**Data sheet**
H-2000-2246-05-A

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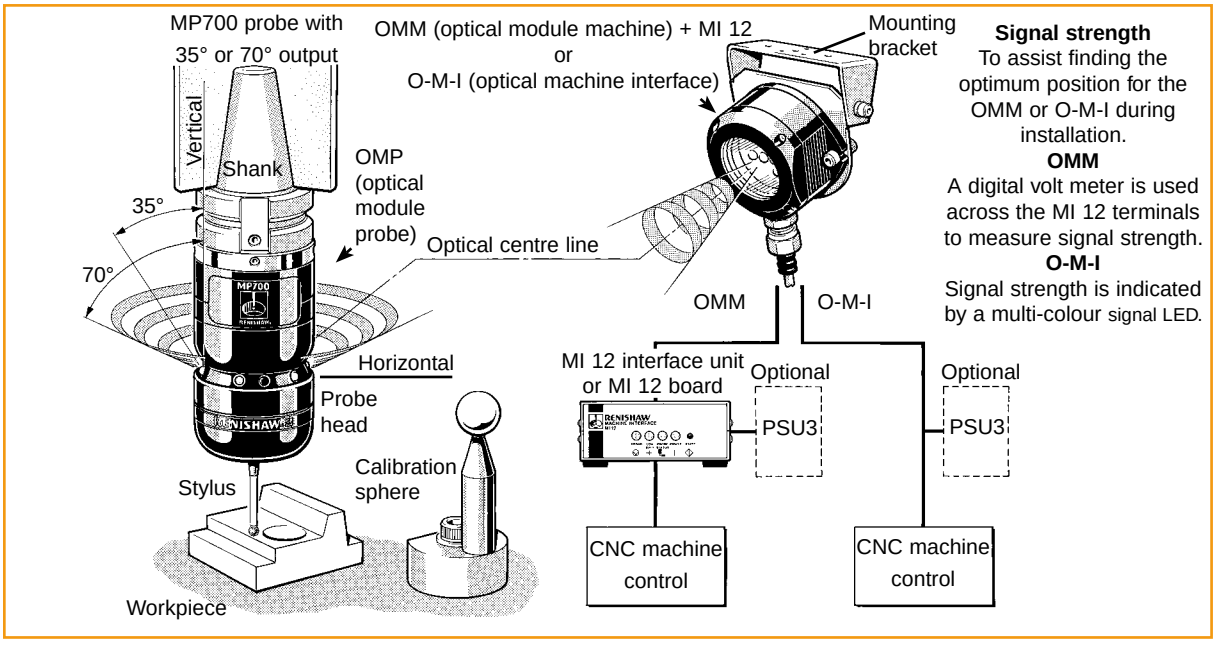
# MP700 probe with 360° optical transmission system

**www.renishaw.com/mp700**




## System components

- **MP700 probe**
  3D touch trigger inspection probe (±X, ±Y, +Z directions). Signal transmission and reception is through 360°. The probe/OMP is sealed to IP68 and designed for reliable operation in the machine tool environment.
- **OMP** (optical module probe)
  A transmitter/receiver module, containing optical signal LEDs and a 9V battery, which powers probe operation.
- **OMM** (optical module machine) **+ MI 12 interface unit**
  Signals pass from the CNC control to the OMP via the MI 12 and OMM and return along the same route. The MI 12 converts probe signals into a form compatible with the CNC control. OMM transmission and reception ranges are factory set to 100%. If OMM signals interfere with probes on other machines, then the optical range can be reduced.
- **O-M-I** (optical machine interface)
  An alternative to the OMM + MI 12 interface, combining the functions of both OMM and MI 12 in one unit.
- **PSU3 power supply unit for O-M-I or MI 12**
  Used when 24 V supply is not available from the machine.
- **Probing software**
  Renishaw probing software is available for most types of machine control.

## System features

- **Improved 3-dimensional pre-travel variation**
  The non-lobing design means the probe is not direction dependant, greatly simplifying probe calibration routines for all styli, including long straight styli, star styli or cranked configurations – at any probe orientation.
- **High accuracy with long styli**
  A low trigger force combined with low pre-travel, provides high accuracy measurement, even when using styli up to 200 mm (7.87 in) long.
  **NOTE:** It is recommended that carbon fibre styli are used whenever possible.
- **Long life**
  Use of strain gauge measurement sensors and micro technology results in a 10 times improvement in probe life and re-seat reliability.
- **Designed for a tough environment**
  Specifically designed for the machine tool environment, offering high resistance to shock and vibration.
- **High speed operation**
  Specifically designed for the machine tool environment, offering high resistance to shock and vibration.

