

OTS optical tool setter

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.

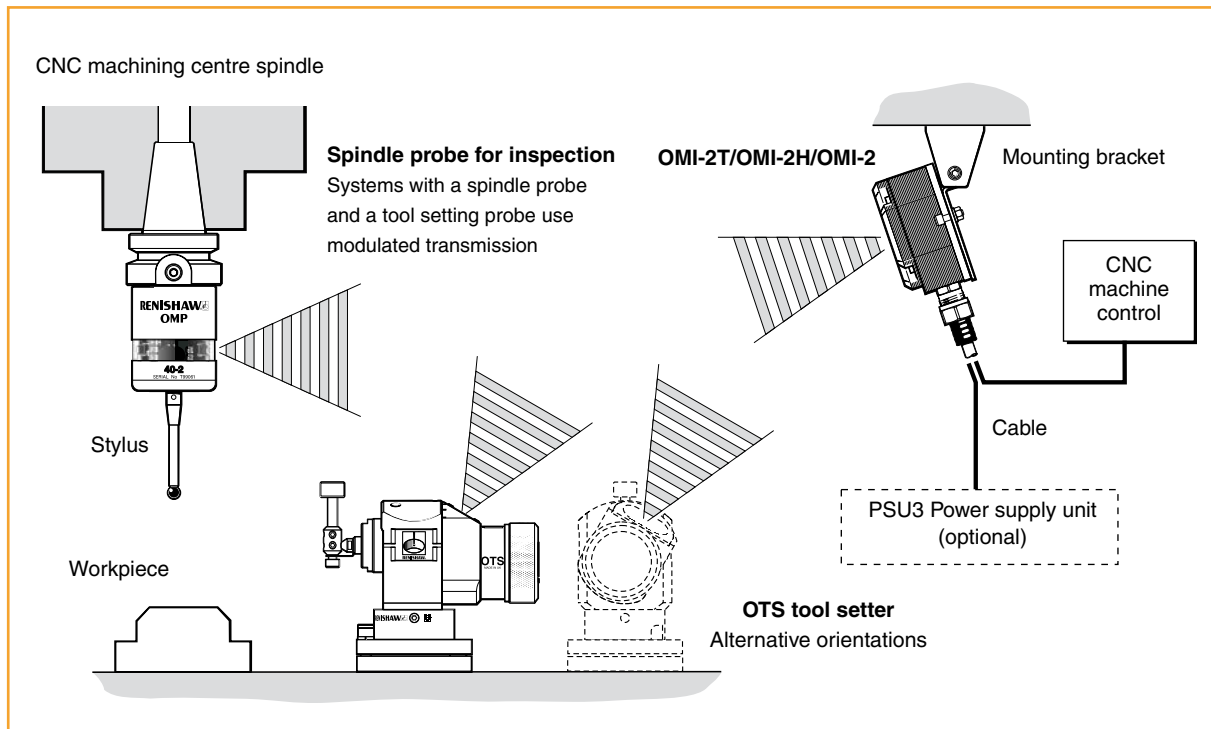
Features

- **Measures wide range of tools**
The OTS can measure large fly cutters, jobber 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**
Effects of light interference are reduced, which in some circumstances could cause false trigger signals.
- **Probe repeatability**
Repeatability, $1.0 \mu\text{m } 2\sigma$ (0.00004 in 2σ) 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.
- **Battery life**
A standard battery life of 290 hours continuous use, or the equivalent of over 130 days at 5% usage is achievable. 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 $\text{Ø}12.7 \text{ mm}$ ($\text{Ø}0.5 \text{ in}$), and square stylus $19.05 \text{ mm} \times 19.05 \text{ mm}$ ($0.75 \text{ in} \times 0.75 \text{ in}$) are available.
The probe body is fully adjustable to enable all axes to be aligned with the machine's axes.
- **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. **Stand-by 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.

Probe 1/Probe 2 start

The OTS is factory set to Probe 2 start for use with a spindle probe and OMI-2T/OMI-2H (twin probe).

