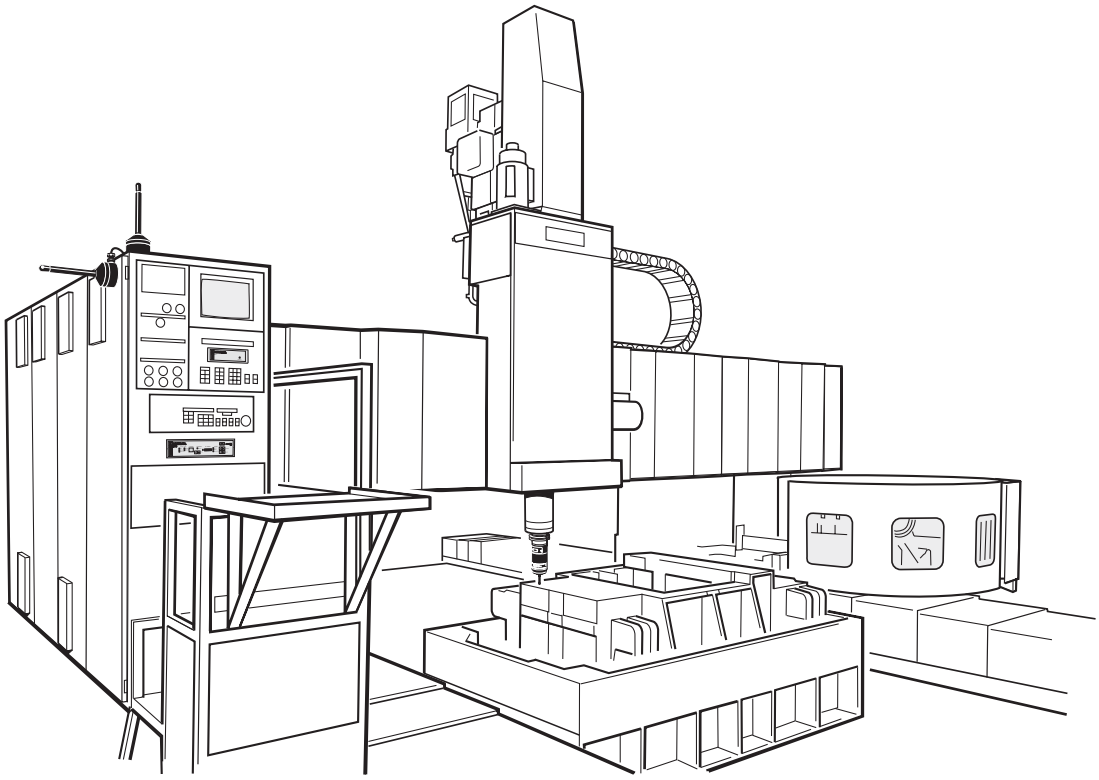
**Data sheet**
H-2000-2034-04-B

RENISHAW
apply innovation™

# MP18 compact probe system



## MP18 compact probe system with selectable channel radio transmission

**The MP18 probe uses radio signals to communicate with the CNC machine tool controller and has selectable channel frequency settings.**

