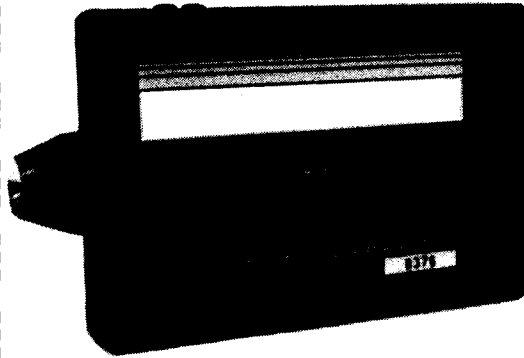
 OS91 and OS92

 Infrared
 Scanners



Operator's Manual
M1492/0792

Servicing USA and Canada: Call OMEGA Toll Free

OMEGA Engineering, Inc.

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RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING Customer Service Department. Call toll free in the USA: 1-800-622-2378, FAX: 203-359-7811; International: 203-359-1660, FAX: 203-359-7807.

BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, YOU MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OUR 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 you are having with the product.

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

1. Your P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems you are having with the product.

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

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Digital Infrared Temperature Scanners

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SECTION 1 INTRODUCTION

1.1 GENERAL DESCRIPTION

The OMEGA Models OS91 and OS92 Infrared Temperature Scanners are the fastest and most accurate instruments for general purpose surface temperature measurement. They are microprocessor-powered and computer calibrated for outstanding stability, and feature an Automatic Emissivity Compensation System (AECS) for close-up measurements; no emissivity adjustment is required. The factory calibration lasts the lifetime of the instrument and is designed and calibrated traceable to the NIST (formerly the NBS).

There are two models available: the OS91 and OS92. The OS91 has a 0.1 degree resolution display which can easily be changed between Celsius and Fahrenheit with the push of a recessed button. Instant lock, Max-reading lock, and Min-reading lock features offer the utmost in speed and precision. An audible assist feature beeps when a new Min or Max reading is detected. The OS92 has a 1 degree F resolution display, and a simpler Scan/Lock system instead of the more sophisticated locking system of the OS91. Both models update their display every 100 milliseconds. Housings are copper coated to shield against EMI/noise, which make these models attractive in the medical field.

The one-piece, high impact design eliminates cable and probe failures and provides durability unmatched in any optical measuring instrument. A psychrometer kit is included that allows measurement of wet and dry bulb temperatures, and a dial indicator to translate these two scanned temperatures into relative humidity and dew point values.

1.2 FEATURES

- Automatic Emissivity Compensation
- Scans Temperature Rapidly
- -50 to 550°F (-46 to 288°C) Temperature Range
- OS91 Features 0.1°C/F Resolution with Scan/Min/Max and Audible Assist
- OS92 Features Simple Scan/Lock with 1°F Resolution
- Spectral Response From 2 to 20 Microns
- Fast 80 msec Time Constant
- °C/°F Switchable (OS91)
- Relative Humidity/Dew Point Measurement
- High Impact Housing with Copper EMI Shield

1.3 AVAILABLE MODELS

- OS91 Digital Temperature Scanner,
0.1° resolution
- OS92 Digital Temperature Scanner,
1° resolution

SECTION 2 UNPACKING

Remove the packing list and verify that all equipment has been received. If there are any questions about the shipment, please call OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660.

Upon receipt of the shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

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

Both models are supplied with relative humidity kit, carrying pouch, marking pen, battery, and instruction manual.