One OTS is required to be set to Probe 1 start in a twin OTS installation.

Probe 1 start is required for use with an OMI-2.

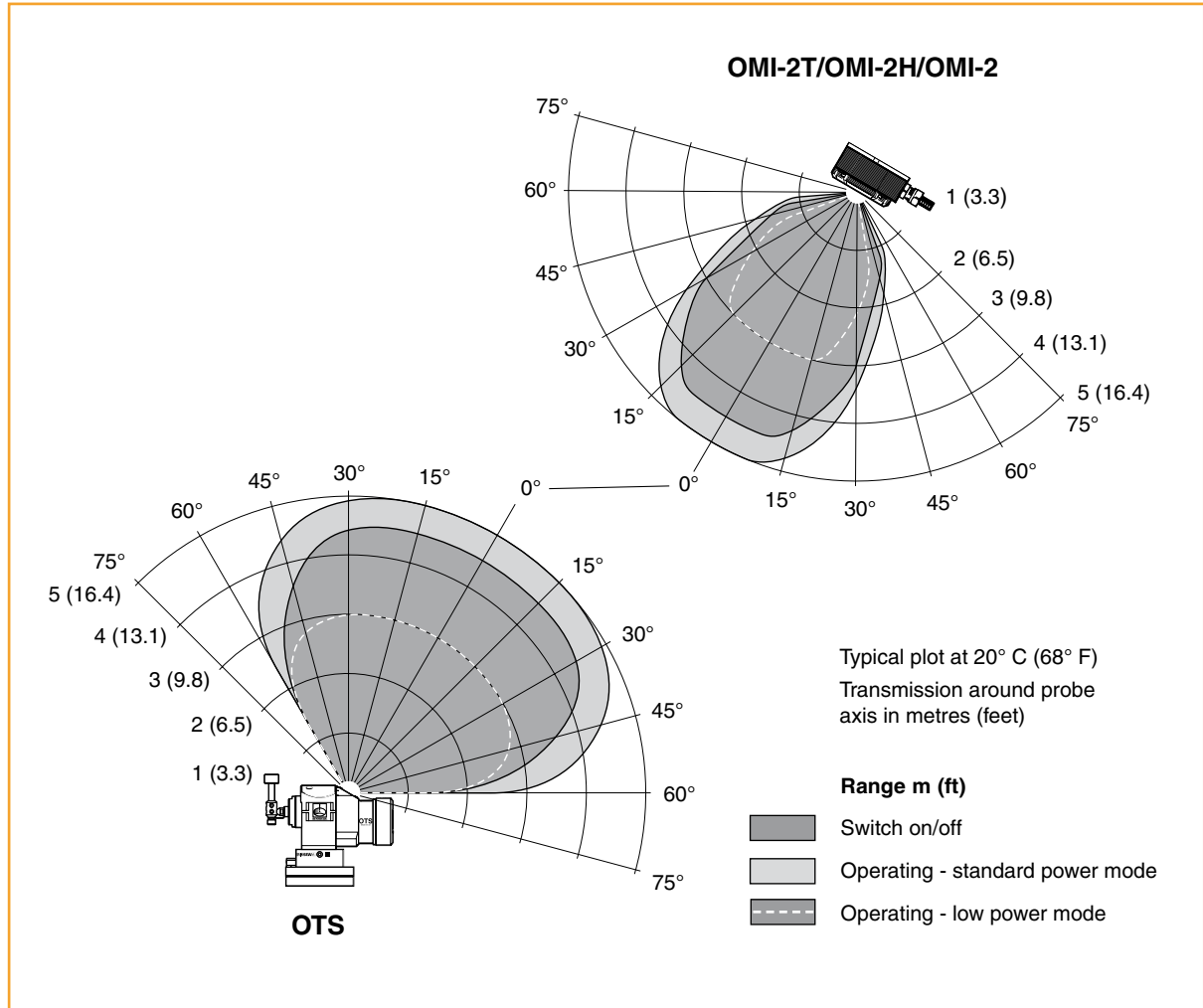
Performance envelope

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

