

# OTS optical tool setter

[www.renishaw.com/ots](http://www.renishaw.com/ots)

The cableless OTS with optical signal transmission allows unrestricted machine motion and ease of installation on CNC machining centres.

## Functions

- Setting tool lengths in Z.
- Setting rotating tools in X and Y for radius offsets.
- Tool breakage detection.

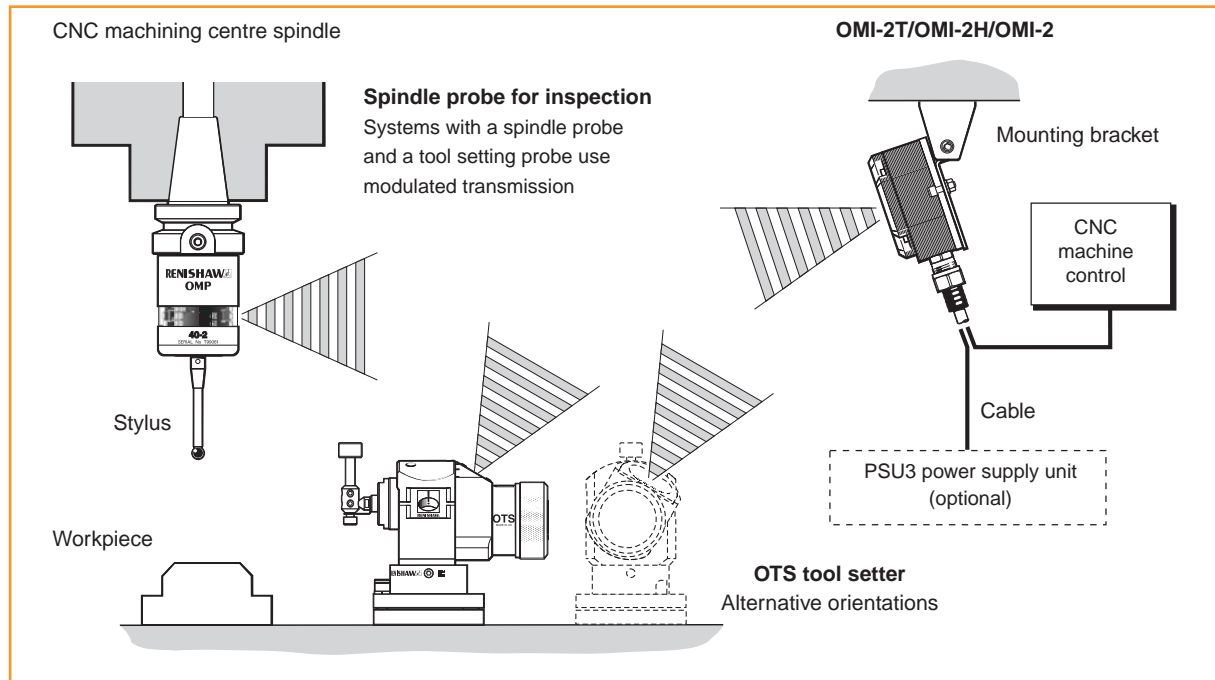
## Features

- **Measures wide range of tools**  
The OTS can measure milling cutters, twist drills and end mills for length and diameter.
- **Adjustable optical module**  
The OTS optical module is adjustable for direction, with a range of up to 5 m (16.4 ft).
- **Modulated transmission**  
The effects of light interference are minimised, which reduces the occurrence of false trigger signals.
- **Probe repeatability**  
Repeatability,  $1.0 \mu\text{m } 2\sigma$  (0.00004 in  $2\sigma$ ) is certified at 480 mm/min with a 35 mm stylus.
- **Probe switch-on/switch-off**  
Probe switch-on/switch-off is by machine input.
- **The OTS is available in two versions allowing a common battery type for tool setter and spindle probes**  
The user can match the batteries in the OTS to the spindle probe  
e.g. OTS with  $\frac{1}{2}$  AA batteries with OMP40/OMP400  
OTS with AA batteries with OMP60.  
Both versions work in conjunction with any modulated spindle probe.
- **Battery life**  
 $\frac{1}{2}$  AA LTC batteries (standard): life of 300 hours with continuous use, or 140 days at 5% usage  
AA Alkaline batteries (standard): life of 400 hours with continuous use, or 210 days at 5% usage.  
AA LTC batteries (optional): life of 600 hours with continuous use, or 300 days at 5% usage.  
Battery life is increased when low power mode is selected.