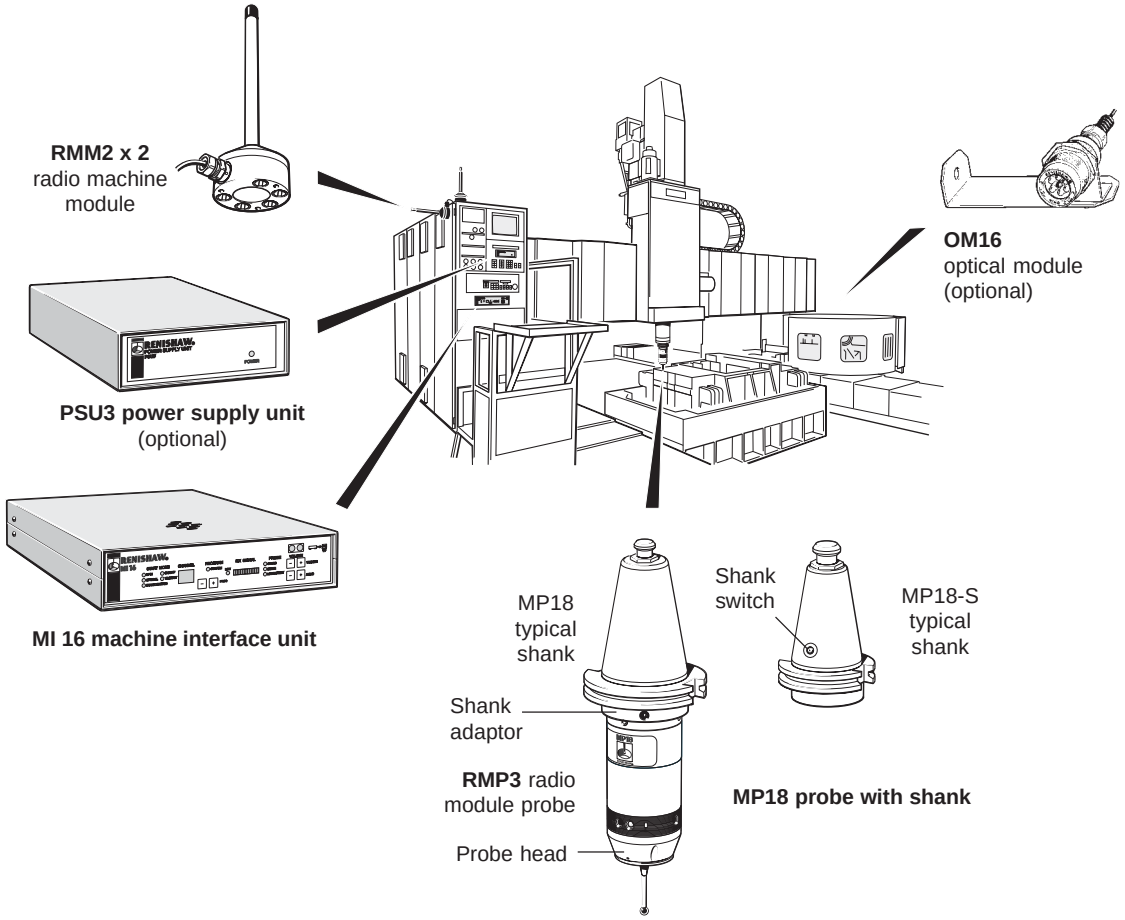
**Probe signals can be transmitted over distances of up to 15 metres (49.2 feet), without the need for line-of-sight operation.**

## The MP18 probe system

- **Uses FM transmission/reception of probe signals.**
- **Provides up to 69 independent channels.**
- **Allows the user to select the frequency channel and 'turn on mode' using the MI 16 interface.**
- **Incorporates an optional OM16 optical module that allows the probe to be switched on and off using a machine M code.**

**Data sheet**
MP18 compact probe system

## System overview




## System components

- **Shank** – available from Renishaw
- **Shank adaptor**
- **MP18** radio transmission probe, or **MP18-S** radio transmission probe with shank switch for probe switch on/off
- **MI 16 interface unit** (cable link to CNC controller)
- **RMM2** antenna (two supplied)
- **OM16 optical module** – probe switch on/off (optional)
- **PSU3 power supply unit** – power for MI 16 (optional)

### System operation

The probe assembly is stored in the machine tool changer as any other tool, and is transferred to the machine spindle for probing routines. The probe head acts as an omnidirectional switch and is effective in the ±X, ±Y and +Z directions.

During operation, the probe stylus is driven against a workpiece feature. On contact, the radio module probe (RMP3) transmits a signal to both antennae (RMM2) using frequency modulated (FM) radio waves, thereby recording the contact position.

### Radio transmission frequency

The frequency range is divided into separate channels, each channel having a typical bandwidth of 25 kHz, to permit many systems to operate in close proximity without the danger of interference. The operating channel is programmed by push buttons on the MI 16.

