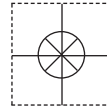


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OS4000 SERIES High Speed Fiber Optic Infrared Transmitter



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Germany/Austria: Daimlerstrasse 26
D-75392 Deckenpfronn, Germany
Toll-Free: 0 800 6397678 TEL: +49 (0) 7059 9398-0
FAX: +49 (0) 7056 9398-29 e-mail: info@omega.de

United Kingdom: ISO 9001 Certified OMEGA Engineering Ltd.
One Omega Drive, River Bend Technology Centre, Northbank
Irlam, Manchester M44 5BD England
Toll-Free: 0800-488-488 TEL: +44 (0)161 777-6611
FAX: +44 (0)161 777-6622 e-mail: sales@omega.co.uk

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Packaging Inspection

The following items are supplied with the OS4001 fiber optic transmitter:

- OS4001 fiber optic infrared transmitter
- Transmitter mounting bracket & two mounting nuts
- 15 Feet shielded power/output cable with 8 pin female connector
- 6 feet shielded RS232 cable with DB9 female connector
- PC interface program CD
- Instruction manual

The fiber optic lens probe is sold separately.

The following items are optional accessories that can be ordered separately:

Model No.	Description
OS4000-WC	Transmitter water cool jacket
L1-MB	Mounting Bracket for fiber optic lens probe
L1-AP	Air Purge collar for fiber optic lens probe
OS4000-VB	Vacuum bushing
TX8-100	8 Conductor shielded cable, 24 AWG, 30 m Long
PSR-24S	Regulated 24 Vdc @ 400 mA power supply, screw terminal
PSR-24L	Regulated 24 Vdc @ 400 mA power supply, stripped leads
WRS232-USB	Wireless RS232 to USB transceiver
WRS232	Wireless RS232 transmitter
WUSB	Wireless USB receiver



NOTES:

Introduction

The OS4000 series high speed fiber optic infrared line of transmitters measures a temperature range of 100°C (212°F) to 1600°C (2912°F) using nine different Fiber Optic Lens Probes, three Polymer Bolt probes, and twelve Glass & Quartz tip assemblies. The Lens Probe offers 3 standard optical field of views at 3 standard fiber optic cable lengths. The transmitter offers many standard features such as adjustable Emissivity from 0.05 to 0.99, adjustable Response time, 4 different analog output options, 2 way RS232 communication, high & low alarm voltage outputs, built-in Laser sighting for positioning the Lens Probe, and mounting bracket & mounting nuts.

The OS4000 series can be ordered with one analog output and an optional Relay contact closure outputs. The following describes the transmitter model number selection:

OS4001-* - **

Add:

* - MV for 1 mV/Degree output

V1 for 0 to 5 Vdc output

V2 for 0 to 10 Vdc output

MA for 4 to 20 mA output

** - AL for optional relay contact closure outputs

The Fiber optic lens probe comes in 9 different standard models as listed below:

Model No.	Temperature Range	Spot size	Cable Length
L1-7-3-1	200 to 800°C (392 to 1472°F)	0.22" @ 8"	0.9 m (3 Feet)
L1-7-6-2	250 to 1000°C (482 to 1832°F)	0.22" @ 8"	1.8 m (6 Feet)
L1-7-10-3	300 to 1200°C (572 to 2192°F)	0.22" @ 8"	3 m (10 Feet)
L1-2-3-2	250 to 1000°C (482 to 1832°F)	0.086" @ 5"	0.9 m (3 Feet)
L1-2-6-3	300 to 1200°C (572 to 2192°F)	0.086" @ 5"	1.8 m (6 Feet)
L1-2-10-4	350 to 1400°C (662 to 2552°F)	0.086" @ 5"	3 m (10 Feet)
L1-2-3-3	300 to 1200°C (572 to 2192°F)	0.025" @ 2"	0.9 m (3 Feet)
L1-2-6-4	350 to 1400°C (662 to 2552°F)	0.025" @ 2"	1.8 m (6 Feet)
L1-2-10-5	400 to 1600°C (752 to 2912°F)	0.025" @ 2"	3 m (10 Feet)

The following describes the fiber optic lens probe model number selections:

Example

L1-7-6-2 where,

L1 – Lens assembly

7 – Fiber bundle diameter (7 = 0.070", 2 = 0.020")

6 – Fiber optic cable length in feet

2 – Temperature Range (1 thru 5)

Other optical field of views, temperature ranges, and fiber optic cable lengths are available upon request.

Installation - Laser Sighting

Figure 1 shows the general dimensions of the fiber optic lens probe & cable.

Figure 2 shows the general dimensions of the lens probe mounting bracket (L1-MB).

Figure 3 shows the general dimensions of the lens probe air purge collar (L1-AP).

Figure 4 shows the general dimensions of the mounting bracket for the transmitter.

Figure 5 shows the general dimensions of the mounting nut for the transmitter.

Figure 6 shows the general dimensions & wiring connections for the transmitter.

Figure 7 shows the Front Plate of the transmitter with Laser warning certification label.

Figure 8 shows the Fiber Cable connection (keyed) to the transmitter

Figure 9 shows the Back Plate of the transmitter with all the controls and LED indications.

Figure 10 shows the general dimensions of the water cool jacket accessory for the transmitter (OS4000-WC).

Figure 11 shows the general dimensions of the Vacuum Bushing (OS4000-VB).

The vacuum bushing allows transitioning the fiber optic cable from vacuum environment to the atmosphere environment. Normally, the lens probe is located in the vacuum and the transmitter in the atmosphere environment.