- **Probe sealing**  
The probe is sealed to IPX8 for the machine tool environment. The mechanism being protected from hot chips and coolant by an outer metal eyelid and inner flexible seal.
- **Visible probe diagnostic LED**  
Provides on/off, seated/triggered and low battery status information.
- **Optical receivers**  
Compatible with OMI-2T/OMI-2H/OMI-2 (modulated transmission).
- **Styli**  
Disc stylus  $\varnothing 12.7 \text{ mm}$  ( $\varnothing 0.5 \text{ in}$ ), and square stylus  $19.05 \text{ mm} \times 19.05 \text{ mm}$  ( $0.75 \text{ in} \times 0.75 \text{ in}$ ) are available.
- **Stylus weak link**  
A weak link break stem protection device is incorporated in the stylus mounting, to protect the probe mechanism from damage in the event of excessive stylus overtravel or a collision.  
A captive link secures the stylus to the probe if the break stem is broken.
- **Machine mounting**  
The probe is mounted on the machine table using a cap head bolt and T nut (not supplied by Renishaw).
- **Software for probe routines**  
The OTS is suitable for use with Renishaw tool setting cycles.

## Typical probe system



## Probe modes

The OTS probe can be in one of three modes:

1. **Standby mode** - The OTS is waiting for a switch-on signal to be received.
2. **Operating mode** - The OTS is ready for use in this mode, when activated by M code.
3. **Configuration mode** - The Trigger Logic™ configuration method allows the following settings to be configured.

## Probe settings

### Enhanced trigger filter

Probes subjected to high levels of vibration or shock loads may output signals without the stylus having been contacted. The enhanced trigger filter improves the probe's resistance to these effects.

### Low optical power

Where the separation between the OTS and the OMI-2T/OMI-2H/OMI-2 is small, the low optical power setting may be used.

In this setting, battery life will be extended and the optical transmission range will be reduced as shown by white dotted lines on the performance envelopes.

### Optical transmission start mode

With modulated mode, the OTS is compatible for use with the OMI-2T/OMI-2H/OMI-2, for high resistance to light interference.

The OTS operates using optical on/optical off mode, although a timer automatically switches the probe off after 90 minutes from the last trigger if not turned off optically, to preserve battery life.

### OTS start function

Machine tools often require two probes to function on the same machine, such as an optical spindle probe and OTS tool setter. To facilitate this, certain Renishaw optical products (probes and interfaces) allow the user to select which probe to turn on.

The OTS can be user configured to use one of three coded start commands, named Probe 1, Probe 2 and Probe 3.

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**NOTE:** Currently no interface is compatible with Probe 3.

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### OTS start setting

The OTS is factory set to Probe 2 (spindle probes are factory set to Probe 1).

### Interface compatibility

OMI-2T/OMI-H	Probe 1 and Probe 2 start. Allows two probes on a machine tool.
OMI-2	Probe 1 start. Allows one probe on a machine tool. Configure the OTS to Probe 1 start when using an OMI-2.