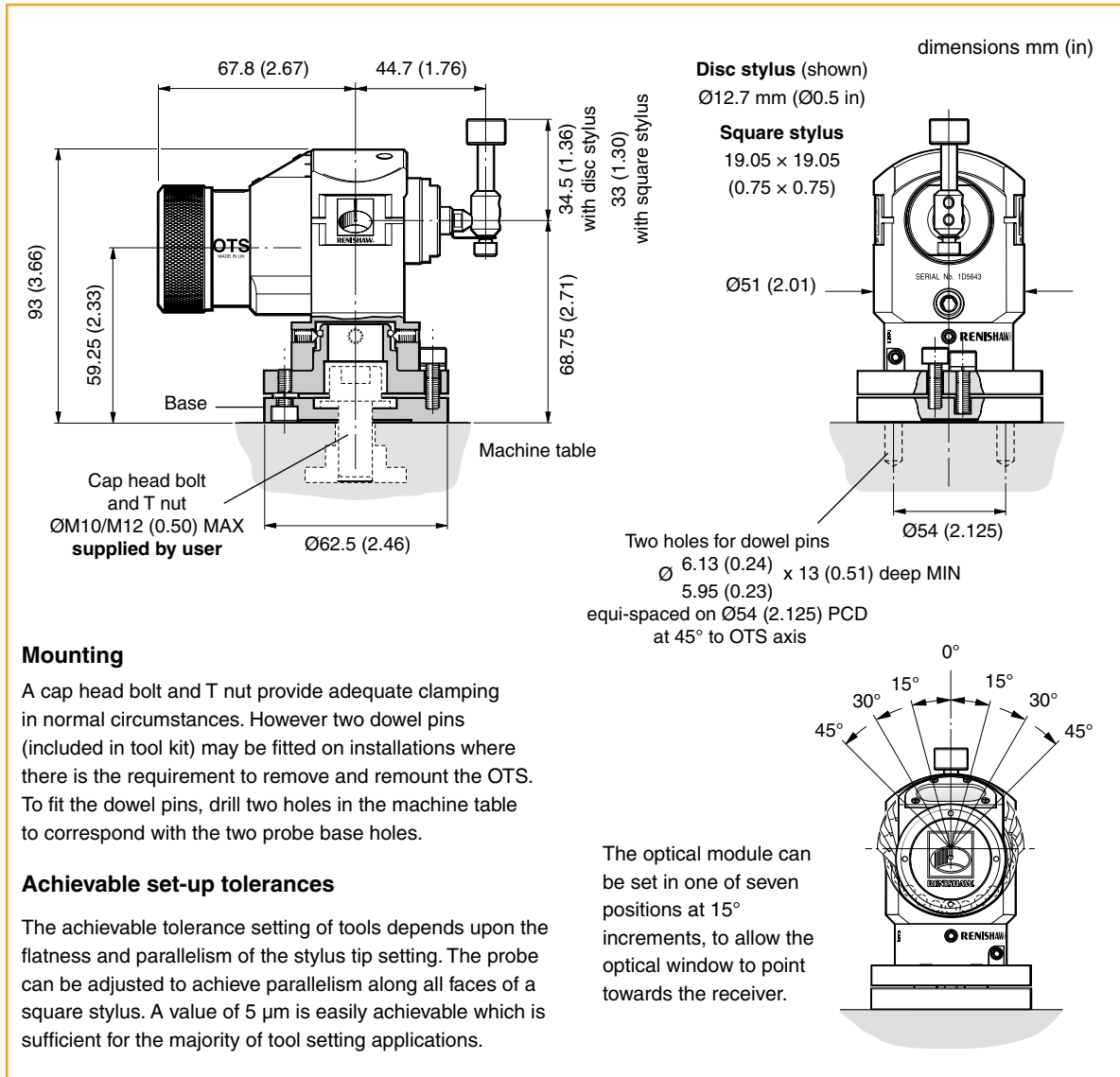
The OTS and OMI-2T/OMI-2H/OMI-2 may deviate from the optical centre line, provided opposing light cones always overlap, with transmitters and receivers in the other's field of view (eye to eye).

