Digital Infrared Scanners High Accuracy, Certified NIST-Traceability

OS950 Series

2 YEAR WARRANTY NIST CE

Standard
No Points

OS951 with integral sensing head shown smaller than actual size.

OS950 Series infrared scanners from OMEGA provide the highest accuracy available anywhere!

They are very different from conventional temperature measuring devices. These scanners are the only infrared instruments with certified NIST-traceable accuracy on real surfaces of unknown emissivity, and they are free of the contact errors and heat errors of contact devices. Traceable accuracy applies to surfaces with an emissivity of 0.8 or higher.

PATENTED

Covered by U.S. and International patents and pending applications.

The sensing surface area of the OS950 scanners is reflective to correct for emissivity variations.

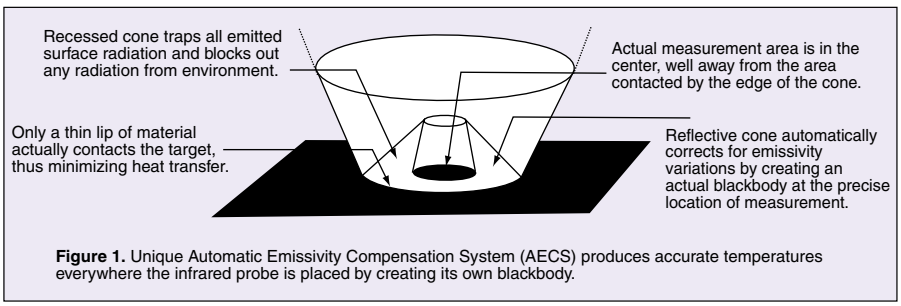


Figure 1. Unique Automatic Emissivity Compensation System (AECS) produces accurate temperatures everywhere the infrared probe is placed by creating its own blackbody.

Effect of Emissivity on Temperature Reading for a 260°C (500°F) Target in 21°C (70°F) Ambient

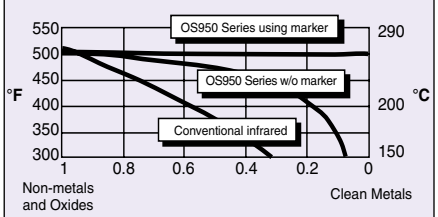


Figure 2. The OS950 Series is accurate over a wide emissivity range, sufficient to include all non-metals. If a marker (or any other non-metal coating) is used, the OS950 Series is accurate on clean metals as well. Conventional infrared devices are very inaccurate on these surfaces.

8 Reasons the OS950 Handheld Infrared Scanners from OMEGA are Superior to Conventional Devices:

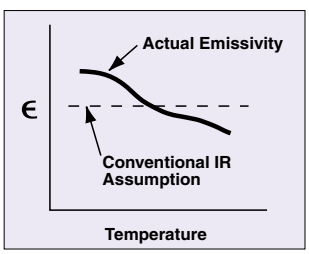
Reason #	Common Surface Temperature Measurement Errors	OS590 Series IR Thermometers	Conventional IR "Point and Shoot" Guns and Probes Including Laser-Aimed Units	Conventional Contact Probes, Thermocouples, RTDs, Thermistors
1	**Preset Emissivity Errors**	No effect	Very sensitive	No effect
2	**Emissivity Shift Errors**	No effect	Very sensitive	No effect
3	**User Adjustment Errors**	No effect	Very sensitive	No effect
4	**Background Errors**	No effect	Very sensitive	No effect
5	**Contact Errors**	No effect	No effect	Very sensitive
6	**Friction Heating Errors**	No effect	No effect	Very sensitive
7	**Heat Sinking Errors**	No effect	No effect	Very sensitive
8	**Time-Based Errors**	No effect	No effect	Very sensitive

1. No Emissivity Errors
The true emissivity of a surface can never be accurately determined by conventional infrared devices. Without OMEGA's automatic emissivity compensation system (see Figure 1 above), infrared devices with a preset emissivity setting can only display an approximate temperature over their entire temperature range.

The accuracy specifications given by most manufacturers are only for a "blackbody" calibration and do not hold outside laboratory conditions. Blackbody calibrations totally ignore emissivity shifts, ambient change effects on the target, and other phenomena. Only OMEGA's OS950 Series is unaffected by these distortions (see Figure 2 above).

2. No Emissivity Shift Errors
Even if an infrared "gun" is set to the correct emissivity to read a surface accurately at a particular temperature, it may not read the same target correctly at other temperatures. The emissivity of virtually all surfaces changes with temperature. For non-metals, the average change in emissivity is approximately -2% per 100°F target temperature change (-3% per 100°C).

3. No User Adjustment Errors
A setting of emissivity = 0.9 on an infrared "gun" from one manufacturer will not necessarily match that on a different gun from another manufacturer. No industry-wide standards exist for the precise use of emissivity



High Accuracy = High Speed in Your Process!

in measurement. Therefore, quality-assurance programs should not rely on any instrument that allows users to alter the instrument settings.

