Repeatable indexing removes the need for constant re-qualification.

Productivity

Improved productivity is realised via probe module changing and indexing without re-qualification.

Increased reach and flexibility

Extension bars available, with up to 75 mm extra reach (125 mm from TP20 mount including max styli).

Innovations

Repeatable probe changing

The TP20 range offers repeatable probe module changing, allowing the use of different stylus configurations, without the need for re-qualification.

Crash protection

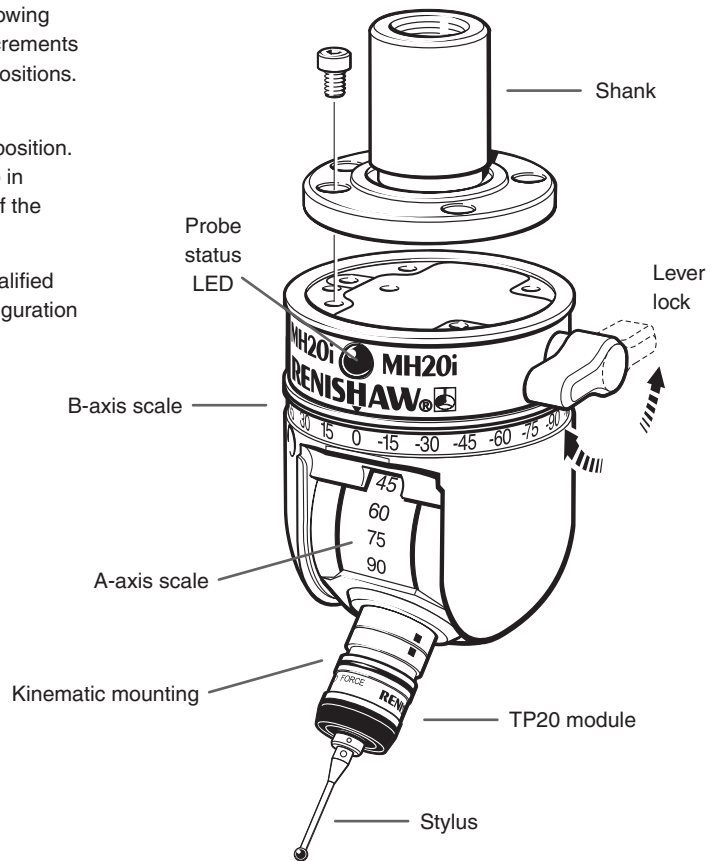
TP20 modules have overtravel in all directions. The magnetic mounting provides additional crash protection in X and Y.

The MH20i incorporates the TP20 kinematic mount with 2-axis indexing. The TP20 is carried on the A-axis swivel and rotates through 90° in the Z plane. The B-axis rotates through ±180° 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° 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.



Specifications

| Measuring performance | |
|---|---------------------|
| Positional repeatability (2σ) (At stylus tip with TP20 standard force module and 10 mm styli) | 1.5 μm (0.00006 in) |
| Positional repeatability (2σ) (At stylus tip with EM2 extended module and 10 mm styli) | 2.5 μm (0.0001 in) |

| Technical data | |
|------------------------------------|--|
| Range of articulation | A-axis 0° to 90° in 15° increments B-axis ±180° in 15° 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 94.5 mm (3.72 in) |
| 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 | 210 g |

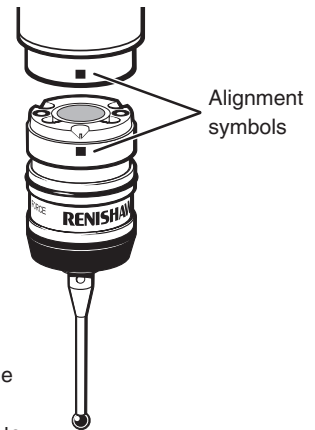
NOTE: MH20i is not compatible with the MCR20 module change rack. For further please refer to the MH20i user's guide (Renishaw part number H-1000-5195) which is available from www.renishaw.com.

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 (69.5 mm) and EM2 (94.5 mm) 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.