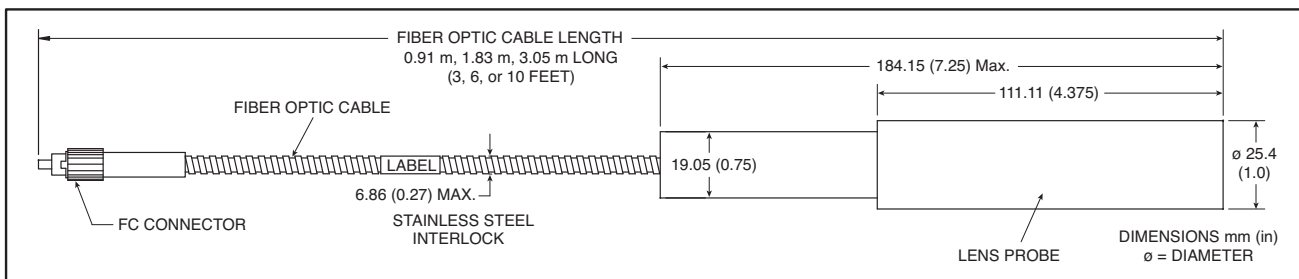


Figure 1. General Dimensions, Fiber Optic Lens Probe Assembly

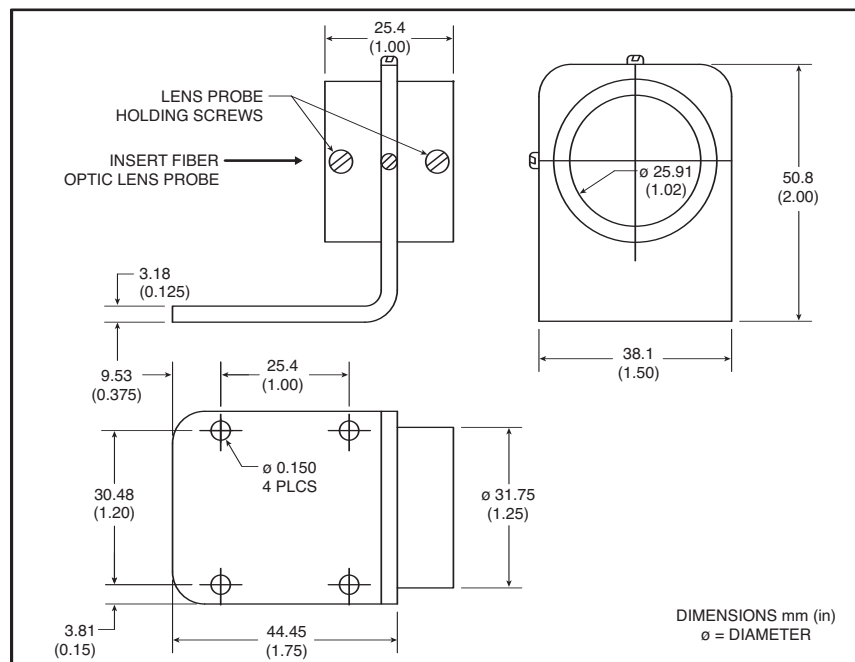


Figure 2. General Dimensions, Lens Probe Mounting Bracket (L1-MB)

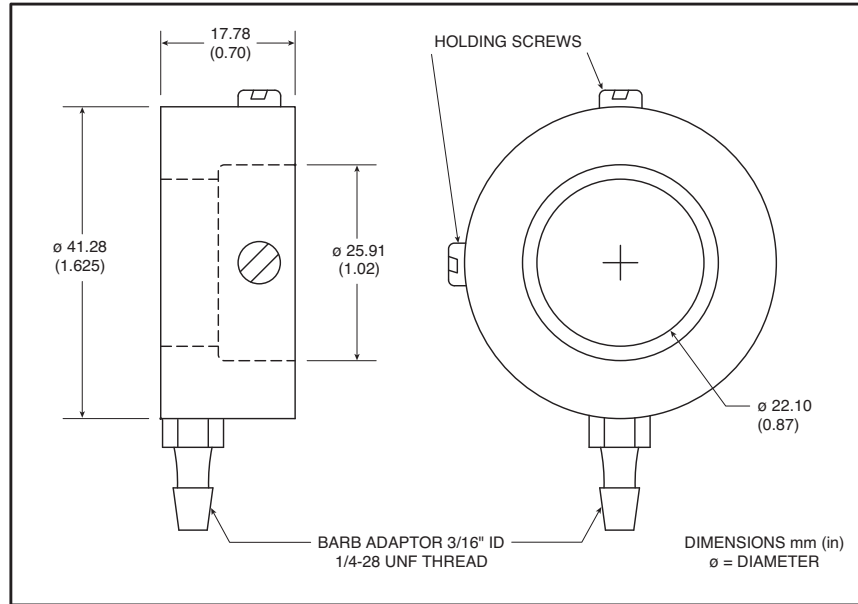


Figure 3. General Dimensions, Lens Probe Air Purge Collar (L1-AP)