### Calibration sphere

Used when datuming the MP700 probe.

**Data sheet**
MP700 probe with 360° optical transmission system

## System operation

**CAUTION:** Prior to probe operation, it is imperative to ensure that the program selected to 'drive' the probe has been verified. Incorrect programming could result in damage to the machine, workpiece or probe system.

The battery powered MP700 has two modes of operation.

1. **Stand-by mode**
   To conserve battery life the probe is held in the stand-by mode, until the CNC control sends a start signal, via the OMM or O-M-I, to the OMP diodes (Rx), which receive through 360° around the probe.
   A start signal switches the probe to the operating mode.

2. **Operating mode**
   During the operating mode, probe signals are transmitted through 360° from the OMP LEDs (Tx), to the OMM or O-M-I for onward transmission to the CNC control.

### Probe switch-on

The probe is switched-on by one of the following methods.

**NOTE:** The probe must remain stationary for a minimum of one second after switch-on.

1. **Manual start** (System with OMM + MI 12 only)
   Initiated by pressing the MI 12 manual start button.

2. **Machine start** (System with OMM + MI 12 or system with O-M-I)
   Initiated by an M code generated by the program.

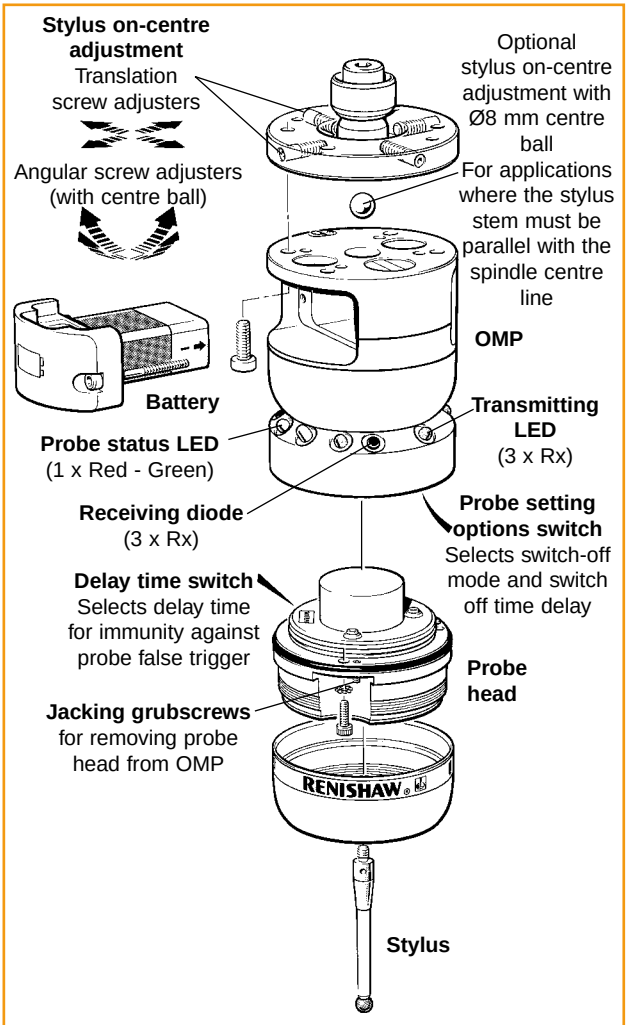
### Probe switch-off

The probe is switched off by one of the following methods.

1. **Optical-on – Optical-off** (Factory set to this option)
   A second start signal generated by a software M code, switches the probe to stand-by after 4.2 or 8.6 seconds.

2. **Optical-on – Timer-out**
   A timer automatically returns the probe to stand-by if the probe has not been used for 33 seconds or 134 seconds.

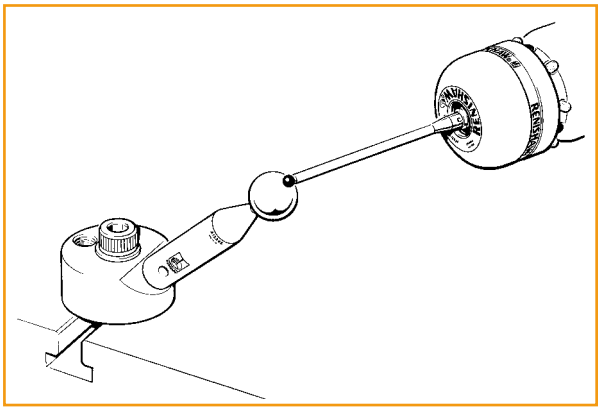
## Probe features




## Calibration sphere

The calibration sphere provides a means of datuming the MP700 probe, when used in conjunction with Renishaw software.