The signals received by each RMM2 pass via coaxial cable to the MI 16 machine interface, which decodes and converts them into solid state relay (SSR) outputs for use by the machine tool's CNC controller.

The time delay between the probe's stylus contacting the workpiece and the MI 16 machine interface providing an output signal to the CNC controller is 12 ms ±10 µs.

**MI 16**

The MI 16 machine interface draws 24 V d.c. power from the CNC machine and presents a load of up to 500 mA. Alternatively, power can be supplied from a Renishaw PSU3 power supply unit, which is mains-powered and suitable for use worldwide.

**OM16 (optional)**

An M code causes the OM16 optical transmission module to send probe switch on/off signals to the RMP3.

RENISHAW
apply innovation™

## MP18 probe switch on/switch off options

The MP18 offers the 'switch-on'/'switch-off' modes shown on the right; the mode is selected using the MI 16 machine interface.

The 'turn off timeout' can be set to 30 s (±1 s) or 180 s (±1 s).

The MP18-S, which is supplied with a dedicated shank incorporating a shank switch, is designed to switch on when the shank is inserted into the machine spindle and switch off when the shank is removed from the machine spindle. Again, this option is selectable via the MI 16 machine interface.

**Important**

Ensure that the shank switch is not depressed when the probe is stored in the machine tool carousel.

| Mode | Switch on method | Switch off method |
|---|---|---|
| **M code (optical) on-off** | An optical signal, generated by the OM16 in response to a machine M code, switches the RMP3 on. | An optical signal, generated by the OM16 in response to a machine M code, switches the RMP3 off. |
| **M code on (optical) timeout off** | An optical signal, generated by the OM16 in response to a machine M code, switches the RMP3 on. | The RMP3 will switch off once the timeout period elapses since the last probe trigger, or since the RMP3 was last switched on (whichever was later). |
| **Spin on-off** | The RMP3 is switched on by rotating it in the machine's spindle at 500 rpm (±50 rpm). A minimum spin of 1 second is recommended to ensure reliable switch on. | The RMP3 is switched off by rotating it in the machine's spindle at 500 rpm (±50 rpm). A minimum spin of 1 second is recommended to ensure reliable switch off. |
| **Spin on timeout off** | The RMP3 is switched on by rotating it in the machine's spindle at 500 rpm (±50 rpm). A minimum spin of 1 second is recommended to ensure reliable switch on. | The RMP3 will switch off once the timeout period elapses since the last probe trigger, or since the RMP3 was last switched on (whichever was later). |
| **MP18-S shank switch** | The RMP3 is switched on when the probe is mounted in the machine's spindle. | The RMP3 is switched off when the probe is removed from the machine's spindle. |

## Typical battery life

| **Battery type** | **Standby** | **5% usage** (72 min/day) | **Continuous** |
|---|---|---|---|
| **Alkaline PP3** MN1604 (Duracell) | 365 days | 31 days | 38 hours |
| **Lithium PP3** U9VL-FP | 730 days | 64 days | 80 hours |

**Low battery warning**

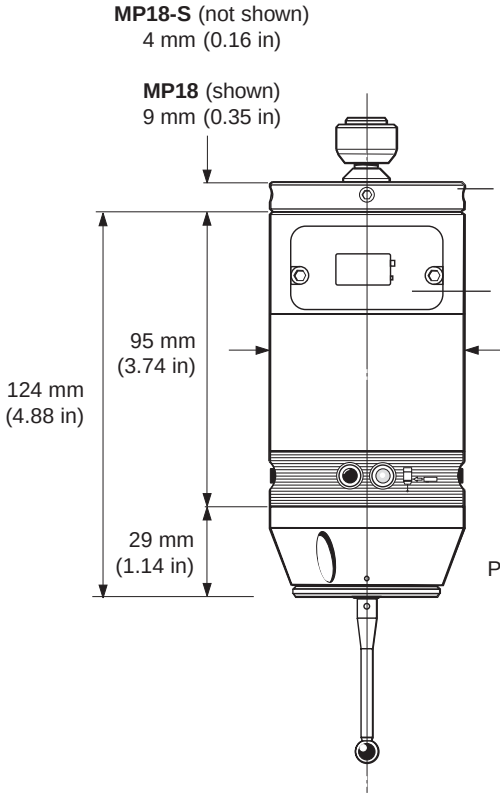
The MP18/MP18-S with an alkaline battery will typically continue to operate for 6 hours continuously or 5 days at 5% usage (72 minutes/day) after the MI 16 'LOW BATTERY' LED illuminates.

