

®  **OS1561**

®  **Fixed Distance Infrared Sensor**

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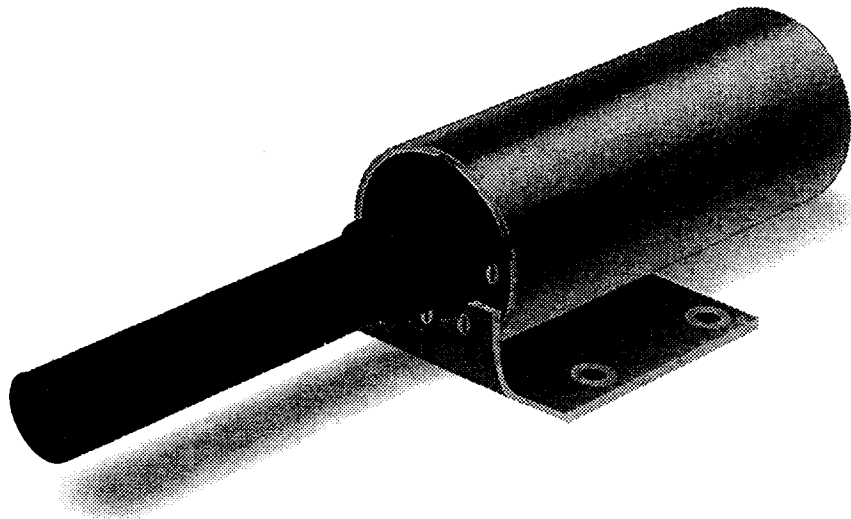
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Operator's Manual



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Remove the Packing List and verify that you have received all equipment. If you have any questions about the shipment, please call the OMEGA Customer Service Department at 1-800-342-3747 or (781) 784-4733.

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor any damage claims unless all shipping material is saved for their inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

The following items are supplied in the box:

- DP1561 (4122) Infrared Monitor
- Operator's Manual

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OS1561 INFRARED SENSOR

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SECTION 1 DESCRIPTION

1-1 GENERAL

The OMEGA® OS1561 Fixed Distance Infrared Sensor is a non-contact temperature measuring device, with built-in focusing optics and target locator. The OS1561 has a standard response time of 50 milliseconds.

Infrared heat radiation emitted by the target is collected by the lens, and directed to a detector cell. A radiation chopper is used for signal stability. The signal from the detector is amplified and then linearized before being output to the cable connector or terminals on the rear of the device. The unit provides a 1 millivolt/degree output standard with additional outputs available at time of order including 0-10 Vdc, 4-20 mA, and J or K thermocouple.

1-2 SPECIFICATIONS

Environmental temperature

Electronic chassis	10 to 50 degrees C
Emissivity Control	.05 - 1.00, adjustable in .01 steps
Response Time:	50 milliseconds (95% response to step input)
Calibration accuracy:	1% of reading
Linearization accuracy:	1% of full scale
Ambient temperature change accuracy:	.08% of full scale per degree C
Thermocouple output accuracy:	1% of linearized output Analog, less than 1 degree (F or C)
Spectral response:	1.8 - 3.0 microns
Detector type:	Lead sulfide
*Note all errors calculated using a blackbody temperature reference.	
Power supply requirements:	+/- 15 VDC @±100 mA regulated supply (±0.5% regulation)
Mating cable connector:	PT-6A-10-65 (SR)
Output:	1mV per degree (F or C) Optional output as ordered
Size:	2.7" H x 4.0" W x 12" D (69 mm H x 102 mm W x 305 mm D)

SECTION 2

INSTALLATION

The electronics housing may be mounted with the optional OS1561-MB mounting bracket at the appropriate target distance. This bracket electrically isolates the housing from ground. All grounding is done through the housing cable. If the OS1561-MB mounting bracket is not used, isolate the chassis from ground with a non-conductive material.

Mount the electronics housing in the vicinity of the measurement area. Although the electronics are temperature compensated for gain change, they are preferably mounted where it is shielded from direct thermal radiation or conduction in fluctuating thermal environments. A cool location is preferred to a warm one, but a stable location is most important. Note: A silicon RTV should be used around the emissivity window, when being mounted in harsh environments.

2-1 CABLE CONNECTIONS

The electronics housing should be connected to the power supply and applicable inputs by use of the connecting cable included. If a permanent type installation is to be made, the cable should be installed in steel conduit for protection and for further shielding.

