

## OMI - SSR optical machine interface



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## **FCC DECLARATION (USA)**

### **FCC Section 15.19**

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

### **FCC Section 15.105**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

### **FCC Section 15.21**

The user is cautioned that any changes or modifications not expressly approved by Renishaw plc, or authorised representative could void the user's authority to operate the equipment.

### **FCC Section 15.27**

The user is also cautioned that any peripheral device installed with this equipment such as a computer, must be connected with a high-quality shielded cable to insure compliance with FCC limits.

## **SAFETY**

### **Information for the user**

In all applications involving the use of machine tools, eye protection is recommended.

Refer to the machine supplier's operating instructions.

### **Information for the machine supplier**

It is the machine supplier's responsibility to ensure that the user is made aware of any hazards involved in operation, including those mentioned in Renishaw product documentation, and to ensure that adequate guards and safety interlocks are provided.

Under certain circumstances the probe signal may falsely indicate a probe seated condition. Do not rely on probe signals to stop machine movement.

# Installation and user's guide



## **WARRANTY**

Equipment requiring attention under warranty must be returned to your supplier. No claims will be considered where Renishaw equipment has been misused, or repairs or adjustments have been attempted by unauthorised persons.

## **CARE OF THE OMI**

Keep system components clean and treat the OMI with care.

## **CHANGES TO EQUIPMENT**

Renishaw reserve the right to change its equipment without obligation to change equipment previously sold.

## **CNC MACHINE**

CNC machine tools must always be operated by competent persons in accordance with manufacturers instructions.

## **ENVIRONMENT**

### **Temperature**

The OMI is specified for storage over  $-10^{\circ}$  to  $70^{\circ}$  C ( $14^{\circ}$  to  $158^{\circ}$  F) and operation over  $5^{\circ}$  to  $60^{\circ}$  C ( $41^{\circ}$  to  $140^{\circ}$  F) ambient temperature range.

### **Sealing**

The unit is fully sealed to IPX8.

### **WEIGHT**

OMI including 8 metres (26.2 ft) of cable = 612 g (21.58 oz).

## **Safety**

**Only qualified persons should adjust switches.**

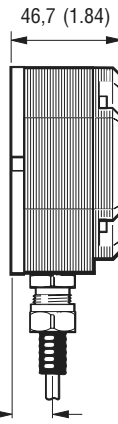
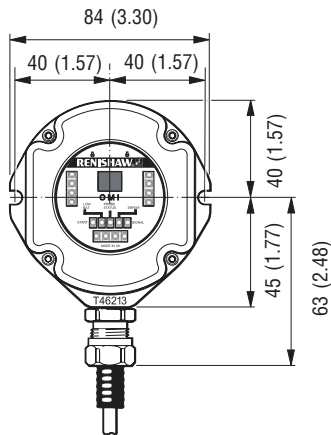
**Remove the mains supply from units before removing covers.**

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**OMI**

dimensions mm (in)

**OMI**

The OMI is a combined optical receiver and machine interface. It is an alternative to the OMM receiver and MI 12 interface combination.

The OMI is designed to be mounted within the machine's working envelope.

**POWER SUPPLY**

The OMI can draw its supply from the CNC machine 12 V to 30 V DC supply and presents a peak load of up to 550 mA during turn on (typically 100 mA).

Alternatively, power may be supplied from a Renishaw PSU3 power supply unit.

**INPUT VOLTAGE RIPPLE**

The input voltage ripple shall not cause the voltage to fall below 12 V, or rise above 33 V.

## VISUAL DIAGNOSTICS

A visual indication of system status is provided by light emitting diodes (LEDs).

Status is continuously updated and indication is provided for  
START, SIGNAL strength received, LOW BATTERY, PROBE STATUS, ERROR.

### 1. LED (yellow) – START signal status.

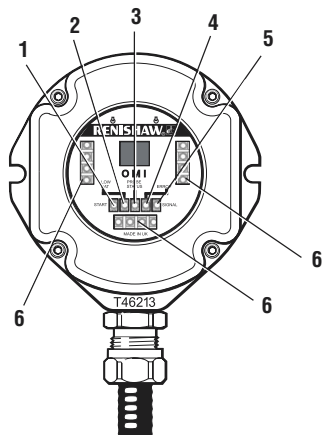
Lit when a START signal is transmitted to the probe.