## Radio frequencies and transmission range

| **Country or region** | **Nominal transmission frequency** Mhz | **Number of transmission channels** | **Channel separation** kHz | **Operating range** metres (feet) |
|---|---|---|---|---|
| EU | 433 | 69 | 25 | 15 (49.2) |

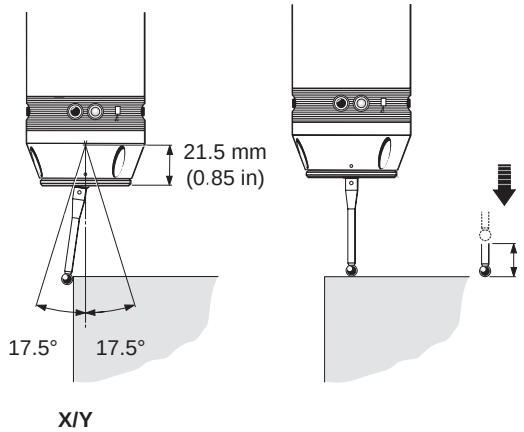
**Data sheet**
MP18 compact probe system

## MP18 radio transmission probe




**Weight of MP18 probe**
including shank adaptor
900 g (31.7 oz)

## Specification




**X/Y**

**Stylus overtravel limits**

| Stylus length | X/Y | Z |
|---|---|---|
| 50 mm (1.96 in) | 21.5 mm (0.84 in) | 8 mm (0.31 in) |
| 100 mm (3.93 in) | 36.5 mm (1.44 in) | 8 mm (0.31 in) |

| | | |
|---|---|---|
| **Primary application** | Inspection probe for machining centres | |
| **Sense directions** | 5-way X±, Y±, Z+ | |
| **Trigger force** using 50 mm (1.97 in) long stylus * | X/Y lowest | 0.75 N / 75 gf (2.64 ozf) |
| | X/Y highest | 1.4 N / 140 gf (4.92 ozf) |
| | Z | 4.20 N / 420 gf (14.83 ozf) |
| **Overtravel** | X Y | 17.5° |
| | Z | 8 mm (0.31 in) |
| **Sealing** | IPX8 (BS 5490, IEC 529) 100 kPa (1 atmosphere) | |
| **Repeatability** (maximum 2σ value in any direction) ** | 1.0 µm (0.00004 in) | |

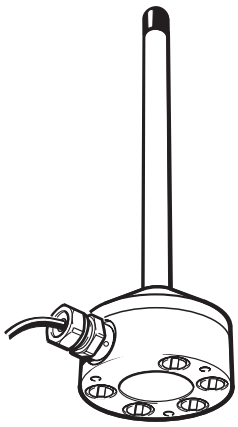
* Trigger forces vary around the stylus seating