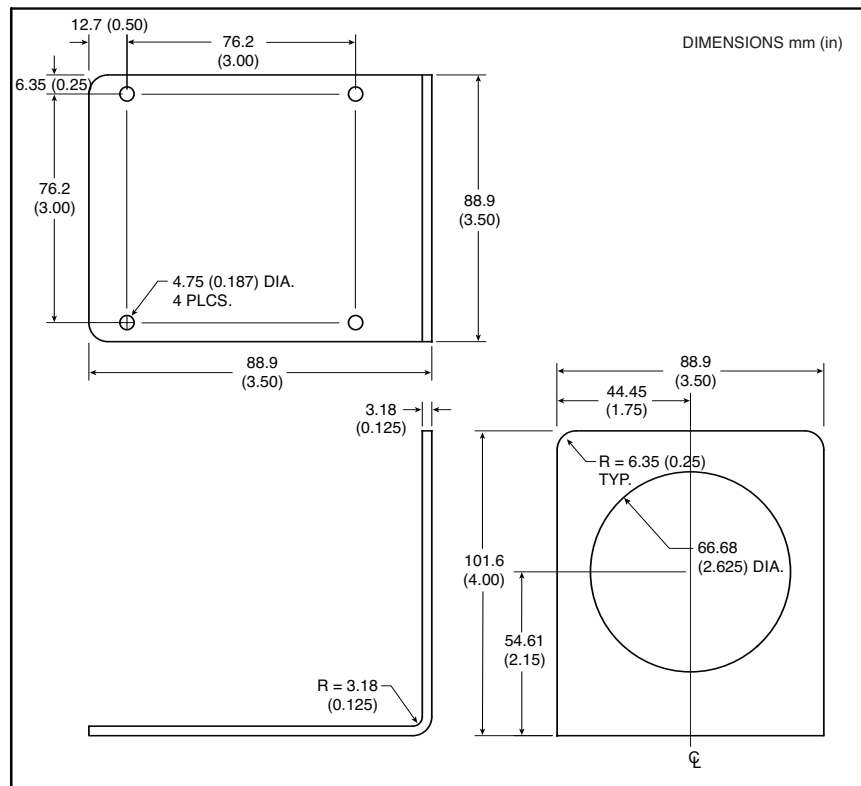


Figure 4. General Dimensions, Mounting Bracket for the Transmitter

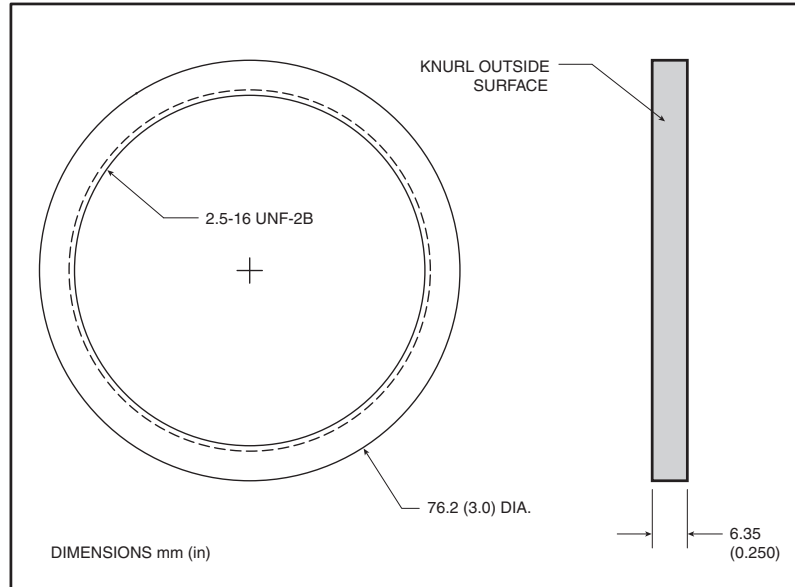


Figure 5. General Dimensions, Mounting Nut for the Transmitter

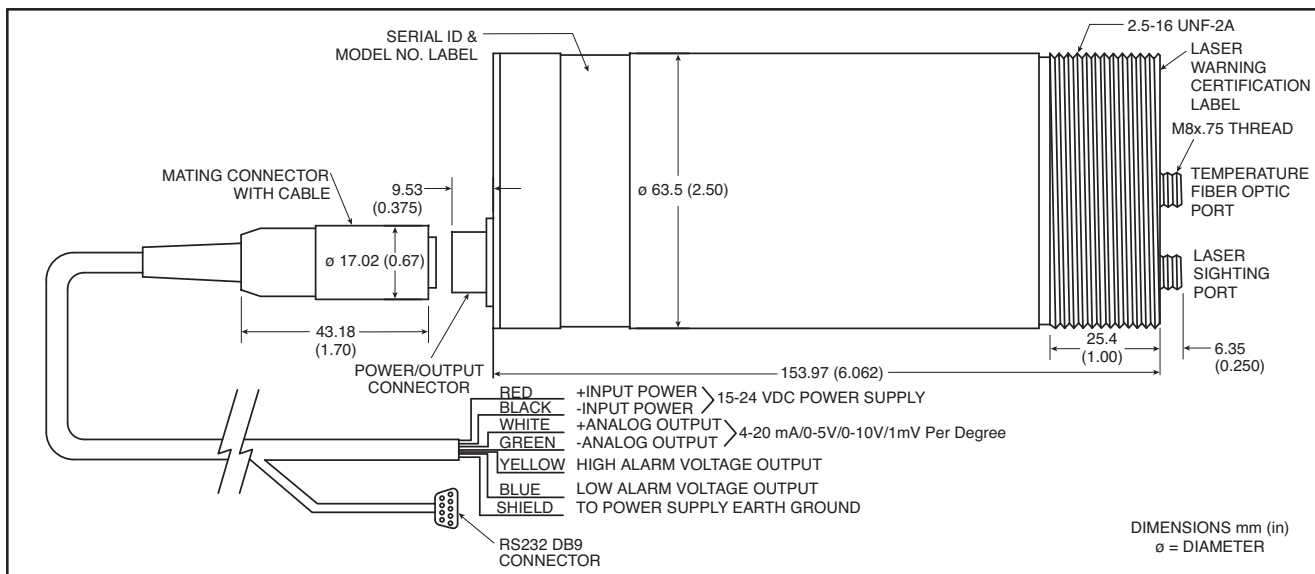


Figure 6. General Dimensions, Wiring Connections for the Transmitter

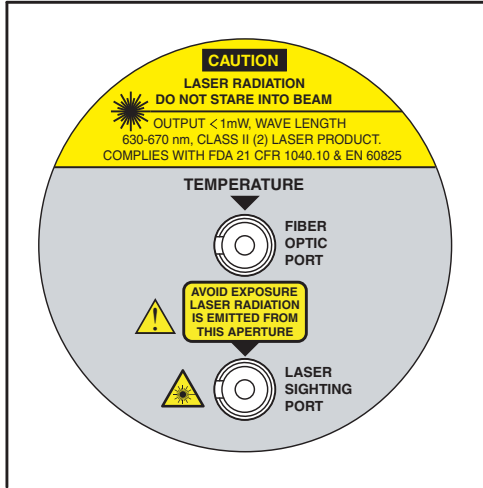


Figure 7. Front Plate With Laser Warning Certification Label

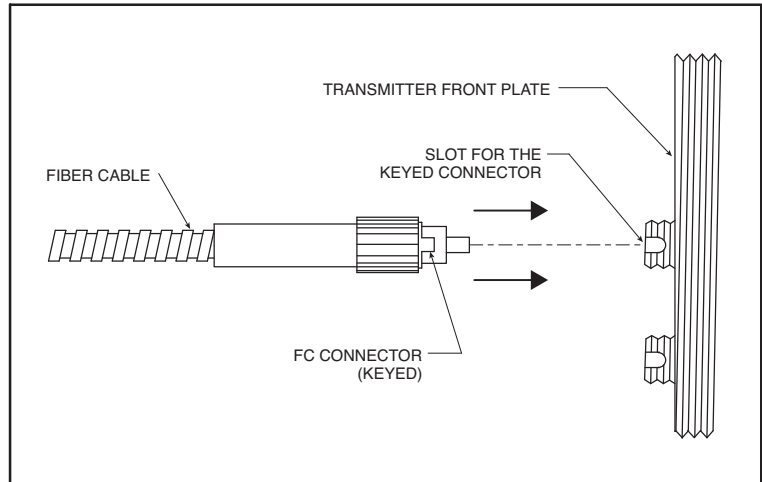


Figure 8. Fiber Cable Connection to the Transmitter

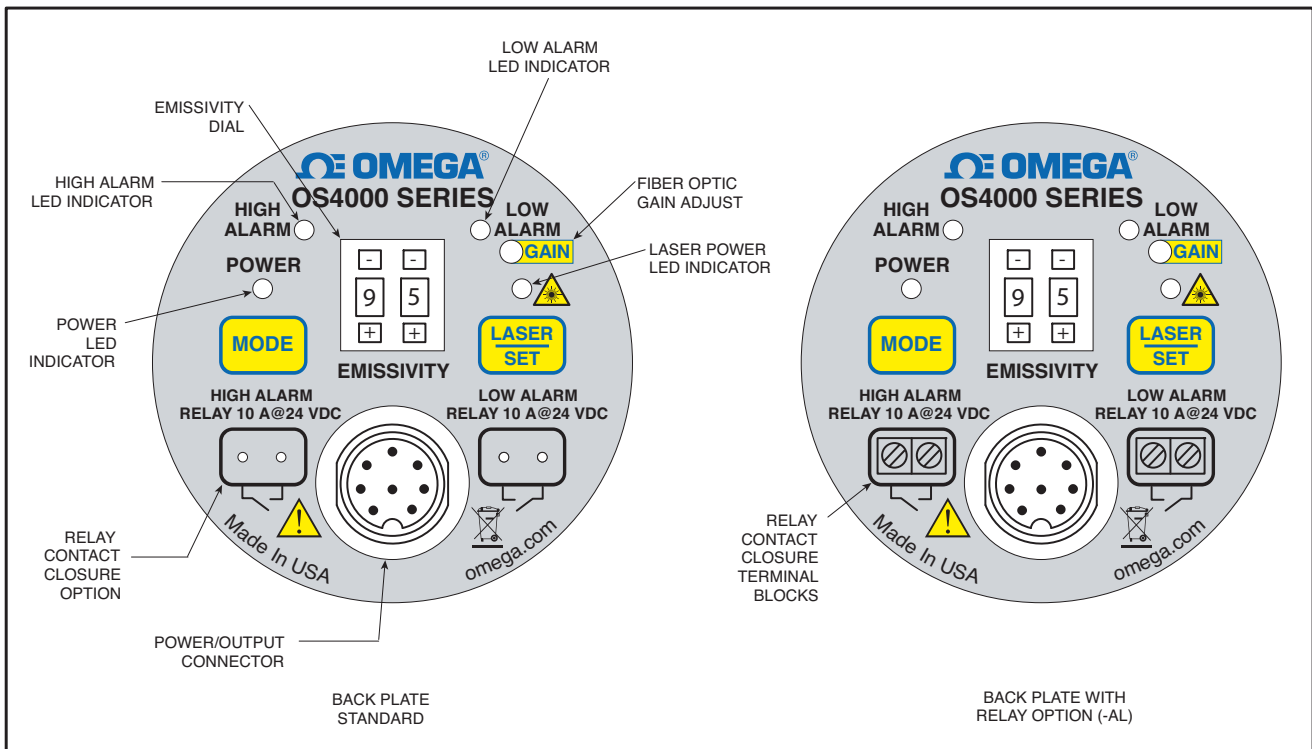


Figure 9. Back Plate With All Controls and LED Indicators

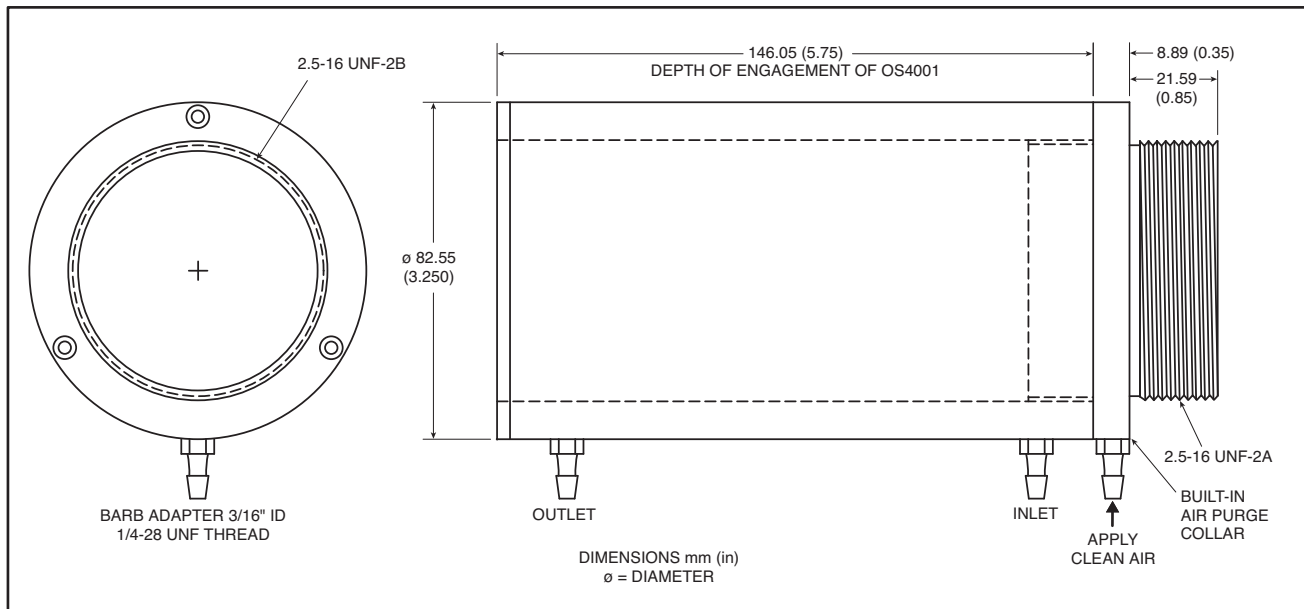


Figure 10. General Dimensions, OS4000-WC Water Cool Jacket

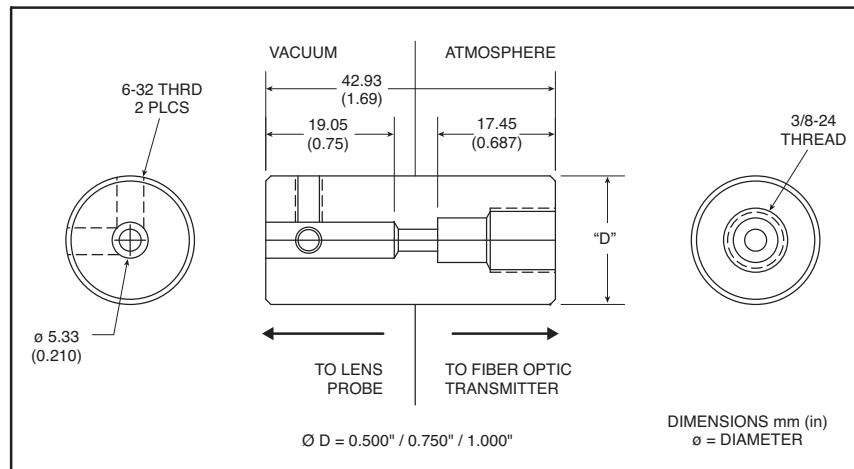


Figure 11. General Dimensions, Vacuum Bushing OS4000-VB

The following steps outline how to install & operate the fiber optic transmitter:

- Install the fiber optic lens probe
- Connect the fiber optic cable to the transmitter front plate. Figure 8 shows the fiber FC connector (keyed) to the mating transmitter connector. There are two ports for connections. The temperature port is for measuring temperature. The laser sighting port is for aligning & positioning the fiber optic lens probe.
- Connect the fiber optic cable to the laser sighting port.
- Connect the power/output cable connector to the mating connector on the back plate of the transmitter.
- Power the transmitter using a DC power supply. Table 1 (page 2-6) & Figure 6 (page 2-3) show the wiring connections.