2-2 OPTICAL ALIGNMENT

Alignment of the infrared transducer with the target is best performed by "back illuminating" the assembly with an OS1500-BLS light source. An available backlighting fiber (OS1500-BLF) assembly should be connected to the fiber optic exiting the head to the left of the electrical connector. The other end is installed in the OS1500-BL light source. The light will project a ring of light at the focus distance. The center is the target area.

The OS1561 is intended for fixed mount applications where the pyrometer mounting location, relative to the object being measured, will be constant. The target spot size versus the distance to target is determined by the user at time of order, and this is what should be used as the spot size versus distance to target.

2-3 REAR PANEL CONNECTIONS

2-3-1 POWER AND OUTPUT CABLE

The cable should be connected to the OS1561 as described in Section 2-1. See Section 2-3-2 for input and output descriptions of cable assembly.

2-3-2 OUTPUT CABLE CONNECTIONS

The two terminals TB1-1 and TB1-2, marked plus and minus, are used for thermocouple output. Only the applicable thermocouple wire can be connected to these terminals. Any other type of wire will result in inaccurate readings.

<u>TERMINAL LUG</u>	<u>DESCRIPTION</u>	<u>USE</u>
CABLE PIN A	+15 VDC	+ 15 VOLT DC POWER SUPPLY INPUT
CABLE PIN B	COMMON	POWER SUPPLY COMMON AND COMMON FOR 4-20 MA OUTPUT
CABLE PIN C	-15 VDC	-15 VOLT DC POWER SUPPLY INPUT
CABLE PIN D	MV/DEGREE	TEMPERATURE OUTPUT 1 MILLIVOLT PER °C OR °F
CABLE PIN E	COMMON	COMMON FOR MV/DEGREE AND 0-10 VDC OUTPUT
CABLE PIN F	ANALOG OUT	4-20 MA OUTPUT (500 OHM LOAD MAXIMUM), OR 0-10 VDC OUTPUT (2 OHM LOAD MINIMUM). ALL ANALOG OUTPUTS ARE SCALED TO THE TEMP. RANGE ORDERED.
CABLE PIN G	OVERALL SHIELD	SHIELD, TIED TO EARTH GROUND. IF THE CHASSIS AND LENS TUBE ARE ISOLATED FROM EACH GROUND, ALSO TIE OVERALL SHIELD TO POWER SUPPLY COMMON.
TB1-1	T/C OUT +	THERMOCOUPLE ANALOG OUTPUT POSITIVE, USE APPLICABLE THERMOCOUPLE WIRE ONLY FROM TRANSDUCER TO CUSTOMER INPUT.
TB1-2	T/C OUT -	THERMOCOUPLE ANALOG OUTPUT NEGATIVE, RETURN. USE APPLICABLE THERMOCOUPLE WIRE ONLY FROM TRANSDUCER TO CUSTOMER INPUT.

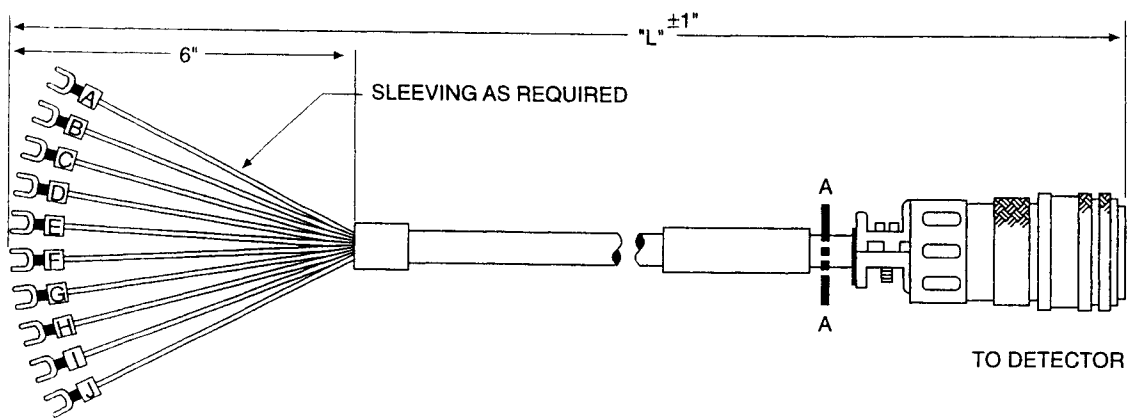


Figure 2-1. OS1561-Cable

SECTION 3

OPERATION

3-1 APPLYING POWER

All cable connections should be made before turning on the power supply. For the most accurate measurements and especially before calibration, the transducer should be allowed to warm up for a 30 minute period or longer if the room temperature is especially low.