This LED will either flash once when a machine controlled START signal is commanded, or flash continuously at one second intervals when the system is set to 'Auto-Start' mode and is awaiting a probe transmission signal.

### 2. LED (red) – LOW BAT.

When the OMP battery voltage falls below a set level, the low battery output device changes state, and causes the LOW BAT LED to commence flashing on and off 4 times per second.

Replace the OMP battery as soon as is practicable after the LED starts flashing.



### 3. LED (red, green) – PROBE STATUS.

This bi-colour LED is lit when the OMI is powered.

Green - Probe is seated.

Red - Probe is triggered or an error has occurred.

The change of colour of this LED will coincide with the probe status output devices changing state.

### 4. LED (red) – ERROR.

Lit when an error condition exists.

i.e. optical beam obstructed, probe out of optical range, probe has switched off or battery is exhausted.

When an error condition exists the probe status output will be held in a triggered state and the probe status LED will be RED. The error LED illuminating will coincide with the error output device changing state.

### 5. LED (red, green)

#### Infra red signal strength received from probe.

As long as there is power to the system, this LED will always be lit. It is a tri-colour LED and indicates as follows :

Red - Signal received from the probe is *either* too weak *or* not there at all (i.e. no signal).

Green - Signal received is good and system will operate correctly.

#### Note :

1. During a start transmission, the signal LED will change through red to green. This is the normal power up sequence.
2. The signal LED will flash green if subject to optical interference during the time the probe is not transmitting.

### 6. LED x 3 groups (clear)

These LEDs transmit infra-red control signals to the probe.



## OMI OUTPUT

### **There is one output from the OMI which is probe status**

The SSR is normally closed, and open when the probe is triggered, or an error condition is detected.

The output stage is protected from overload by an electronic fuse. In the event of an output fuse being tripped, the error LED will light 'YELLOW'.

Maximum current = 50 mA peak  $\pm 10\%$ .

Maximum voltage = 50 V peak.

Switch on time = Less than 120  $\mu$ s

Switch off time = Less than 120  $\mu$ s

On resistance = Less than 120  $\Omega$

Off resistance = Greater than 20 M $\Omega$

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## WARNING

### **Power supply voltage**

Do not exceed 33 V between the black wire and the screen wire (grey/black) as this could result in permanent damage to the OMI and/or the customer power supply.

i.e. Do not use a 'positive earth' supply where -24 V is the negative supply, and 0 V is the positive supply.

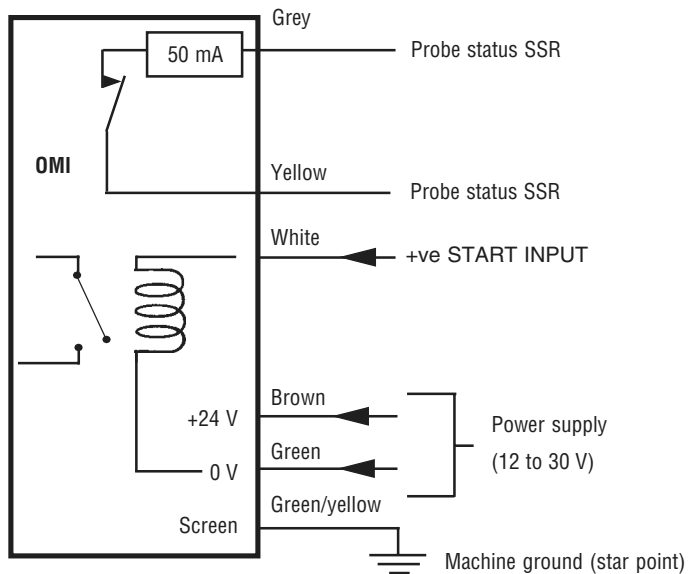
### **Output stage circuit**

Ensure that outputs from the OMI do not exceed specified current ratings.