- Press the **LASER SET** key on the back plate to turn on the laser beam. The laser power red LED indicator will turn on. The laser beam is projected through the lens probe. The laser spot represents the optical envelop of the lens probe field of view. Align & position the lens probe for the proper spot size & distance. Move the lens probe forward or back until the laser projection is in focus. Figure 12 shows a typical laser projection through the lens.
- The lens probe is now positioned properly. Press the **LASER SET** key again to turn off the laser beam. The laser power indicator LED will turn off.
- Disconnect the fiber optic cable from the Laser sighting port of the transmitter and connect to the temperature port for normal temperature measurement.
- Monitor the analog output for temperature measurement.

Power/ Output Cable Wire	Connection
Red	+ Power Input
Black	- Power Input (Common Ground)
White	+ Analog Output
Green	- Analog Output (Common Ground)
Yellow	High Alarm 12V Output
Blue	Low Alarm 12V Output
Shield	Earth Ground
DB9 – Pin 2	RX to the PC
DB9 – Pin 3	TX to the PC
DB9 – Pin 5	Common Ground to the PC

Table 1- Wiring connections for the OS4000 Fiber Optic Transmitter<None>

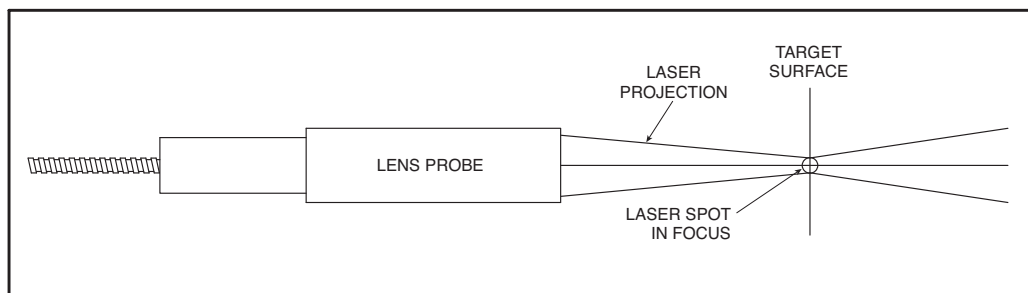


Figure 12. Typical Laser Projection Through the Lens Which Represents the Optical Field of View of the Lens Probe

Main Operations

Figure 9 shows the back panel with all the controls & LED indications as described below:

High Alarm LED – Red, It turns on when in high alarm condition.