3-1-1 EMISSIVITY CONTROL

The emissivity control is used to compensate for targets that are not blackbody (perfect) radiators. This control should be set to .99 for targets, which are known to be near-perfect infrared radiators, and at a suitable less value if the target emissivity is less than one and is known. The control should be set to .99 during system calibration.

There are several ways to determine the proper setting of the emissivity control. Some suggestions are:

1. If the temperature is known (by thermocouple measurement or some other means), simply adjust the emissivity control so that the temperature reading matches the reading desired.
2. Paint an area on the part with a high temperature black paint (use 3 coats). The emissivity of this coating can be assumed to be .99. Warm up the part to a uniform temperature, with the transducer emissivity on .99, measure the temperature of the part in the area that is blackened. Now, move the transducer to view the unblackened area. Adjust the emissivity control to match the temperature readings observed (with the emissivity control on .99) when the blackened area was viewed.
3. Find the emissivity of your material from an emissivity table. It is helpful to understand that emissivity may vary with: MATERIAL, PART SHAPE, ANGLE OF VIEW, WAVELENGTH OF MEASUREMENT, TEMPERATURE. For these reasons, to get the best accuracy possible duplicate your measurement environment when setting the emissivity control.

If you are not concerned with accuracy, but only want a repeatable reading leave the control on .99.

3-1-2 GAIN

This is a multi-turn potentiometer used to adjust system gain for calibration. It is accessed by removing the seal-screw in the front end cap of the electronics housing.

SECTION 4

CALIBRATION AND MAINTENANCE

4-1 PREVENTATIVE MAINTENANCE

Routine maintenance is not required except for periodic recalibration and occasional inspection of the lens for cleanliness. Lens damage or contamination should be suspected if there is a sudden change in the calibration of the transducer.

Dust and particles on the lens may be removed by use of an air jet or a soft brush. Dirt films and other accumulations should be removed by soft cotton or a Q-tip moistened with Windex, triple-distilled alcohol or lighter fluid (Ronsonal). A final wiping with dry cotton is recommended.

A periodic check of the electrical ground connection can be helpful in preventing RF-pick up problems.

4-2 CALIBRATION PROCEDURE

Power up the transducer and let it warm up for 30 minutes in a normal environment or longer in a cool one. Set the emissivity control to .99.

Clean the lens of the OS1561 before calibration. Make sure the target size of the OS1561 is fully taken up by the blackbody calibration source.

Align the OS1561 spot size to the blackbody calibration source and set desired temperature of the blackbody. The OS1561 reading should agree with the value indicated based on the blackbody calibration source. If not, the front end cap GAIN control should be adjusted until agreement is obtained. A clockwise rotation increases the gain.

If it is not possible to achieve calibration by use of the GAIN control, or if there has been a sharp change in calibration since the last check, there may be damage to or contamination of the lens or electronics. Contact OMEGA.

SECTION 5

ACCESSORY ITEMS

5-1 THE OS1500-BLS LIGHT SOURCE

This light source will be found useful in "back illuminating" the optical assembly in order to position the target spot precisely. In back-illumination, light is sent into the rear of the transducer and out through the target end of the assembly so as to illuminate and to define the target visually.

The OS1500-BLS consists of a housing containing a high intensity quartz-iodide lamp, with related items.

The dimmer control operates by variation of the lamp voltage through a rheostat. A "fiber chuck" on the right hand side of the panel serves as the receptacle for the illuminated end of the fiber assembly. The lamp has a 200 hour lifetime at full intensity. The lifetime rating is an average value, and statistical fluctuations may be expected, especially as the result of supply voltage variations. Replacement lamps are available from OMEGA.



WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of **13 months** from date of purchase. OMEGA 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 should malfunction, 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. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being 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 which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

OMEGA is glad to offer suggestions on the use of its various products. Nevertheless, OMEGA only warrants that the parts manufactured by it will be as specified and free of defects.

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SPECIAL CONDITION: Should this equipment be used in or with any nuclear installation or activity, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the equipment in such a manner.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING 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.

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

1. P.O. 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 OR **CALIBRATION**, consult OMEGA for current repair/calibration charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair/calibration,
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3. Repair instructions and/or specific problems relative to the product.

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