4. No Background Reflection Errors
Even if the emissivity were constant at all temperatures (see reason 2, on previous page), errors could still occur depending on changes in ambient temperatures. For example, with emissivity = 0.9, ambient reflections account for 10% of the signal that the infrared gun will detect. If the ambient temperature changes, the infrared gun will display a different target temperature, even if the target remains at the same temperature (see Figure 3 below).

5. No Contact Errors
Thermocouples, RTDs, thermistors, and other contact devices only measure their own temperature, not the surface temperature. When using such devices, one must ensure that the probes are brought to the same temperature as the surface.

6. No Friction Heating Errors
For moving surfaces, a contact probe is prone to friction heating errors. The size of the error depends on the roughness of the surface, the speed, the coating on the probe, and so on. It is impossible to control all the variables.

7. No Heat Sinking Errors
For most non-metals, heat sinking errors can be quite large. The metal leads of contact probes conduct heat faster than the target material can replace it, resulting in fairly sizable errors. In general, the less thermally conductive the target material, the larger the heat sinking error with a contact probe.

8. No Time-Based Errors
Contact temperature probes are slow. The temperature of a target can change more quickly than most probes can measure, causing errors in real-time measurement (see Figure 4 below).

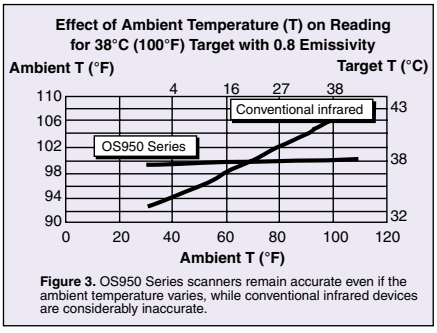


Figure 3. OS950 Series scanners remain accurate even if the ambient temperature varies, while conventional infrared devices are considerably inaccurate.

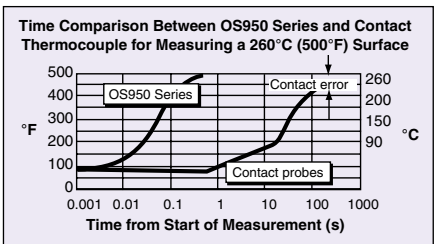


Figure 4. OS950 Series scanners measure surface temperature in a fraction of a second, while contact probes (thermocouples, RTDs, thermistors, etc.) require several minutes to achieve equilibrium. In addition, contact probes always have a residual error because of imperfect heat transfer from the surface to the probe.

Specifications

Temperature Range:
OS951/2: -45 to 287°C (-50 to 550°F)
OS953: -18 to 540°C (0 to 1000°F)

Emissivity Adjustment:
Automatic emissivity compensation system (best for emissivity above 0.8)

Accuracy: ±1% of reading or 2°C

Linearity Error (% of Reading):
OS951/2: 1%
OS953: 3%

Emissivity Error: -1% maximum of difference between target temperature and instrument temperature when touching, for emissivity of 0.8 to 1.0

Repeatability: 0.1°C (-0.1°F)

Resolution: 0.1°C (0.1°F)

Response Time: Approximately 0.1 s

Field of View: 1:1 (approximately 53°)

Minimum Spot Size:
Approximately 6.4 mm (0.25")

Spectral Response: 2 to 20 microns

Digital Output: RS232 (optional on all units)

°C/°F Conversion: Yes

Operating Temperature Range:
0 to 50°C (32 to 122°F)

Power: 9V battery (included)

Battery Life: Approximately 5000 readings

Dimensions: 165 H x 51 W x 25 mm D (6.5 x 2 x 1")

Weight: 198 g (7 oz)

OMEGACARE℠ Extended Warranty Program

OMEGACARE℠ extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE℠ covers parts, labor and equivalent loaners.

CAUTION! – This product is not intended for medical use or use on humans

OS952 with remote sensing head shown smaller than actual size.

OS953 with integral sensing head shown smaller than actual size.

To Order

Model No.	Range	Description
OS951	-45 to 287°C (-50 to 550°F)	Handheld IR scanner with integral sensor
OS952	-45 to 287°C (-50 to 550°F)	Handheld IR scanner with remote sensor
OS953	-18 to 540°C (0 to 1000°F)	Handheld IR scanner with integral sensor
Options	**Description**	
-RS232	RS232 digital output with 1.8 m (6') cable and 9-pin female connector	

Comes complete with operator's manual, 9V battery and NIST certificate.

***Ordering Examples: OS951-RS232,** handheld infrared scanner with integral sensor, -45 to 287°C (-50 to 550°F) range, and RS232 communications option.*

***OCW-2,** OMEGACARE℠ extends standard 2-year warranty to a total of 4 years.*

***OS952,** handheld infrared scanner with remote sensor, -45 to 287°C (-50 to 550°F) range.*