Low Alarm LED – Red, It turns on when in low alarm condition.

Laser LED – Red, It turns on when the laser beam is on.

Power LED – Green, It turns on when the power is on.

Emissivity Dial – The dial allows the user to set the object Emissivity from 0.99 to 0.05 in 0.01 steps.

Gain Adjust – It allows the user to increase or decrease the optical gain. Over time, some of the fiber strands inside the fiber cable may break due to handling or stress which can reduce the overall optical gain and the accuracy of the unit. The gain adjust compensates for the optical gain loss.

MODE & **LASER SET** keys – Table 2 shows the operation of the two keys. In order to leave the Real time mode and get into configuration (Maximum Mode), the **MODE** key has to be pressed and held for 2 seconds.

The back panel also accommodates two terminal blocks for Relay options. Each provides contact closure for high and low alarm built-in relays.

Operation	Press MODE Key	Press LASER SET /Set Key
Real Time	Go to Maximum Mode Power LED flashes once	Laser & Laser LED is ON/ OFF
Maximum Mode Output is set to Max.	Go to Minimum Mode Power LED flashes twice	Reset Max & Min temperature
Minimum Mode Output is set to Min.	Go to High Alarm Mode Power LED flashes 3 times	Reset Max & Min temperature
High Alarm Mode Output is set to High Alarm set point	Go to Low Alarm Mode Power LED flashes 4 times	Change output from 1mV/°C to F or vice versa (If applicable)
Low Alarm Mode Output is set to Low Alarm set point	Go to Real Time Mode Power LED is on	Change output from 1mV/°C to F or vice versa (If applicable)

Table 2. Keypad Configuration Flow Chart

NOTE:

On the mV/Degree analog output models (OS4001-MV), the default output is 1 mV/°F. You can change the output from 1 mV/°F to 1 mV/°C or vice versa by going through the Configuration menu with Response time set for 25 msec or higher. At 1 msec response time, the output is fixed at 1 mV/°F.

Polymer Bolt Probe Assemblies

The Polymer Bolt probes are offered at Right angle with quick disconnect as shown in Figure 13. They come in three standard models as listed below:

Model No.	Temperature Range	Cable Length
2108-650-RA-1	100 to 425°C (212 to 797°F)	0.3 m (1 Ft)
2108-650-RA-3	125 to 425°C (257 to 797°F)	0.9 m (3 Ft)
2108-650-RA-6	150 to 425°C (302 to 797°F)	1.8 m (6 Ft)

The standard Polymer Bolt Probe length is 6.5 inches, other lengths are available upon request (3 to 12 inches).

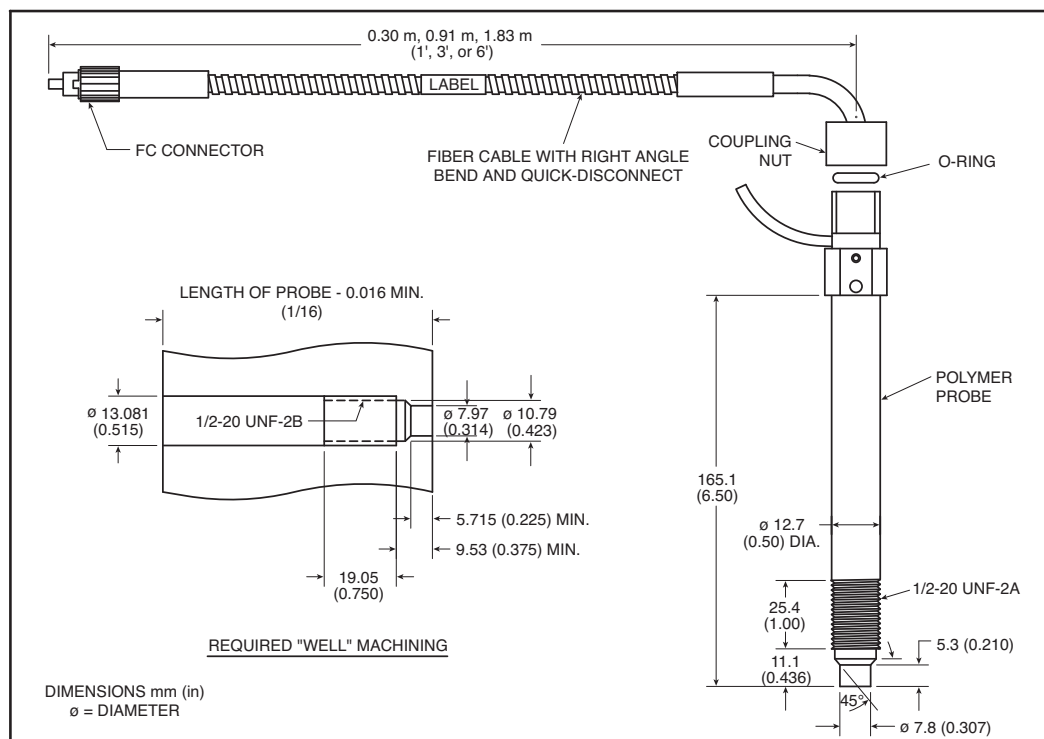


Figure 13. 2108 Series Quick-Disconnect Polymer Probe

Glass & Quartz Tip Fiber Cable Assemblies

We offer twelve different Glass & Quartz tip fiber cable assemblies as listed below. The glass or quartz tip can be replaced in the field.

Metal Encased Tip Assemblies

Model No.	Temperature Range	Cable Length
2615-G-*-2650-3	150 to 400°C (302 to 752°F)	0.9 m (3 Ft), Glass Tip
2615-G-*-2650-6	175 to 400°C (347 to 752°F)	1.8 m (6 Ft), Glass Tip
2615-G-*-2650-10	200 to 400°C (392 to 752°F)	3 m (10 Ft), Glass Tip
2615-Q-*-2650-3	250 to 800°C (482 to 1472°F)	0.9 m (3 Ft), Quartz Tip
2615-Q-*-2650-6	275 to 800°C (527 to 1472°F)	1.8 m (6 Ft), Quartz Tip
2615-Q-*-2650-10	300 to 800°C (572 to 1472°F)	3 m (10 Ft), Quartz Tip

Ceramic Encased Tip Assemblies

Model No.	Temperature Range	Cable Length
2610-G-*-2650-3	150 to 400°C (302 to 752°F)	0.9 m (3 Ft), Glass Tip
2610-G-*-2650-6	175 to 400°C (347 to 752°F)	1.8 m (6 Ft), Glass Tip
2610-G-*-2650-10	200 to 400°C (392 to 752°F)	3 m (10 Ft), Glass Tip
2610-Q-*-2650-3	250 to 1000°C (482 to 1832°F)	0.9 m (3 Ft), Quartz Tip
2610-Q-*-2650-6	275 to 1000°C (527 to 1832°F)	1.8 m (6 Ft), Quartz Tip
2610-Q-*-2650-10	300 to 1000°C (572 to 1832°F)	3 m (10 Ft), Quartz Tip

* - Insert -3 (3 inches) or -6 (6 inches) for the length of the tip assembly.

Figure 14 shows the field replaceable Glass or Quartz tip fiber cable assembly.