### **Screen connection**

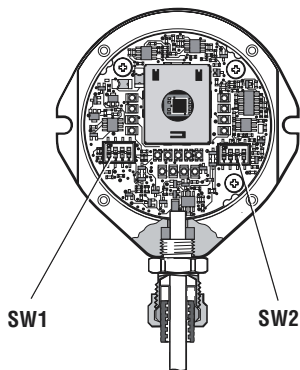
The screen connection should never be connected to the +24 V input.  
i.e. The use of a negative supply is not recommended.

## OUTPUT WIRING CONFIGURATION



## START INPUT SWITCHES SW1 AND SW2

Factory settings shown



### START INPUT

AUTO START selection causes the system to send a START signal at one second intervals, and does not require a CNC machine control input.

AUTO START should only be used when no output from the machine control is available. If this mode is selected, care should be taken to ensure system signals are not receivable by probing systems on other machines or in the tool changer.

To initiate a MACHINE START signal, an input of between 8 V at 10 mA and 30 V at 12 mA is required on the the START input line (WHITE +ve).

The MINIMUM pulse width is ONE MILLI SECOND.

### SWITCH SW1 Output configuration

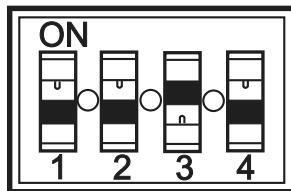
#### Machine start

Rx (reception) = 100%

Tx (transmission) = 100%

(see range setting diagram pages 9 and 10).

Tx AUTO  
100% START

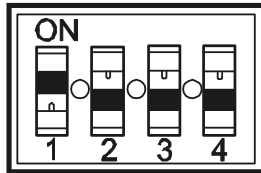


Rx 100% Tx 50% MACHINE START

To gain access to the switches, remove the OMI window - see page 11.

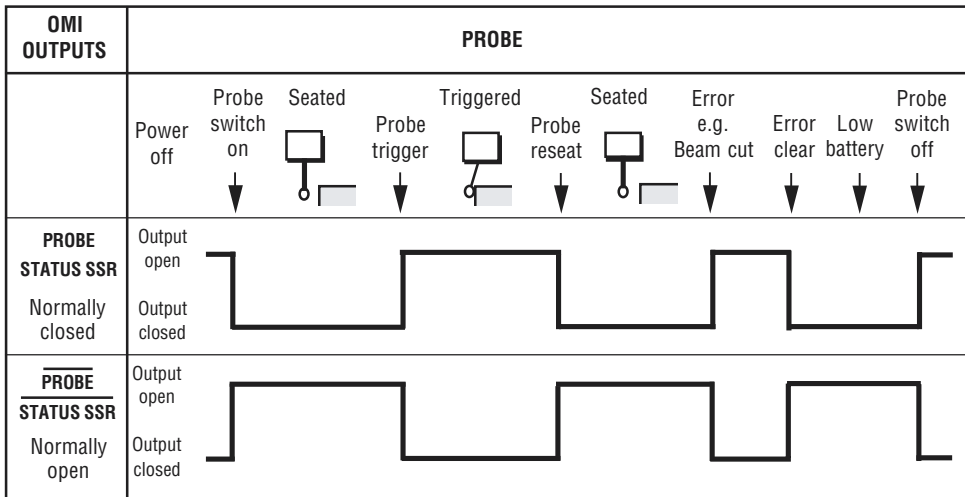
## SWITCH SW2 OUTPUT CONFIGURATION

Probe status  
Normally closed



Probe status  
Normally open

## OMI OUTPUT WAVEFORMS



The output signals from the OMI must be compatible with the machine control input.

## OPTICAL RANGE SETTING FOR SIGNAL TRANSMISSION AND RECEPTION

The effective range of the OMI can be adjusted by use of the RANGE SELECT SWITCH (SW1). If problems are experienced with either electrical or optical noise and the unit is installed at less than half the specified maximum range of the probe, then the range selection switch can be adjusted to reduce the effective range. This will reduce the units susceptibility to noise.