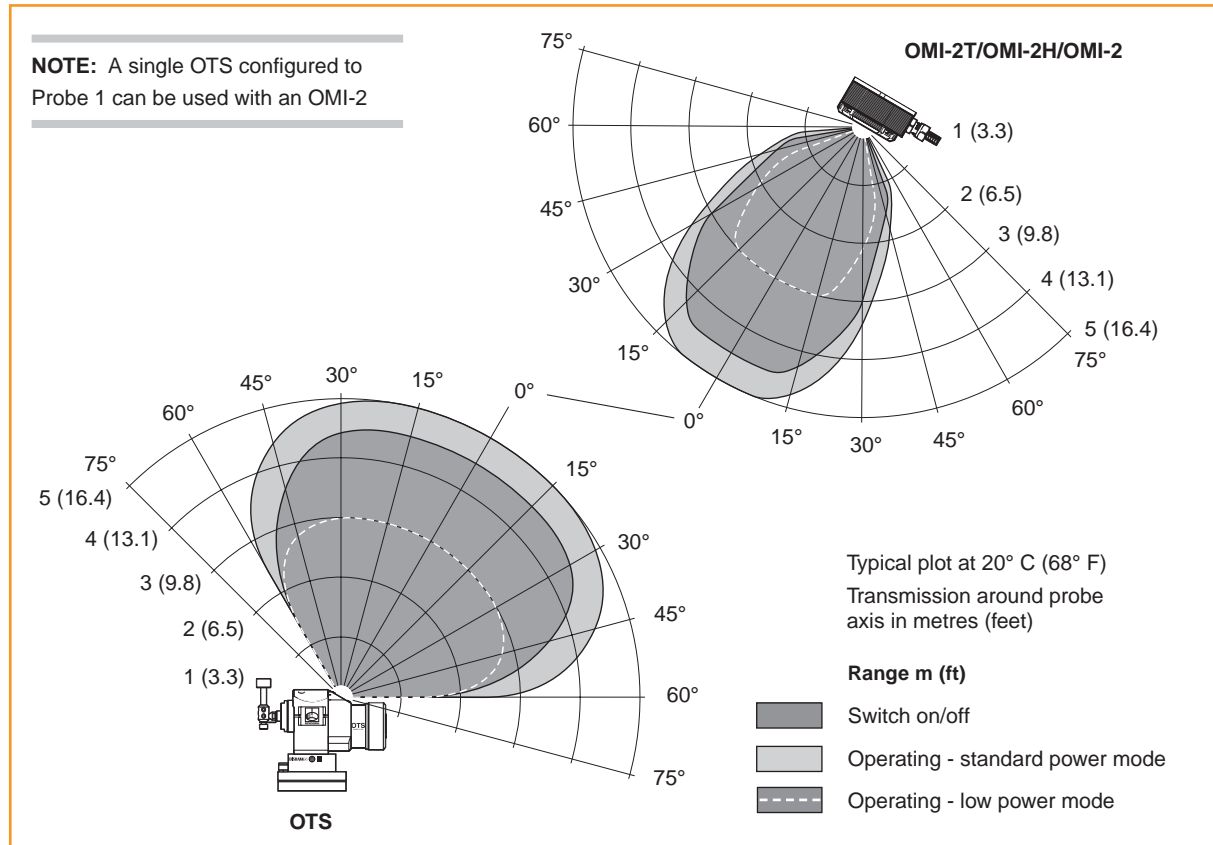
## Performance envelope

The probe system should be positioned so that the signal transmission is maintained when the OTS is positioned below the machine spindle.

The OTS and OMI-2T/OMI-2H/OMI-2 may deviate from the optical centre line, provided opposing light cones always overlap, with transmitters and receivers in the other's field of view (line of sight).

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

Coolant residue accumulating on the OTS or OMI-2T/OMI-2H/OMI-2 windows may reduce the signal transmission range. Wipe clean as often as is necessary to maintain unrestricted transmission.