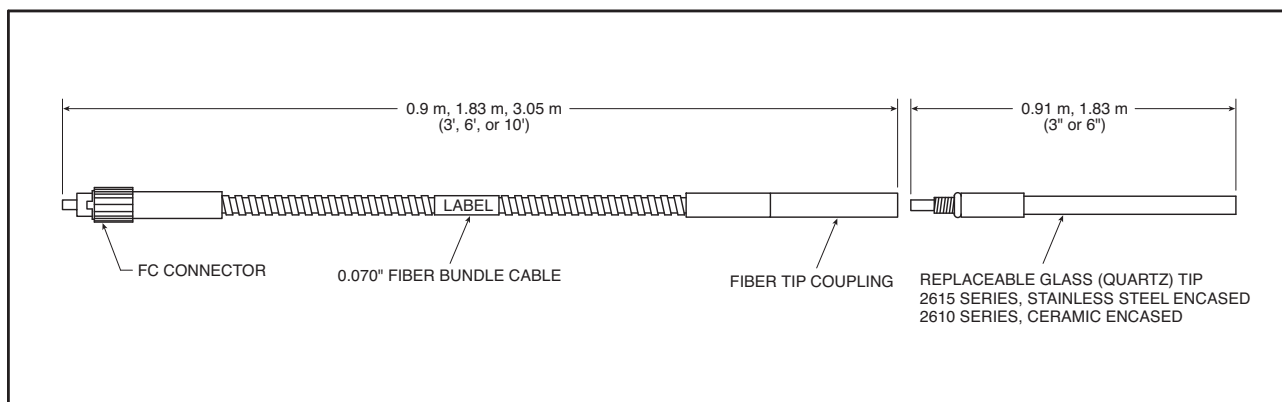


Figure 14. Glass or Quartz Tip Fiber Cable Assembly

PC Interface

The OS4000 series comes with a Windows® based PC interface software. The software runs on Windows Vista, XP, and 2000. The software allows the user to do the following:

- Establish communication with the OS4001 and display the temperature in real time both digitally and graphically.
- Select sound, COM port, and temperature engineering unit
- Change the response time, and high & low alarm set points
- Select chart scale either manual or automatic, and chart time base
- Display the temperature vs. time along with high & low alarm lines
- Save the log temperature data to a file

Figure 15 shows the Main screen when the program is open. Figure 16 (page 4-2) shows the Settings menu screen. The following is a description of the two menus:

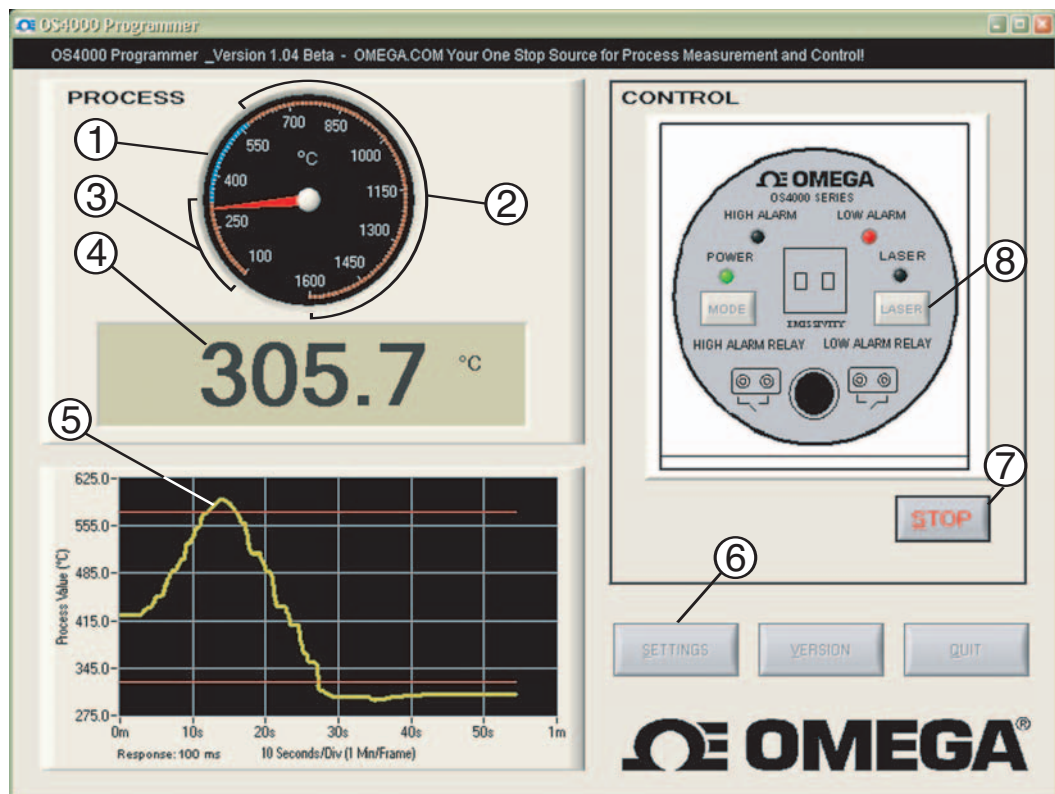


Figure 15. Main Menu Screen

- 1 – An analog Gage showing the temperature in real time.
- 2 – The portion of the gage (Highlighted Red) representing the high alarm zone.
- 3 – The portion of the gage (Highlighted Red) representing the low alarm zone.
- 4 – A digital display of the current temperature.
- 5 – A line graph of the temperature vs. time along with the high & low alarm lines. The Chart time base is set for 1 Minute/Frame or 10 seconds/Div. as

the time goes on, the temperature graph line gets updated as well as the time stamping.

- 6 – The Settings button allows the user to get into the settings menu.
- 7 – The Go/Stop button allows the user to start/stop the temperature logging.
- 8 – The Laser button is active when the temperature logging is stopped. Pressing the Laser button will turn on/off the laser beam in the unit. A laser warning symbol will also flash when the laser beam is turned on.