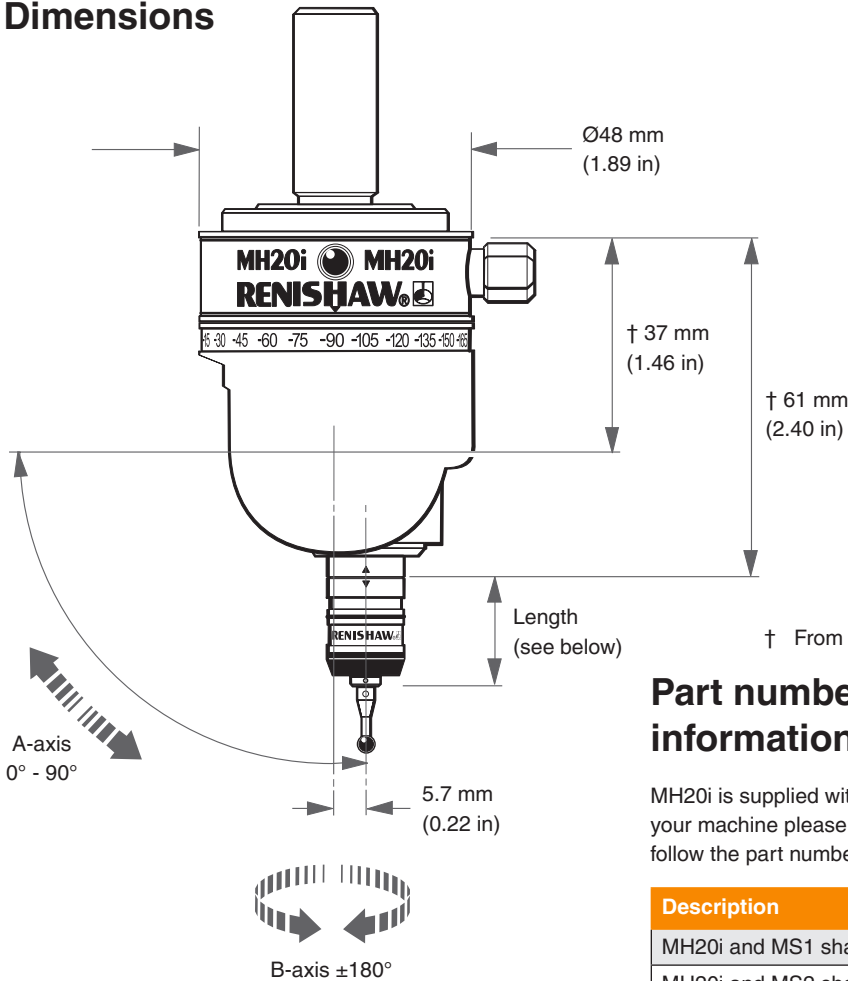
Probing forces and overtravel limits

| Parameter | | Probe module and stylus length | | | |
|---------------------------------------|-----|---|---|---|---|
| | | LF 10 mm | SF 10 mm | MF 25 mm | EF 50 mm |
| Trigger force - nominal at stylus tip | XY | 0.055 N / 5.5 gf / 0.19 ozf | 0.08 N / 8 gf / 0.28 ozf | 0.1 N / 10 gf / 0.35 ozf | 0.1 N / 10 gf / 0.35 ozf |
| | Z | 0.65 N / 65 gf / 2.29 oz | 0.75 N / 75 gf / 2.64 ozf | 1.9 N / 190 gf / 6.70 ozf | 3.2 N / 320 gf / 11.29 ozf |
| Overtravel force - max at stylus tip | XY | 0.09 N / 9 gf / 0.31 ozf | 0.2 N - 0.3 N / 20 gf - 30 gf / 0.7 ozf - 1.1 ozf | 0.2 N - 0.4 N / 20 gf - 40 gf / 0.7 ozf - 1.4 ozf | 0.2 N - 0.5 N / 20 gf - 50 gf / 0.7 ozf - 1.8 ozf |
| | Z | 1.15 N / 115 gf / 4.05 ozf | 3.5 N / 350 gf / 12.35 ozf | 7 N / 700 gf / 24.71 ozf | 10 N / 1000 gf / 35.30 ozf |
| Overtravel displacement | XY* | ±14° | ±14° | ±14° | ±14° |
| | +Z | 3.1 mm (0.12 in) | 4.0 mm (0.16 in) | 3.7 mm (0.14 in) | 2.4 mm (0.09 in) |
| Length (excluding stylus) | | 19.5 mm (0.77 in) | 19.5 mm (0.77 in) | 19.5 mm (0.77 in) | 19.5mm (0.77 in) |
| Module changing | | Changed manually probe module repeaibility is 2.0 µm. | | | |