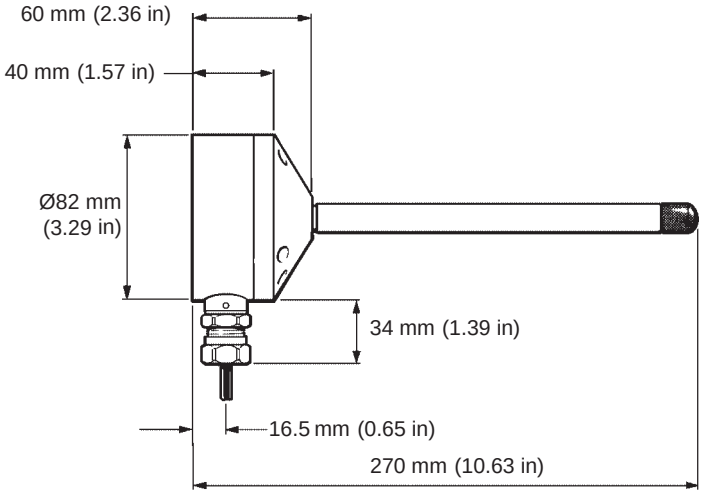
** at test velocity of 480 mm/min (1.57 ft/min)

RENISHAW
apply innovation™

## RMM2 radio machine module

The RMM2 is available with either a side exit cable arrangement (as shown), or a rear exit cable arrangement.






The RMM2 is an antenna which receives radio signals from the probe (RMP3) and passes the signals, via a cable, to the MI 16 interface.

Two RMM2 units are supplied with each probe system. The system can operate with a single RMM, but it may then be vulnerable to “dead spots” where reflections mask some or all of the radio signals.

Each RMM2 is supplied with 10 metres of coaxial cable to allow connection of the unit to the MI 16 machine interface. Additional antenna extension cables are available in 10 metre lengths.

The base of each RMM2 incorporates five permanent magnets to allow temporary attachment to a suitable metal surface. Alternatively, three M4 clearance holes are provided within the base to allow permanent fixing if required.

## Shank and shank adaptor for MP18

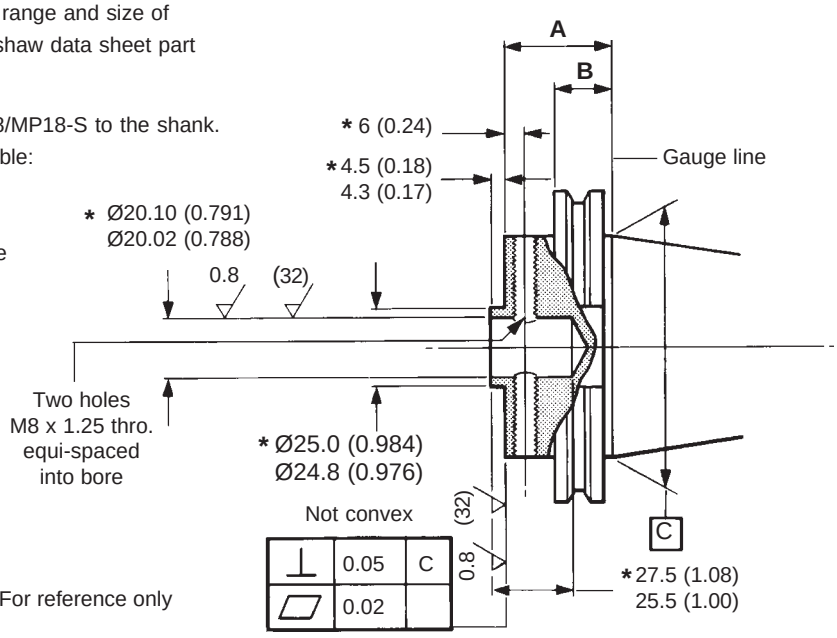
The MP18-S shank with shank switch is supplied by Renishaw’s Styli and Custom Products division.

Renishaw supplies a variety of probe-ready shanks conforming to DIN 2080, DIN 69871, ANSI B5.50-1985 (CAT) and BT. For further information on the range and size of shanks available, please refer to Renishaw data sheet part number H-2000-2011.