SECTION 3 OPERATION

3.1 CONTROLS AND DISPLAYS

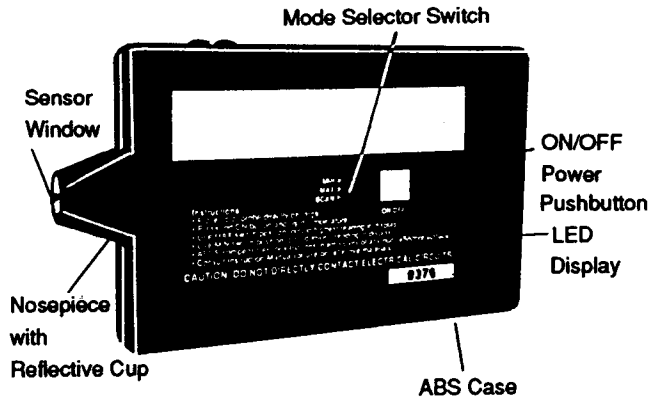


Figure 3-1. OS91/92 Controls and Displays

3.2 INITIAL START-UP

To turn the unit on, push and hold the ON/OFF pushbutton. The display will momentarily read "8888", an indication that the microprocessor is performing its self-diagnostic testing. The unit will then measure and display temperature in the selected mode of operation for as long as the button is depressed.

With the OS91, release the ON/OFF button to lock the display on the last reading. A single beep will audibly indicate that the display is locked. The instrument will hold the last reading on the display for ten seconds before it automatically turns itself off.

To reset the display and initiate a new set of readings, press the ON/OFF button at any time.

3.3 OS91 OPERATION MODES: SCAN, MAX and MIN

In the SCAN mode, the target's temperature is continuously displayed and updated 10 times per second for as long as you hold the button in. After you release the button, the display will lock on the last temperature measured and hold that reading for 10 seconds.

In the MIN and MAX modes, the display will lock on the highest or lowest temperature measured for as long as you hold the pushbutton in. Each time a new peak or valley temperature is measured or repeated, an audible beep will sound. After you release the pushbutton, the display will lock on the maximum recorded temperature and hold that reading for 10 seconds.

3.4 OS92 OPERATION MODES: SCAN and LOCK

The SCAN mode is used most of the time. It is used if you can see the display while measuring temperature.

If you cannot see the display while measuring a temperature, use the LOCK mode. The LOCK mode allows the display to lock onto the temperature of a surface in approximately three seconds after the ON/OFF button is pressed, and will hold the reading for as long as you keep the button pressed in.

1. Slide the switch into LOCK mode.
2. Put the nosepiece on your target surface.
3. Wait at least three seconds before removing the nosepiece.
4. Read the display.
5. Release the ON/OFF button.

You can also lock the reading at any time by first pushing the ON/OFF button ON with the mode switch in SCAN mode, aiming at your target and then sliding the mode switch into LOCK position. This locks the current reading instantly.

3.5 FAHRENHEIT TO CELSIUS CONVERSION

The OS92 Model is fixed for Fahrenheit operation. The OS91 can be switched from Fahrenheit to Celsius operation as follows.

1. Find the small hole on the left side of the red display filter.
2. Insert the end of a straightened paper clip into the hole and push to activate the small switch underneath.
3. While holding the paper clip pressed into the switch, turn the instrument on by pressing the ON/OFF button.
4. Remove the paper clip.

The instrument now reads in Celsius instead of Fahrenheit. To return to the original setting, simply repeat the process.

3.6 EMISSIVITY COMPENSATION

Emissivity is a measure of an object's ability to absorb and emit infrared energy. Typical emissivity values can range from 0.1 (very shiny metals) to 1.0 (blackbody).

The OS91 and OS92 models are equipped with an Automatic Emissivity Compensation System (AECS), so no emissivity adjustment is necessary. The AECS will work on any surface with an emissivity of 0.8 or higher.

For surfaces with emissivities lower than 0.8, such as metals, it is necessary to mark the surface with the solid paint marker which is provided.

Emissivity is automatically corrected for by "trapping" the infrared energy in the reflective cup nosepiece. The cup creates a blackbody on the surface and ensures an accurate temperature reading regardless of emissivity. Make sure that the nosepiece is very close to or touching the surface so that all of the energy is trapped. In general, the cup will not have enough compensation when held greater than approximately 1/4 inch (6.4mm) from the surface. You can, however, use an OMEGA OS20 thermometer for distance scanning, in which case the emissivity setting will be fixed at 0.98.