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

Coolant residue, accumulating on the OTS or OMI-2T/OMI-2H/OMI-2 windows will have a detrimental effect on transmission performance. Wipe clean as often as is necessary to maintain unrestricted transmission.



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.

Specification

Primary application	Tool setter for machining centres
Sense directions	5 way ±X ±Y +Z
Overtravel	X/Y 3.5 mm (0.13 in) Z 6 mm (0.24 in)
Stylus trigger force	1.3 N to 2.4 N / 130 gf to 240 gf (4.6 ozf to 8.5 ozf) depending on sense direction
Repeatability	1 µm (0.00004 in). Maximum mean 2 sigma (2σ) value *
Temperature	Operating +5 °C to 50 °C (41 °F to 120 °F) Storage -10 °C to 70 °C (14 °F to 158 °F)
Sealing	IPX8 (BS 5490, IEC 529) 1 atmosphere
Weight	900 g (31.74 oz) with batteries

* Valid as tested with a 35 mm straight stylus and a velocity of 480 mm/min at the centre of the stylus tip

Battery life

Typical battery life

Using the 1/2 AA lithium thionyl chloride (LTC) batteries at 5% usage, the probe will continue to operate for approximately one week after a low battery warning is first indicated. Replace the batteries as soon as possible.






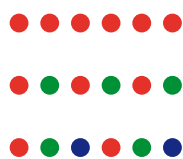
After batteries are inserted into the OTS, the flashing LED will indicate the current settings.

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

Battery life (1/2 AA Lithium Thionyl Chloride (3.6 V) x 2)

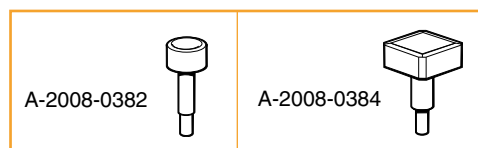
Stand-by life (typical)		5% usage = 72 minutes/day (days - typical)		Continuous use (hours - typical)	
Standard power mode	Low power mode	Standard power mode	Low power mode	Standard power mode	Low power mode
One year	One year	130	140	290	320

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 or flashing red	Battery dead	
Flashing red or flashing red and green or sequence (when batteries are inserted)	Unsuitable battery	

Parts list — please quote the part number when ordering equipment

Type	Part no.	Description
OTS	A-5401-2001	OTS probe with disc stylus, 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 (x 1), captive link (x 1), support bar (x 1), M4 screw (x 2), M4 grub screw (x 3), hexagon keys: 2.0 mm (x 1), 3.0 mm (x 1) and spanner 5.0 mm (x 1).
Stylus holder kit	A-2008-0389	Stylus holder kit comprising stylus holder and screws.
Batteries	P-BT03-0007	1/2 AA batteries - Lithium thionyl chloride (pack of two).
Battery cap	A-5401-0301	OTS battery cap assembly.
Seal	A-4038-0301	Battery housing seal.
Tool kit	A-2008-1125	Tool kit comprising: break stem (x 1), captive link (x 2), support bar (x 1), M4 screw (x 2), M4 grub screw (x 3), spiro pin (x 2), hexagon keys: 2.0 mm (x 1), 2.5 mm (x 1), 3.0 mm (x 1), 4.0 mm (x 1) and spanner 5.0 mm (x 1).
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-2H/OMI-2 mounting bracket with fixing screws, washers and nuts.
Publications. These can be downloaded from our web site at www.renishaw.com		
OTS	A-5401-8500	Quick-start guide - for rapid set-up of the OTS, includes CD with Installation guide.
Styli	H-1000-3200	Catalogue - Styli and accessories.
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 - lists programs.
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.



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