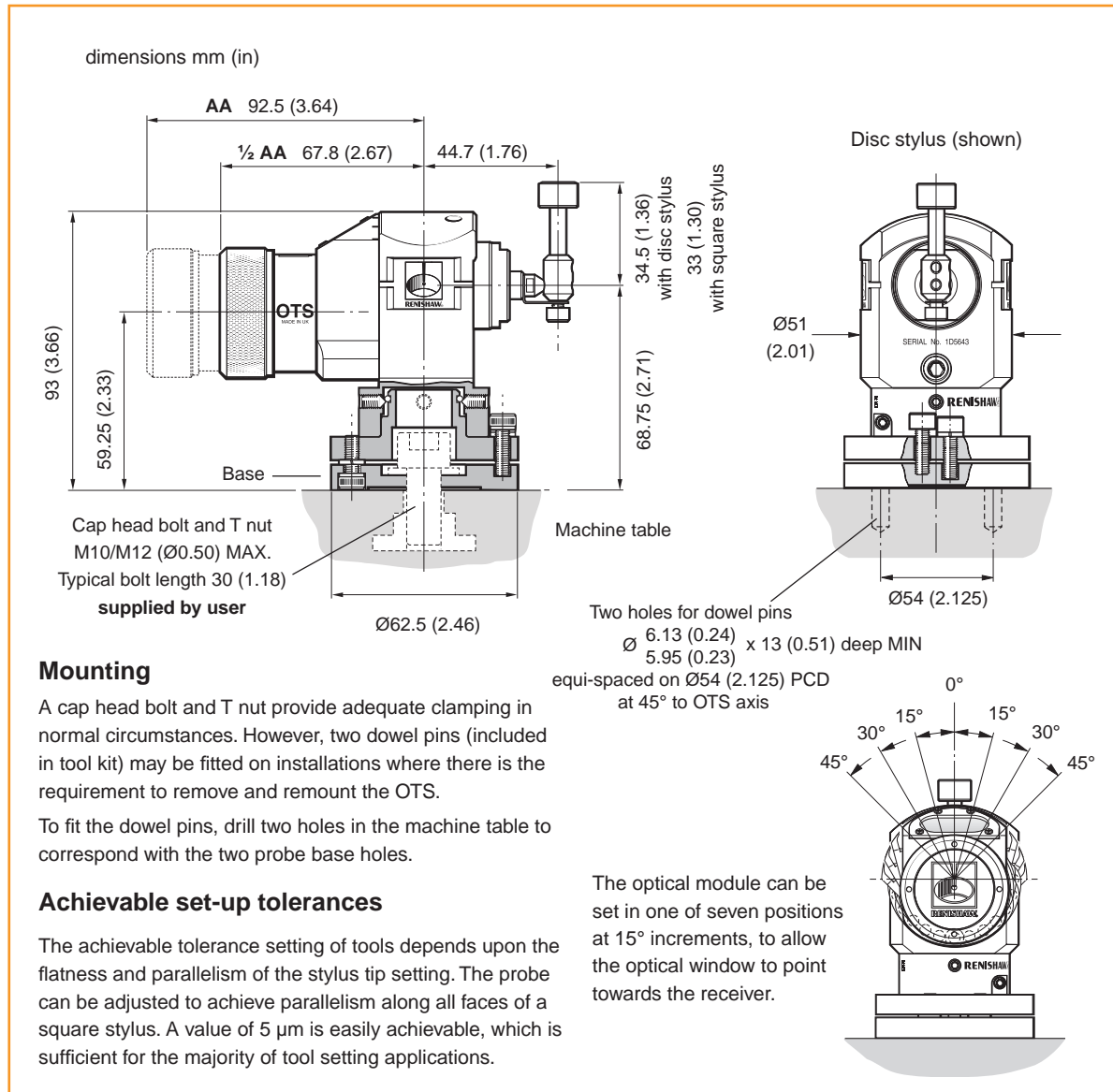


## Specification

\* Probe module results valid as tested with a 35 mm straight stylus and a velocity of 480 mm/min