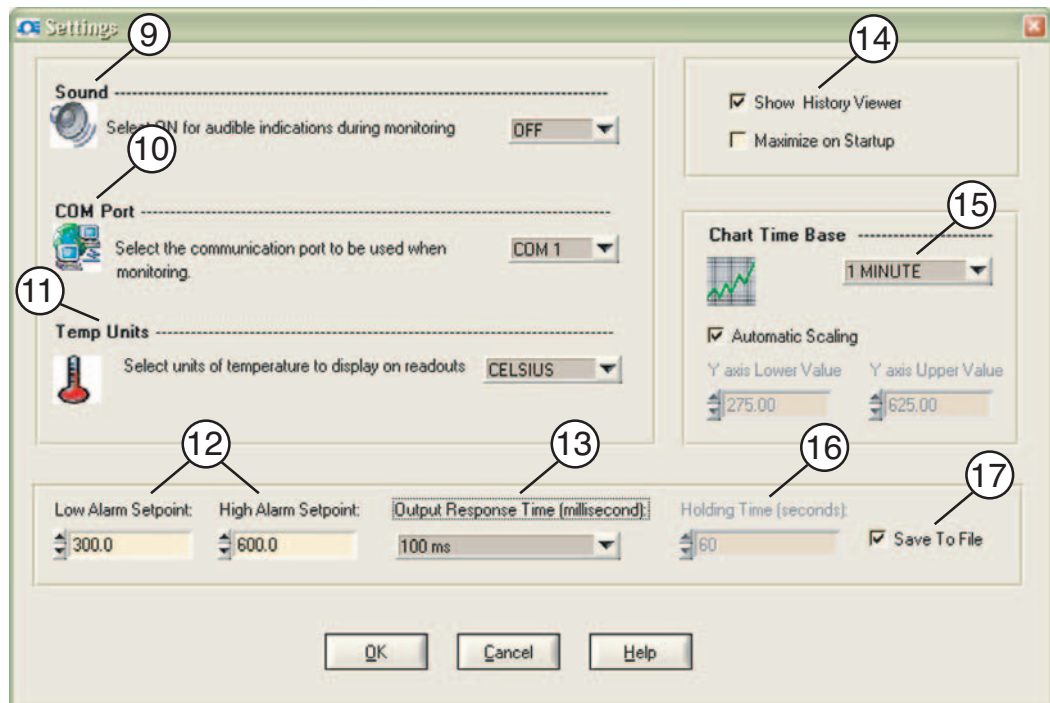


Figure 16. Settings Menu Screen

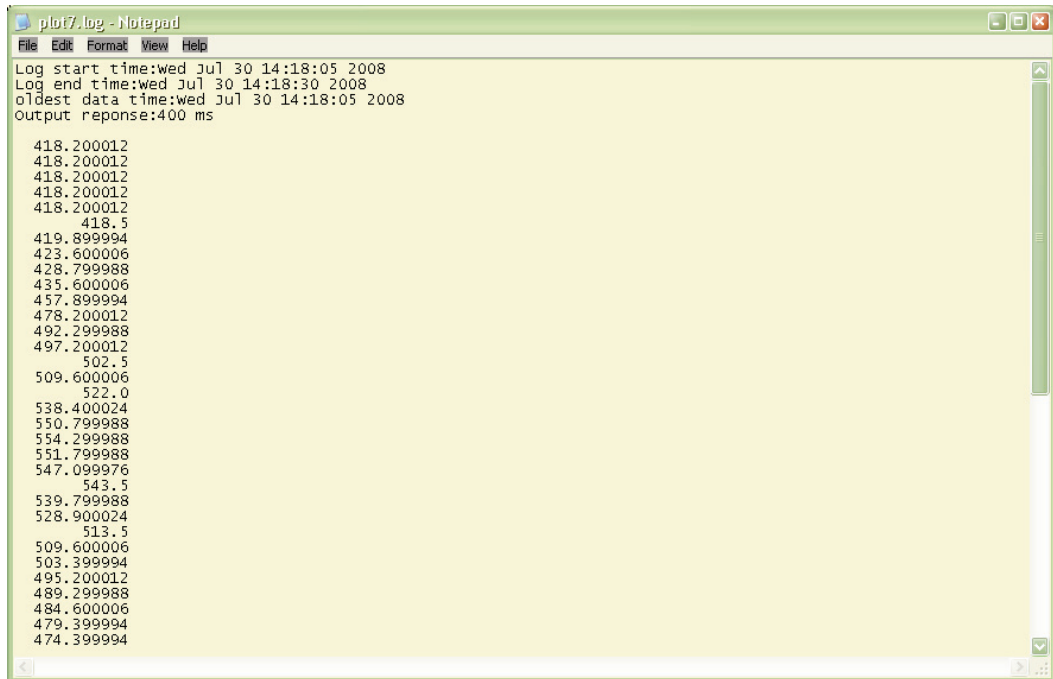
- 9 – The Sound feature allows the user to hear a beep when the process temperature goes below the low alarm or above the high alarm set points.
- 10 – COM port can be selected from 1 through 255.
- 11 – Temp unit allows the user to select the process temperature display in degrees Fahrenheit or Celsius.
- 12 – Low & high alarm set points can be set from the two drop down menus.
- 13 – Output Response selection allows the user to select an analog output response time anywhere from 1 msec to 3200 msec. You can also select the Peak-Hold function which will enable the Holding Time drop down menu.
- 14 – When the History viewer is checked, you can view a history of all the events with this program.
- 15 – Chart Time Base allows the user to select the chart speed from 1 minute/frame to 1 hour/frame.

You can select the Automatic Scaling which will automatically select the chart temperature range based on the process temperature and the Low & High alarm

set points. You can also set the chart temperature scale manually, if the Automatic Scaling is not checked.

- 16 – Holding Time drop down menu allows the user to select the Peak Holding time from 1 to 60 seconds. This is only active when the Peak-Hold function is selected from the Output Response Time menu.
- 17 – When the Save to File is checked, the user can save the logged data into a data file which can then be imported into Excel for further analysis. Fig 17 shows a typical data file in Notepad.

The data file starts with the starting time, ending time, and the Output response time which is the data time interval. The first data is the oldest data point. The last data is the latest data point in the file.



```
plot7.log - Notepad
File Edit Format View Help
Log start time:wed Jul 30 14:18:05 2008
Log end time:wed Jul 30 14:18:30 2008
oldest data time:wed Jul 30 14:18:05 2008
output response:400 ms
418.200012
418.200012
418.200012
418.200012
418.200012
418.5
419.899994
423.600006
428.799988
435.600006
457.899994
478.200012
492.299988
497.200012
502.5
509.600006
522.0
538.400024
550.799988
554.299988
551.799988
547.099976
543.5
539.799988
528.900024
513.5
509.600006
503.399994
495.200012
489.299988
484.600006
479.399994
474.399994
```

Figure 17. Typical Data File in Notepad

By clicking OK, in the Settings Menu, the program will save all the new settings in the OS4000 transmitter.

Peak-Hold Function

The OS4000 can be selected for Peak-Hold analog output via the PC interface software. The holding time can be selected from 1 to 60 seconds. Figure 18 shows a typical Peak-Hold analog output time diagram with a Holding Time of 2 seconds.

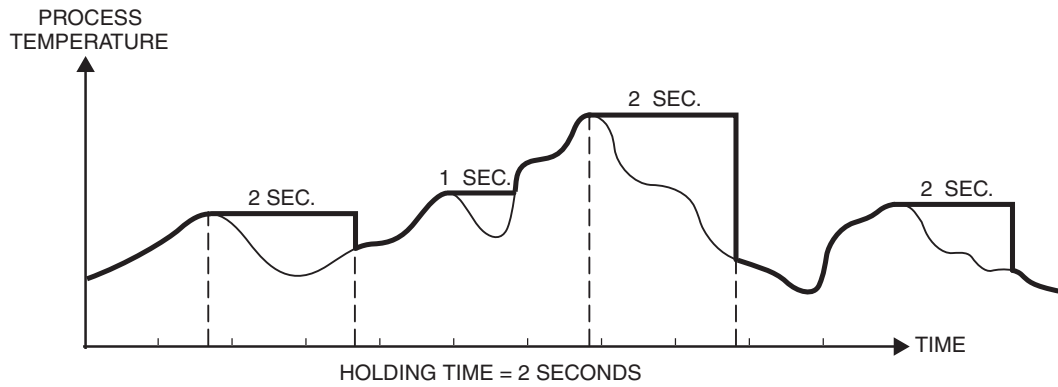


Figure 18. Peak & Hold Timing Diagram

Signal Averaging (Sample & Hold) Function

The OS4000 provides analog output averaging. This function is desirable when the process temperature is changing too rapidly and the user is more interested in the overall trend of the process temperature. Fig 19 shows a fast process temperature and the corresponding analog output when the response time is set to 1.6 seconds. The analog output provides an update every 1.6 seconds where the output is the average of all the sample temperatures within the 1.6 seconds time period.