The shank adaptor connects the MP18/MP18-S to the shank. Two types of shank adaptor are available:

- A-2107-0031for the MP18 probe
- A-2249-0134 for the MP18-S probe

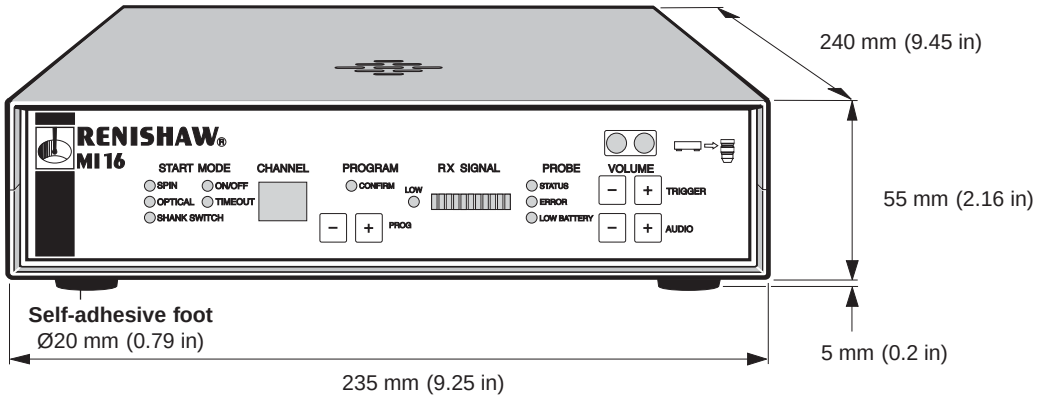
Dimensions **A** and **B** are shown on data sheet H-2000-2011




* For reference only

**Data sheet**
MP18 compact probe system

## MI 16 machine interface




The MI 16 machine interface is a radio receiver which converts probe signals into an acceptable form for the CNC machine controller.

**Front panel features**

The front panel displays system status information. Push buttons are used to select the RMP3 radio channel frequency, and the start mode, when the OM16 short range optical link is fitted.

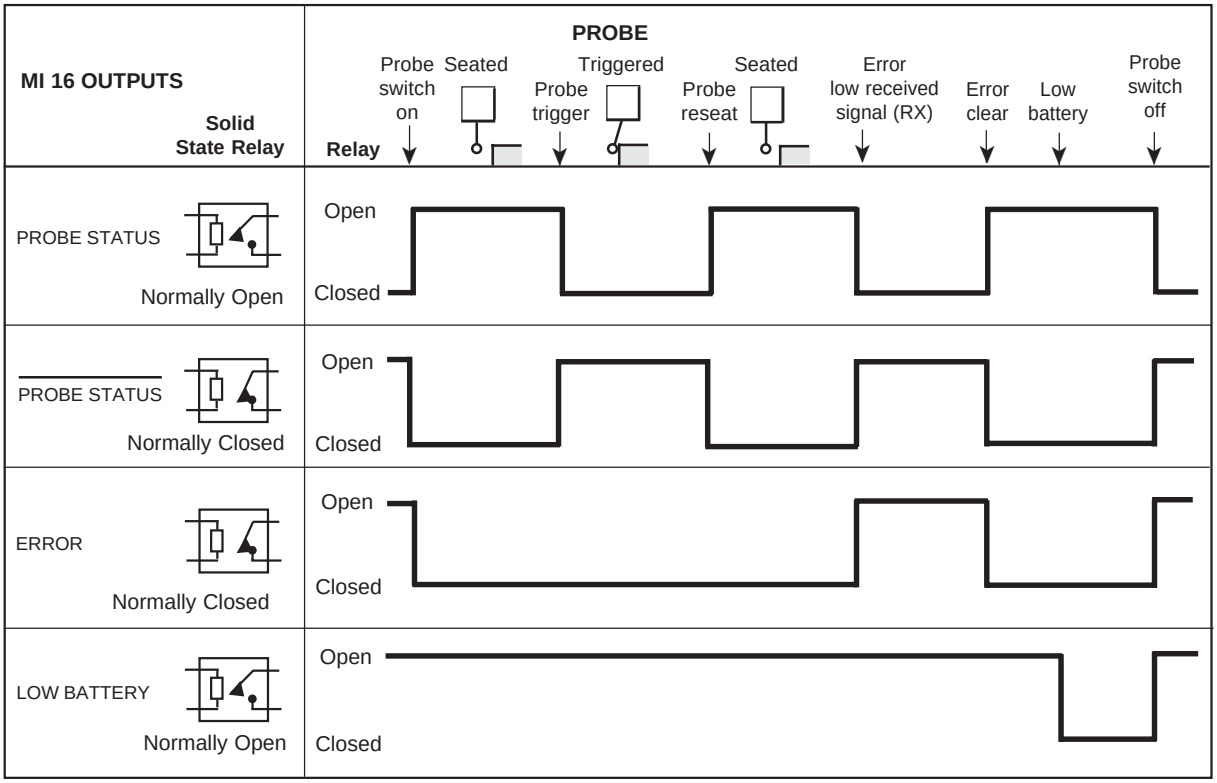
All connections to the machine controller, the power supply input, the RMM2s and the optional OM16 are located on the rear panel of the MI 16 interface.