<b>Primary application</b>	Tool setter for machining centres
<b>Sense directions</b>	5 way $\pm X$ $\pm Y$ $+Z$
<b>Overtravel</b>	XY $\pm 3.5$ mm (0.13 in) Z 6 mm (0.24 in)
<b>Stylus trigger force</b>	1.3 N to 2.4 N / 130 gf to 240 gf (4.6 ozf to 8.5 ozf) depending on sense direction
<b>Repeatability</b>	1 $\mu$ m (0.00004 in). Maximum mean 2 sigma ( $2\sigma$ ) value *
<b>Temperature</b>	Operating +5 °C to 50 °C (41 °F to 120 °F) Storage -10 °C to 70 °C (14 °F to 158 °F)
<b>Sealing</b>	IPX8 (BS 5490, IEC 529) 1 atmosphere
<b>Weight</b> (with disc stylus)	½ AA version 870 g (30.69 oz) with batteries AA version 950 g (33.51 oz) with batteries

## Dimensions



### Mounting

A cap head bolt and T nut provide adequate clamping in normal circumstances. However, two dowel pins (included in tool kit) may be fitted on installations where there is the requirement to remove and remount the OTS.

To fit the dowel pins, drill two holes in the machine table to correspond with the two probe base holes.

### Achievable set-up tolerances

The achievable tolerance setting of tools depends upon the flatness and parallelism of the stylus tip setting. The probe can be adjusted to achieve parallelism along all faces of a square stylus. A value of 5 µm is easily achievable, which is sufficient for the majority of tool setting applications.



#### Disc stylus

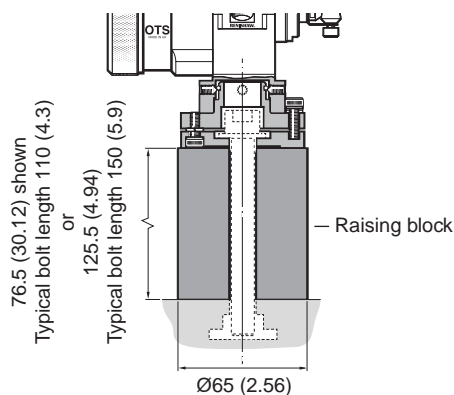
Ø12.7 (Ø0.5)



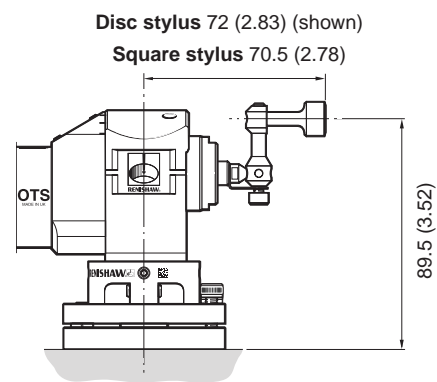
#### Square stylus

19.05 x 19.05 (0.75 x 0.75)

### Raising block



### Cranked horizontal stylus adaptor kit



## Battery life

### Typical battery life

Using the probe at 5% usage, it will continue to operate for approximately one week after a low battery warning is first indicated. Replace the batteries as soon as possible.

After batteries are inserted into the OTS, the flashing LED will indicate the current settings.






Low power mode should be used whenever possible for increased battery life.

Battery type (x 2)	Standby life	5% usage (72 minutes/day)		Continuous use	
		Standard power mode	Low power mode	Standard power mode	Low power mode
½ AA LTC (standard)	320 days	140 days	170 days	300 hours	400 hours
AA Alkaline (standard)	530 days	210 days	250 days	400 hours	550 hours
AA LTC (optional)	730 days	300 days	350 days	600 hours	800 hours

Lithium Thionyl Chloride (LTC).

AA battery types are also designated as LR6 or MN1500.