| Parameter | | Probe module and stylus length | | |
|---------------------------------------|-----|---|---|---------------------------|
| | | EM1 10 mm | EM2 10 mm | TP20 6-way 10 mm |
| Trigger force - nominal at stylus tip | XY | 0.08 N / 8 gf / 0.28 ozf | 0.08 N / 8 gf / 0.28 ozf | 0.14 N / 14 gf / 0.28 ozf |
| | Z | 0.75 N / 75 gf / 2.64 ozf | 0.75 N / 75 gf / 2.64 ozf | 1.6 N / 160 gf / 2.64 ozf |
| Overtravel force - max at stylus tip | XY | 0.2 N - 0.3 N / 20 gf - 30 gf / 0.7 ozf - 1.1 ozf | 0.2 N - 0.3 N / 20 gf - 30 gf / 0.7 ozf - 1.1 ozf | 0.25 N / 25 gf / 0.88 ozf |
| | +Z | 3.5 N / 350 gf / 12.35 ozf | 3.5 N / 350 gf / 12.35 ozf | 2.5 N / 250 gf / 8.83 ozf |
| | -Z | - | - | 9.0 N / 900 gf / 31.8 ozf |
| Overtravel displacement | XY* | ±14° | ±14° | ±14° |
| | +Z | 4 mm (0.16 in) | 4 mm (0.16 in) | 4.5 mm (0.18 in) |
| | -Z | - | - | 1.5 mm (0.06 in) |
| Length (excluding stylus) | | 69.5 mm (2.74 in) | 94.5 mm (3.72 in) | 24.5 mm (0.96 in) |
| Module changing | | Changed manually probe module repeaibility is 2.0 µm. | | |

* **NOTE:** The module may become detached if this value is exceeded.

Dimensions

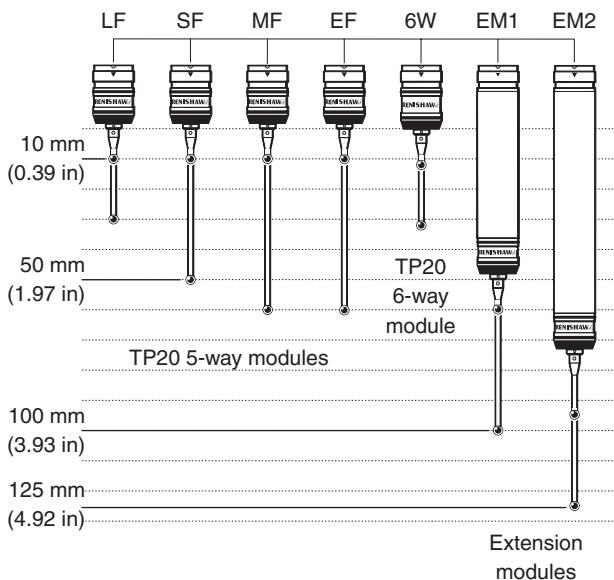


† From shank mounting face

Part numbers and ordering information

MH20i is supplied with the shank fitted. To select the shank for your machine please refer to www.renishaw.com/MH20i, then follow the part number selection criteria detailed below.

| Description | Part number |
|----------------------|---------------|
| MH20i and MS1 shank | A-4099-xx01 * |
| MH20i and MS2 shank | A-4099-xx02 * |
| MH20i and MS4 shank | A-4099-xx04 * |
| MH20i and MS5 shank | A-4099-xx05 * |
| MH20i and MS7 shank | A-4099-xx07 * |
| MH20i and MS9 shank | A-4099-xx09 * |
| MH20i and MS10 shank | A-4099-xx10 * |
| MH20i and MS13 shank | A-4099-xx13 * |
| MH20i and MS15 shank | A-4099-xx15 * |
| MH20i and 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.

www.renishaw.com/MH20i

#renishaw

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