The calibration sphere is particularly effective when used on multi-axis machines, where the measurement of shape and form is a requirement.



## Performance envelope

The MP700 has transmission envelope over the ranges shown below.

The probe system should be positioned such that the optimum range can be achieved over the full travel of the machine axis.

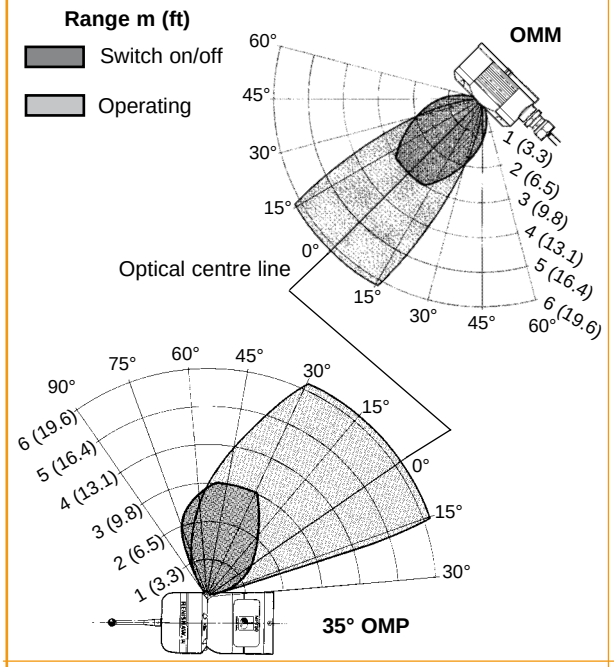
The OMP and OMM/O-M-I may deviate from the optical centre line, provided opposing light cones always overlap with transmitters and receivers mutually in each others field of view (eye to eye).

Natural reflective surfaces within the machine may increase the signal transmission range.

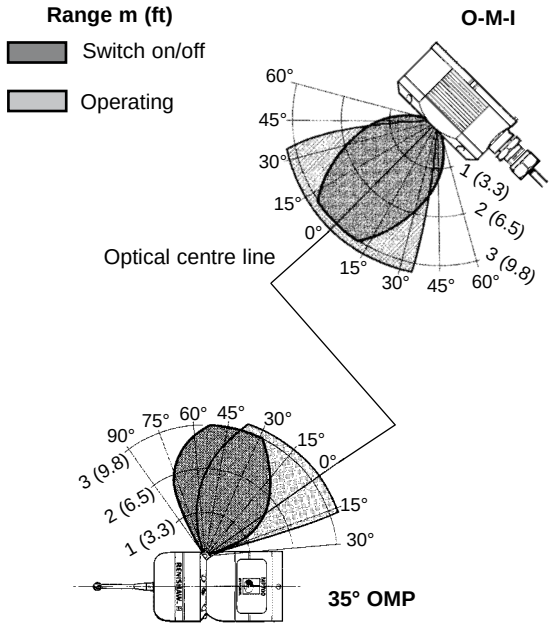
Coolant residue accumulating on the OMP LEDs and OMM/ O-M-I window, will have a detrimental effect on transmission performance.

Wipe clean as often as is necessary to maintain unrestricted transmission.