**MI 16 output signals**

There are four solid state relay (SSR) outputs, comprising two probe complimentary outputs, an error output and a low battery output.

Each output has a maximum current of ±40 mA and a maximum voltage of ±50 V peak. The output waveforms are as shown below.

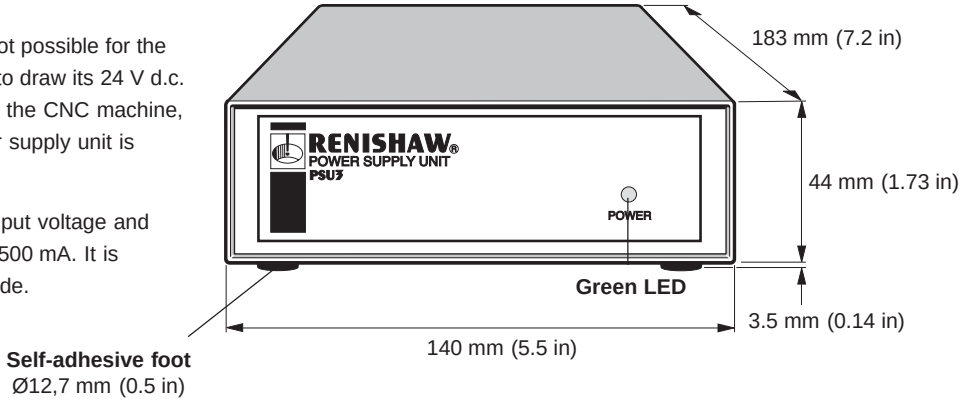
## MI 16 output waveforms



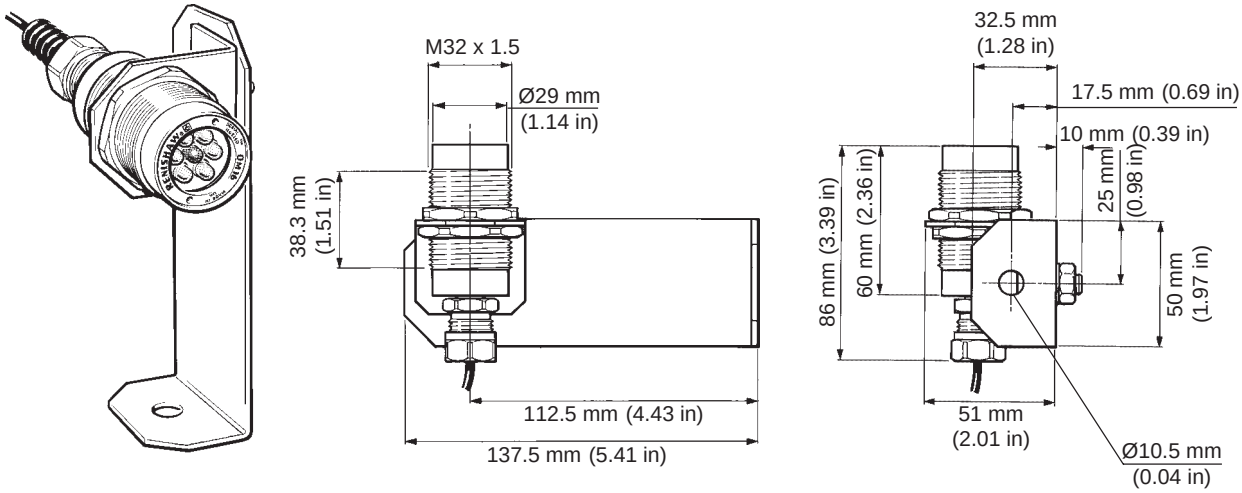
## PSU3 power supply unit (optional)