3.7 MEASURING EXACT TEMPERATURES

For exact temperature measurements, use the following procedure:

1. Set the MODE switch.
2. Press the ON/OFF button.
3. Touch the nosepiece to the target surface.
4. Release the ON/OFF button and read the display.

For best accuracy, speed and convenience, touch the nosepiece flush to the surface you wish to measure. This ensures that the Automatic Emissivity Compensation System will work at its optimum level. If the surface is metallic, be sure to mark it with the solid paint marker. See Section 3.6, Emissivity Compensation.

When using the OS91/92 on high temperature targets, momentarily touch the nosepiece to the target's surface - one second is enough to set an accurate reading. If contact is made for an extended time (10 seconds or more), the target's heat will conduct into the nosepiece. Although this will not harm the unit, the temperature reading may be a few degrees high. If this happens, allow a few minutes between readings to cool down. If the display message reads "HI", remove the instrument from the object immediately.

3.8 FIELD OF VIEW AND THERMAL SCANNING

The high performance OS91/92 can be used to measure temperatures at a distance. The displayed reading is an average of everything within its field of view. The emissivity setting is fixed at 0.98. Thermal scanning is very useful in many applications such as evaluating insulation, monitoring machinery, and inspecting electrical equipment.

The MIN and MAX modes can be particularly useful in thermal scanning. Once a hot or cold spot is located, the exact temperature can be measured by the procedure previously explained in Section 3.7.

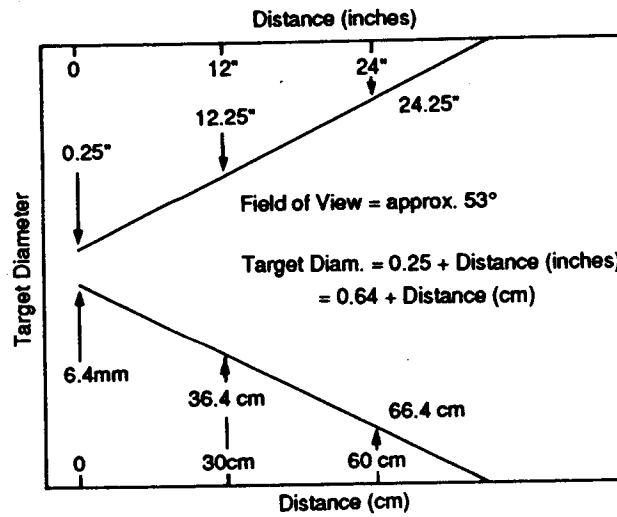


Figure 3-2. OS91/92 Field of View Diagram

3.9 MEASURING RELATIVE HUMIDITY

The OS91 and OS92 models are provided with a Relative Humidity Kit. The kit is comprised of a calculator card, a tube of water, and instructions. The calculator card incorporates two circular membranes, an RH calculator and a Dew Point calculator.

The temperature scanner is used to measure the wet bulb and dry bulb temperatures of the atmosphere. From these two temperatures, both the relative humidity and dew point can be calculated.

1. Wet the absorbent membrane identified as WET with a few drops of water (a small tube of tap water is provided with the kit).
2. Rapidly wave the card in the air for several seconds. This assures that the water on the wet membrane is evaporating at its maximum rate.
3. With the OS91 in the MIN mode, or the OS92 in the SCAN mode, quickly measure the temperature of the WET membrane immediately after you stop waving it. This is the atmosphere's wet bulb temperature.
4. With the scanner in the SCAN mode, measure the DRY spot. This is the atmosphere's dry bulb temperature.

5. Use the calculator card as directed to compute the relative humidity and dew point.

3.10 DISPLAY MESSAGES

The OS91/92 continuously monitors its ability to produce accurate temperature readings. If either the target's temperature or the unit's ambient temperature exceeds the operational limits, the beeper will sound one beep per second and the display will default to a display message.

The battery voltage is also monitored. A low battery is indicated by a double beep each second. Temperatures will continue to be displayed as long as accuracy can be assured. If the battery drops below 5.7 volts, the battery is considered dead and the display defaults to "----".