**Note :** For optimum OMI positioning during installation, an indication of signal strength received is provided by the SIGNAL LED - see page 4.

### WARNING

If two systems are operating in close proximity to each other, take care to ensure that signals transmitted from the OMP on one machine, are not received by the OMI on the other machine, and vice versa. The OMI may have to be shielded from direct light sources.

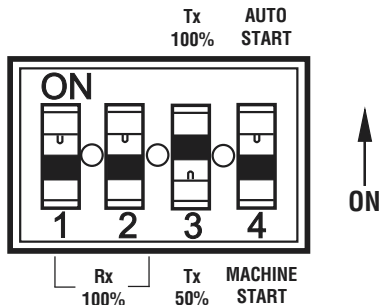
Reception range		Transmission range		Auto start ↕ Machine start
1	2	3	4	
100% Off	Off	100% On	On	↕
50% On	Off	50% Off	Off	
25% Off	On	50% Off	Off	

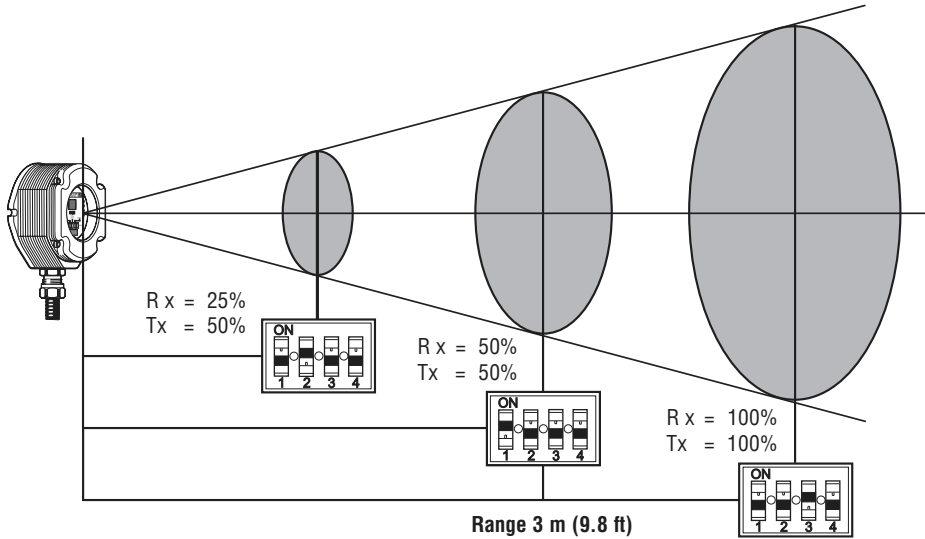
### CONDITIONS AFFECTING TRANSMISSION

Natural reflective surfaces within the machine may increase the signal transmission range. Coolant residue accumulating on the OMP LEDs and OMI window, will have a detrimental effect on transmission and reception performance. Wipe clean as often as necessary to maintain unrestricted transmission.

Operation in temperatures below 5° C or above 60° C (below 41° F or above 140° F) will result in some reduction in range.

### SWITCH SW1





**SW1 - range selection switch**

Rx = Reception range

Tx = Transmission range

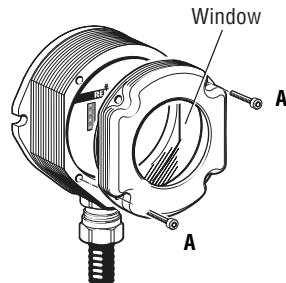
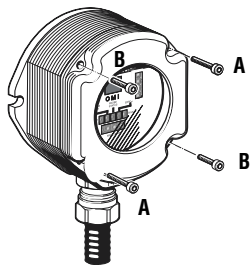
## TO REMOVE OMI WINDOW

**KEEP OMI CLEAN** - No liquids or solid particles must be allowed to enter the OMI body.

It is not necessary to remove the OMI from the machine, when installing new parts or adjusting the range selection switch.

The window is removed for the following reasons.

1. To change the reception/transmission range settings, and output options - see pages 7, 9 and 10.
2. To replace a broken window.