In instances where it is not possible for the MI 16 machine interface to draw its 24 V d.c. ±10% power supply from the CNC machine, a Renishaw PSU3 power supply unit is available.

The PSU3 uses mains input voltage and presents a load of up to 500 mA. It is designed for use worldwide.




## OM16 optical module (optional)




The OM16 is an optional, optical transmission module, which provides the additional facility of M code activation and deactivation of the RMP3.

It is designed to be mounted on the machine tool via the mounting bracket supplied, or alternatively it can be mounted directly on the machine guarding using the two M32 x 1.5 locknuts provided. Each OM16 is supplied with 25 metres of cable as standard.

**Renishaw plc**
New Mills, Wotton-under-Edge,
Gloucestershire GL12 8JR
United Kingdom

T +44 (0)1453 524524
F +44 (0)1453 524901
E uk@renishaw.com
www.renishaw.com

RENISHAW
apply innovation™

# Parts list - please quote the part number when ordering equipment

**Note:** These part numbers apply to the EU (including UK) user region

| Component | Part number | Description |
|---|---|---|
| MP18 system kit | A-2249-0200 | MP18 probe + battery, stylus ∅6 ball x 50 mm long, adaptor plate, RMM2 x 2, MI 16 and tool kit. |
| MP18 probe assembly | A-2249-0220 | MP18 probe + battery, adaptor plate and tool kit. |
| Adaptor plate | A-2107-0031 | Adaptor plate for MP18. |
| MP18-S system kit * | — | MP18-S probe + battery, stylus ∅6 ball x 50 mm long, adaptor plate, shank, RMM2 x 2, MI 16 and tool kit. |
| MP18-S probe assembly * | A-2249-0221 | MP18-S probe + battery and tool kit. |
| Adaptor plate | A-2249-0134 | Adaptor plate for MP18-S. |
| MI 16 | A-2137-0160 | MI 16 interface unit. |
| RMM2 side exit | A-2137-0170 | Radio machine module (side exit). |
| RMM2 rear exit | A-2137-0470 | Radio machine module (rear exit). |
| RMM2 extension cable | A-2056-0322 | Extension cable for RMM2, 10 m long. |
| OM16 kit | A-2137-0401 | Optical module kit (OM16). |
| User's guide | H-2000-5154 | User's guide for MP18 radio probe system (English language). |
| Stylus | A-5000-3709 | PS3-1C stylus, ∅6 ball x 50 mm long with ceramic stem. |
| Weak link kit | A-2085-0068 | Kit comprising: stylus weak link stem x 2, spanner and instruction sheet. |
| Weak link stem | M-2085-0069 | Stylus weak link stem for use with steel shaft styli. |
| Spanner | P-TL09-0003 | Spanner for weak link stem. |
| Battery | P-BT03-0001 | PP3 9 V battery. |
| Styli | — | See brochure H-1000-3200 – Styli and accessories |
| Shank | — | See data sheet H-2000-2011 – Taper shanks |
| PSU3 | — | See data sheet H-2000-2200 – PSU3 power supply unit. |
| Software | — | See data sheet H-2000-2289 – Probe software for machine tools. |

* Please contact Renishaw. All MP18-S versions are custom products, requiring a separate quotation and price.

**For worldwide contact details, please visit our main website at www.renishaw.com**


Issued 04/04 Part no. H-2000-2034-04-B