If a problem is discovered during the initial self-diagnostic test, the instrument will display an error message (E-01, E-02), etc. If an "E-##" error message is displayed, the unit will not function and must be returned to OMEGA for repair.

DISPLAY MESSAGES

DISPLAY	CONDITION
HI 1 beep/second	High Target Temp. >565°F (296°C)
LO 1 beep/second	Low Target Temp. <-65°F (-54°C)
HI A 1 beep/second	High Ambient Temp. >122°F (50°C)
LO A 1 beep/second	Low Ambient Temp. <32°F (0°C)
2 beeps/second	Low Battery <6.2V
---- 2 beeps/second	Dead Battery <5.7V
E-##	Processing Error Return unit for repair.

SECTION 4 MAINTENANCE

4.1 MAINTENANCE

The OS91/92 are rugged and durable instruments designed for long term reliability.

Calibration is performed by a computer through an optical link with the unit's microprocessor. Because there are no mechanical adjustments, the instrument is able to maintain its calibration through vibration and normal use. No user calibration is provided.

The only maintenance required is to keep the sensor window clean. This window, located at the base of the nosepiece reflective cup, is made of a special crystal which passes infrared heat. Dirt, greasy film or moisture on the window will interfere with the passage of infrared heat and affect the accuracy of the instrument.

If necessary, clean the sensor window and reflective cup with a cotton swab dipped in alcohol. Periodic cleaning is a good practice. When not in use, be sure to store the instrument in its carrying case to keep it clean.

4.2 BATTERY REPLACEMENT

The battery is accessed by removing the instrument cover. Loosen the four screws on the body of the instrument to remove the cover.

4.3 TROUBLESHOOTING

If the accuracy of the measurement is in question, check the following:

Is the sensor window clean?

Clean the sensor window and reflective cup and re-measure.

Is the target's surface non-metallic?

Coat metallic surfaces with a non-metallic finish and re-measure.

Is the target's surface transparent?

Coat transparent surfaces with an opaque non-metallic finish and re-measure.

Put a shiny metallic surface such as aluminum foil behind the transparent target and re-measure.

SECTION 5 SPECIFICATIONS

TEMPERATURE RANGE: -50 to 550°F
(-46 to 288°C)

TEMPERATURE UNITS: OS91: °C/°F switchable
OS92: °F

LINEARITY ERROR: ±1% of reading

EMISSIONITY ERROR: ±1% of difference between target temperature and instrument temperature when touching surface

REPEATABILITY: OS91: ±0.1 °F or C
OS92: ±1°F

DISPLAY RESOLUTION: OS91: 0.1°F or C
OS92: 1°F

LED DISPLAY UPDATE: 100 milliseconds

TIME CONSTANT: 80 milliseconds approx.

FIELD OF VIEW: 1:1 (53°) approx.

MINIMUM SPOT SIZE: 1/4 inch (6.4mm)

SPECIFICATIONS (Continued)

**SPECTRAL
RESPONSE:** 2 to 20 microns

POWER: One 9 volt alkaline battery

BATTERY LIFE: Approx. 5000 readings

DIMENSIONS: 3.375" x 5" x .75"
(8.5cm x 12.5cm x 2cm)

WEIGHT: 7 oz. (.2 kg)

NOTES

NOTES

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 our customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. Our 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.

There are no warranties except as stated herein. There are no other warranties, expressed or implied, including but not limited to the implied warranties of merchantability and of fitness for a particular purpose. OMEGA ENGINEERING, INC. is not responsible for any damages or losses caused to other equipment, whether direct, indirect, incidental, special or consequential, which the purchaser may experience as a result of the installation or use of the product. The buyer's sole remedy for any breach of this agreement by OMEGA ENGINEERING, INC. or any breach of any Warranty by OMEGA ENGINEERING, INC. shall not exceed the purchase price paid by the purchaser to OMEGA ENGINEERING, INC. for the unit or units or equipment directly affected by such breach.

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