## TO REMOVE THE WINDOW

1. Remove the four cover screws, using a 2.5 mm A/F hexagon key.

Two screws are short and two are long.

Two of the cover holes are threaded - **A**, and two are plain - **B**.

2. The window fits tightly in the OMI body, and is removed using the two long screws, which are inserted into the threaded holes **A**.

Tighten each screw a few turns at a time to lift the window evenly.

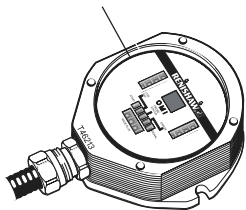
When it is clear of the body, remove the window and screws completely.

**DO NOT** remove the window by twisting or rotating by hand - use jacking screws only.

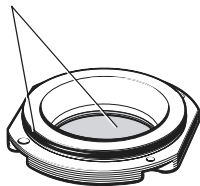
## FITTING WINDOW

### FITTING THE WINDOW

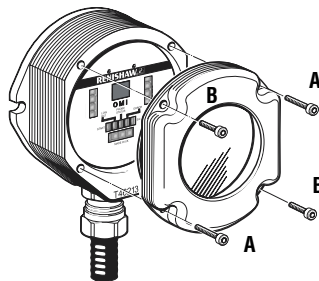
1. Before fitting window, check for any damage to screws or scratch marks which could prevent sealing.
2. Ensure that the 'O' ring seating in the OMI body is clean, and there are no scratch marks which could prevent complete sealing.



3. Ensure that the window and 'O' ring are clean.



4. Insert the two short screws into window holes **A**, and tighten.  
Screw torque is 0.3 - 0.7 Nm (0.22 - 0.51 lbf.ft).



5. Place window complete with 'O' ring onto OMI body.

**Note :** The 'O' ring should be lubricated with silicone grease to prevent nicking.

6. Insert the long screws into holes **B**.  
Tighten each screw a few turns at a time, to pull the window down evenly.  
There may be some resistance due to compression of air trapped inside the body.  
Screw torque is 1.0 - 1.8 Nm (0.74 - 1.32 lbf.ft).

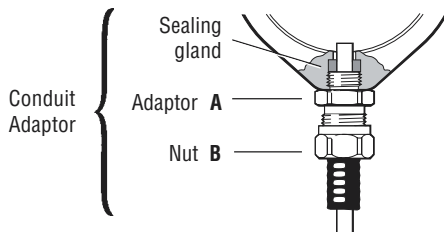


## OMI CABLE SEALING

### IMPORTANT

Coolant and dirt are prevented from entering the OMI by the cable sealing gland. The OMI cable is protected against physical damage by fitting either flexible or rigid conduit. The OMI conduit adaptor supplied by Renishaw accepts both types of conduit, provided the correct components are selected during assembly.

**WARNING** - Failure to adequately protect the cable can result in system failure due to either cable damage or coolant ingress through cores into the OMI. Failure due to inadequate cable protection will invalidate the warranty. When tightening or loosening nut **B** onto conduit ensure that torque is only applied between **A** and **B**.