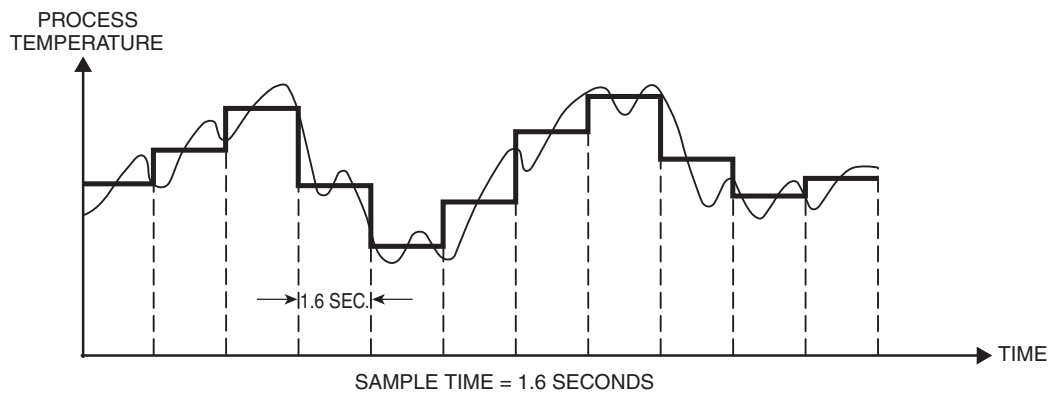


Figure 19. Signal Averaging (Sample & Hold) Timing Diagram

Specifications

Power:	15 to 24 Vdc @ 100 mA
Power Indicator:	Green LED
Temperature Ranges	
Fiber Lens Probes:	200 to 800°C (392 to 1472°F) 250 to 1000°C (482 to 1832°F) 300 to 1200°C (572 to 2192°F) 350 to 1400°C (662 to 2552°F) 400 to 1600°C (752 to 2912°F)
Polymer Bolt Probes:	100 to 425°C (212 to 797 °F) 125 to 425°C (257 to 797°F) 150 to 425°C (302 to 797°F)
Glass Tip Assembly:	150 to 400°C (302 to 752°F) 175 to 400°C (347 to 752°F) 200 to 400°C (392 to 752°F)
Quartz Tip Assembly: (Metal Encased)	250 to 800°C (482 to 1472°F) 275 to 800°C (527 to 1472°F) 300 to 800°C (572 to 1472°F)
Quartz Tip Assembly: (Ceramic Encased)	250 to 1000°C (482 to 1832°F) 275 to 1000°C (527 to 1832°F) 300 to 1000°C (572 to 1832°F)
Accuracy:	1% of Rdg
Repeatability:	0.5% of Rdg
Resolution:	0.1 degree
Optical Field of Views	
Fiber Lens Probe:	5.6 @ 203 mm (0.22" @ 8") 2.2 @ 127 mm (0.086" @ 5") 0.63 @ 51 mm (0.025" @ 2")
Glass Tip Assembly:	1.2 (Distance to spot size ratio)
Quartz Tip Assembly:	1.8 (Distance to spot size ratio)
Glass or Quartz Rod Diameter:	0.080"
Fiber Optic Cable Lengths:	0.3, 0.9, 1.8, 3 m (1, 3, 6, 10 Feet)
Emissivity:	0.05 to 0.99 Adjustable
Response Time: (0-63% Final value)	1 msec default (Programmable via RS232) 25 msec 50 msec 100 msec 200 msec 400 msec 800 msec 1.6 sec 3.2 sec maximum
Output Peak-Hold:	Programmable via RS232
Holding Time:	1 to 60 seconds
Sampling Time:	25 msec

Signal output Averaging: (Sample & Hold)	Set by Response Time Selection (25 msec to 3.2 sec)
Spectral Response:	1.2 to 2.6 microns
IR Detector:	InGaAs photo detector
Fiber Optic Cable Connector:	FC connector, Keyed
Analog Outputs:	0 to 5 Vdc @ 250 ohms min load 0 to 10 Vdc @ 1200 ohms min load 4 to 20 mA @ 400 ohms max load 1 mV/Deg @ 250 ohms min load
PC Communication:	RS232, 2 way
RS232 Settings:	9600 BPS, 8-Bit Data, 1 Stop Bit, No Parity
RS232 Cable:	6 Feet Shielded Cable with DB9 Female Connector Pin 2 – RX, Pin 3 – TX, Pin 5 – GND
Maximum Data Storage on PC:	144,000 Temperature Data Points
Response Time = 25 msec:	1 Hour Worth of Data
Response Time = 100 msec:	4 Hours Worth of Data
Power/Output Connector:	8 Pin Circular DIN metal connector (Male/Female)
Power/Output Cable:	15 Feet Shielded Cable, 8 conductor, 24 AWG
High Alarm Set Point:	Max Temp Range default (Programmable via RS232)
Low Alarm Set Point:	Min Temp Range default (Programmable via RS232)
High & Low Alarm Indication:	Red LEDs on the back Plate
Alarm Deadband:	5°C (10°F)
Alarm Outputs:	Two 12V outputs, 30 mA drive
Optional Built-in Relay: Rating	Two 12V SPST NO Relays (High & Low) 10A @ 24 Vdc – 10A @ 250 Vac
Transmitter Housing:	304 Stainless Steel
Lens Probe Housing:	Black Anodize Aluminum
Operating Ambient Temperature	
Transmitter:	0 to 50°C (32 to 122°F)
Transmitter with Water: Cool Jacket OS4000-WC	0 to 100°C (32 to 212°F)
Fiber Optic Lens Probe:	0 to 150°C (32 to 302°F)
Polymer Bolt Probe:	Tip (425°C, Max.), Bolt (150°C)
Glass Tip Assembly:	Tip (425°C, Max.), Fiber junction (150°C)
Quartz Tip Assembly:	Tip (1000°C, Max.), Fiber junction (150°C)
Water Flow Rate: (OS4000-WC)	0.5 GPM, room temperature

Air Flow for Lens Probe:	1 to 3 CFM (0.5 to 1.5 Liters/sec) Air purge collar (L1-AP)
Operating Relative Humidity:	0 to 95% RH without condensation
General Dimensions	
Main Housing:	63.5 OD x 154 L mm (2.5" OD x 6.062" L)
Fiber Optic Lens Probe:	25.4 OD x 184 L mm (1" OD x 7.25" L) Lens Housing 0.9, 1.8, 3 m (3, 6, 10 Ft.) Fiber Optic Cable
Weight:	900 g (2 lbs)

LASER SIGHTING

Maximum Laser Power Output:	Less than 1 mW @ 72°F Ambient Temperature
Laser Beam Wavelength: (Color)	630 – 670 nm (Red)
Operating Distance:	Up to 10 m (32 Feet)
FDA Classification:	Complies with 21 CFR Chapter 1, Subchapter J Class II Laser Product
European Classification:	Class 2 , EN60825-1
Beam Diameter:	5 mm
Beam Divergence:	Less than 1 mrad
Laser Power Switch:	Laser button
Laser Power Indicator:	Red LED on the back plate
Warning & Certification Label:	Located on the front plate
Identification Label:	Located on the back plate and around the periphery of the housing



NOTES:



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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