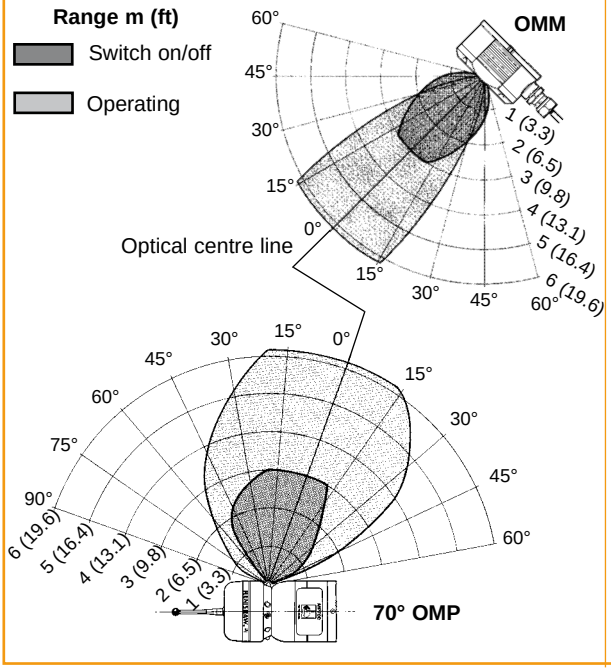
**MP700** 35° output probe with **OMM**



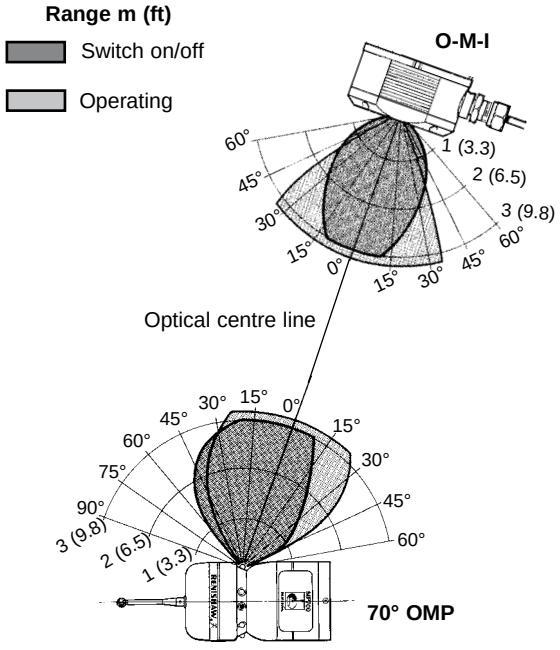

**MP700** 35° output probe with **O-M-I**




**MP700** 70° output probe with **OMM**

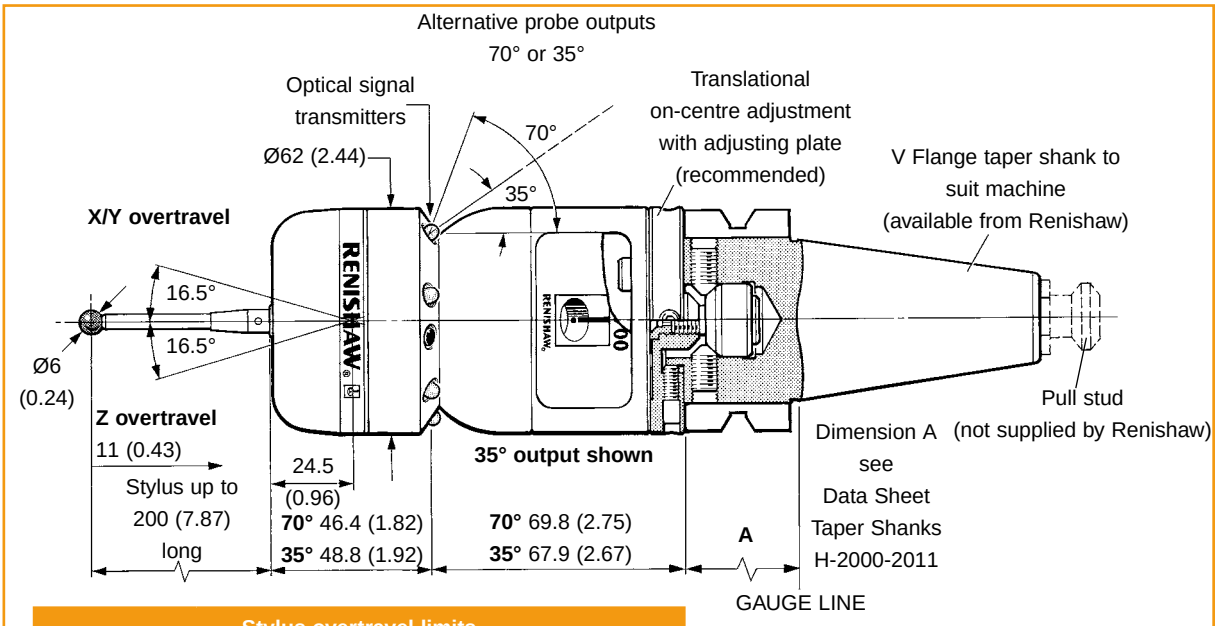



**MP700** 70° output probe with **O-M-I**



**Data sheet**
MP700 probe with 360° optical transmission system

## Dimensions




| Stylus overtravel limits | | | |
|---|---|---|---|
| **Stylus length** | **X** | **Y** | **Z** |
| 50 (1.97) | 21.5 (0.84) | 21.5 (0.84) | 11 (0.43) |
| 100 (3.94) | 36.0 (1.42) | 36.0 (1.42) | 11 (0.43) |