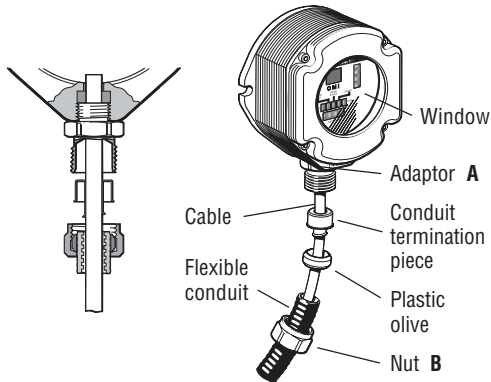


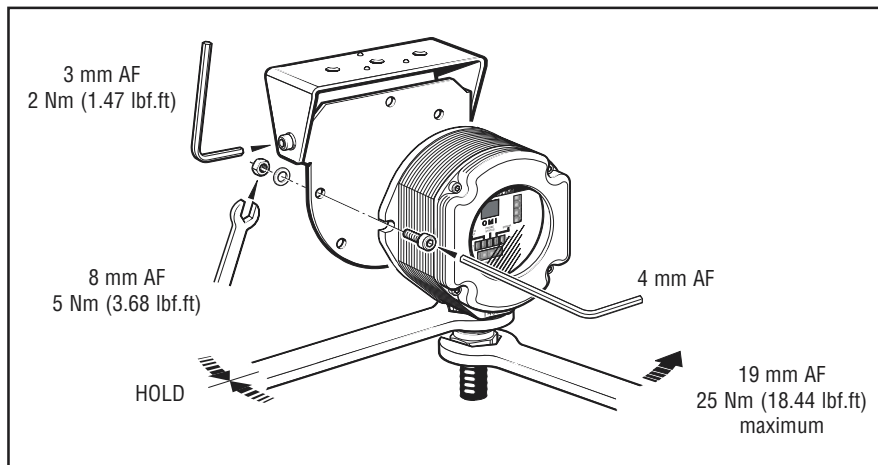
Before fitting nut **B**, grease the adaptor thread with a general purpose grease. e.g. Shell Alvania grease.

### FITTING FLEXIBLE CONDUIT

Recommended flexible conduit is Thomas and Betts SHURESEAL 1/4in Part No. TBEF 0250-50 or equivalent. Use the plastic olive when fitting flexible conduit.

When tightening nut **B** onto the conduit, first tighten until finger tight, then tighten an additional 1.5 to 2.5 turns. This will achieve a seal to BS 5490 (IEC 529) to IPX8 between the flexible conduit and the conduit adaptor.



**SCREW TORQUE VALUES Nm (lbf.ft).****PARTS LIST - Please quote the Part No. when ordering equipment**

Type	Part No.	Description
OMI	A-2115-0015	OMI (HAAS) with 8 metres (26 ft) of Cable.
Mtg Brkt	A-2033-0830	Mounting bracket.
Window	A-2115-0002	Window replacement kit.

The serial number of each OMI is to be found at the bottom of the housing.

**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](http://www.renishaw.com)

**RENISHAW**   
**apply innovation**

**Renishaw worldwide****Australia**

**T** +61 3 9521 0922  
**E** australia@renishaw.com

**Brazil**

**T** +55 11 4195 2866  
**E** brazil@renishaw.com

**Czech Republic**

**T** +420 5 4821 6553  
**E** czech@renishaw.com

**The People's Republic of China**

**T** +86 10 8448 5306  
**E** china@renishaw.com

**France**

**T** +33 1 64 61 84 84  
**E** france@renishaw.com

**Germany**

**T** +49 7127 9810  
**E** germany@renishaw.com

**Hong Kong**

**T** +852 2753 0638  
**E** hongkong@renishaw.com

**India**

**T** +91 80 5320 144  
**E** india@renishaw.com

**Italy**

**T** +39 011 966 10 523  
**E** italy@renishaw.com

**Japan**

**T** +81 3 5332 6021  
**E** japan@renishaw.com

**The Netherlands**

**T** +31 76 543 11 00  
**E** benelux@renishaw.com

**Poland**

**T** +48 22 575 8000  
**E** poland@renishaw.com

**Russia**

**T** +7/095/113 42 44  
**E** russia@renishaw.com

**Singapore**

**T** +65 6897 5466  
**E** singapore@renishaw.com

**Slovenia**

**T** +386 1 52 72 100  
**E** mail@ris.si

**South Korea**

**T** +82 2 565 6878  
**E** southkorea@renishaw.com

**Spain**

**T** +34 93 478 21 31  
**E** spain@renishaw.com

**Switzerland**

**T** +41 55 415 50 60  
**E** switzerland@renishaw.com

**Taiwan**

**T** +886 4 251 36651  
**E** taiwan@renishaw.com

**UK (Head Office)**

**T** +44 (0)1453 524524  
**E** uk@renishaw.com

**USA**

**T** +1 847 286 9953  
**E** usa@renishaw.com

**For all other countries**

**T** +44 1453 524524  
**E** international@renishaw.com