### Probe status LEDs

LED colour	Probe status	Graphic hint
Flashing green	Probe seated in operating mode	
Flashing red	Probe triggered in operating mode	
Flashing green and blue	Probe seated in operating mode - low battery	
Flashing red and blue	Probe triggered in operating mode - low battery	
Constant red	Battery dead	

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

Type	Part no.	Description
OTS (½ AA)	A-5401-2001	OTS probe with disc stylus, ½ AA LTC batteries, tool kit and Quick-start guide. Set to: optical on/optical off/filter off/Probe 2 start/standard power.
OTS (½ AA)	A-5401-2011	OTS probe with square stylus, ½ AA LTC batteries, tool kit and Quick-start guide. Set to: optical on/optical off/filter off/Probe 2 start/standard power.
OTS (AA)	A-5514-2001	OTS probe with disc stylus, AA alkaline batteries, tool kit and Quick-start guide. Set to: optical on/optical off/filter off/Probe 2 start/standard power.
OTS (AA)	A-5514-2011	OTS probe with square stylus, AA alkaline batteries, tool kit and Quick-start guide. Set to: optical on/optical off/filter off/Probe 2 start/standard power.
Disc stylus	A-2008-0382	Disc stylus (tungsten carbide, 75 Rockwell C) Ø12.7 mm (Ø0.5 in).
Square stylus	A-2008-0384	Square tip stylus (ceramic tip, 75 Rockwell C) 19.05 mm x 19.05 mm (0.75 in x 0.75 in).
Break stem kit	A-5003-5171	Stylus protection kit comprising: break stem (x1), captive link (x1), support bar (x1), M4 screw (x2), M4 grub screw (x3), hexagon keys: 2.0 mm (x 1), 3.0 mm (x1) and spanner 5.0 mm (x1).
Stylus holder kit	A-2008-0389	Stylus holder kit comprising stylus holder and screws.
½ AA batteries	P-BT03-0007	Pack of two ½ AA lithium thionyl chloride (LTC) batteries.
AA battery	P-BT03-0005	One AA alkaline battery (two required).
AA battery	P-BT03-0008	One AA lithium thionyl chloride (LTC) battery (two required).
Battery cap	A-5401-0301	OTS battery cap assembly.
Seal	A-4038-0301	Battery housing seal.
Tool kit	A-5401-0300	Tool kit comprising: break stem (x1), captive link (x2), support bar (x1), M4 screw (x2), M4 grub screw (x3), spirol pin (x2), hexagon keys: 2.0 mm (x1), 2.5 mm (x1), 3.0 mm (x1), 4.0 mm (x1) and spanner 5.0 mm (x1).
OMI-2T	A-5439-0049	OMI-2T complete with cable 8 m (26.25 ft) long.
OMI-2T	A-5439-0050	OMI-2T complete with cable 15 m (49 ft) long.
Mounting bracket	A-2033-0830	OMI-2T/OMI-2/OMI-2H mounting bracket with fixing screws, washers and nuts.
<b>Accessories</b>		
Raising block	M-2033-7347	Raising block Ø65 mm (Ø2.55 in) x 76.5 mm (3.0 in) tall.
Raising block	M-2033-7189	Raising block Ø65 mm (Ø2.55 in) x 125.5 mm (4.94 in) tall.
Stylus adaptor kit	A-2008-0448	Adaptor kit to position stylus in horizontal attitude.
<b>Publications.</b> These can be downloaded from our web site at <a href="http://www.renishaw.com">www.renishaw.com</a>		
OTS	A-5514-8500	Quick-start guide, includes CD with Installation guide.
Styli	H-1000-3200	Catalogue Styli and accessories.
OMI-2T	A-5439-8500	Installation and user's guide OMI-2T.
PSU3	H-2000-5057	Installation and user's guide PSU3 power supply unit.
Software features	H-2000-2289	Data sheet Probe software for machine tools - illustrated features.
Software list	H-2000-2298	Data sheet Probe software for machine tools - list of programs.

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main web site at [www.renishaw.com/contact](http://www.renishaw.com/contact)**