**dimensions mm (in)**

## Specification

| | |
|---|---|
| **Primary application** | Inspection probe for machining centres |
| **Operating range** | Up to 6 m (19.6 ft) |
| **Weight** | 730 g (26.0 oz) |
| **Sense directions** | 5-way |
| **Repeatability, maximum** | 0.25 µm (10 µin) - 50 mm stylus length* |
| **2σ value in any direction** | 0.35 µm (14 µin) - 100 mm stylus length* |
| **X/Y 2D pre-travel variation** | 0.25 µm (10 µin) - 50 mm stylus length* |
| | 0.25 µm (10 µin) - 100 mm stylus length* |
| **X/Y/Z 3D measuring performance** | 1.00 µm (40 µin) - 50 mm stylus length* |
| **(Variation from a true sphere)** | 1.75 µm (70 µin) - 100 mm stylus length* |
| **Trigger speed range** | 30 mm/min (1.18 in/min) to 500 mm/min (19.68 in/min) |
| **Stylus trigger force** | |
| XY plane | 0.19 N, 19 gf, (0.68 ozf) typical § |
| +Z direction | 3.25 N, 325 gf, (11.69 ozf) typical § |
| **Stylus overtravel force** | |
| XY plane | 1.8 N, 180 gf, (6.47 ozf) typical maximum† |
| +Z direction | 14 N, 1400 gf, (50.36 ozf) typical maximum† |
| **Stylus overtravel** | |
| XY plane | 16.5° |
| +Z direction | 11 mm (0.43 in) |
| **Sealing** | IP68 (BS 5490, IEC 529) 1 atmosphere |
| **Maximum recommended stylus length** | 200 mm (7.87 in) |
| **Maximum number of triggers per second** | 3 |

* The specification applies to a test rig gauging speed of 240 mm/min (9.45 in/min) with zero time delay.

§ Performance specification is for a test velocity of 30 mm/min (1.18 in/min) with a 50 mm stylus and with the trigger filter delay set to 8 ms.

† Performance specification is with a 50 mm stylus.

## Battery life

| | Stand-by life | | 5% usage = 72 minutes (days-typical) | | | | Continuous use (hours-typical) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Optical on Optical off | | Optical on Timer off | | Optical on Optical off | | Optical on Timer off | |
| **Battery type** | Minimum | Typical | Minimum | Typical | Minimum | Typical | Minimum | Typical | Minimum | Typical |
| **Alkaline** Duracell MN 1604 | 286 days | 381 days | 25 | 36 | 23 | 34 | 30 | 43 | 28 | 41 |

## Probe status LEDs

The probe status LED gives a visual indication of the probe state (triggered or seated). It also indicates when battery has become unusable.

| LED colour | Probe status | Graphic hint |
|---|---|---|
| Flashing green | Probe seated in operating mode |  |
| Flashing red | Probe triggered in operating mode |  |
| Constant red | Battery dead (at this stage, probe status is forced open and the probe cycle will stop.) |  |

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# Parts list

**Please quote the part number when ordering equipment**

| Type | Part number | Description |
|---|---|---|
| MP700 kit | A-2107-1035 | MP700 35° probe with battery, stylus, OMM, MI 12 interface unit and tool kit. |
| MP700 kit | A-2107-1070 | MP700 70° probe with battery, stylus, OMM, MI 12 interface unit and tool kit. |
| MP700 kit | A-2107-0013 | MP700 35° probe with battery, stylus, O-M-I and tool kit. |
| MP700 kit | A-2107-0017 | MP700 70° probe with battery, stylus, O-M-I and tool kit. |
| MP700 | A-2107-0035 | MP700 35° probe with battery. |
| MP700 | A-2107-0070 | MP700 70° probe with battery. |
| Battery | P-BT03-0001 | PP3 9V alkaline battery. |
| Stylus | A-5003-1358 | Carbon fibre stylus 100 mm long with Ø6 mm ball – this stylus is included in kits listed above. |
| Tool kit | A-2107-0040 | Tool kit |
| **Publications. These can be downloaded from our web site at www.renishaw.com** | | |
| Styli | H-1000-3200 | Technical specification: styli and accessories. |
| Taper shanks | H-2000-2011 | Data sheet: Taper shanks for machine tool probes. |
| OMM | H-2000-2275 | Data sheet: OMM Optical module machine |
| MI 12 | H-2000-2195 | Data sheet: MI 12 interface unit |
| OMI | H-2000-2285 | Data sheet: Optical machine interface |
| PSU3 | H-2000-2200 | Data sheet: PSU3 power supply unit (optional) |
| Calibration sphere | H-2000-2013 | Data sheet: Renishaw calibration sphere |
| Software | H-2000-2289 | Data sheet: Probe software for machine tools |

**For worldwide contact details, please visit our main web site at www.renishaw.com/contact**

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