Spectra Vista Corporation

Full Sky Irradiance Sphere

USER MANUAL

Revision 2.0

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Introduction

Overview: The SVC Full Sky Irradiance Sphere has been precisely designed and manufactured to produce excellent correlation to the ideal cosine response function across the full spectral range. Adhering closely to the cosine response is necessary to obtain accurate values of irradiance levels. Laboratory tests have proven the SVC Full Sky Irradiance Sphere to be superior to typical cosine receptors especially in the SWIR spectral region, where many commercial diffuser-type cosine receptors stray from the correct cosine response. The Full Sky Irradiance Sphere consists of an integrating sphere attached to a special lens relay system to convey the light exiting the sphere into the instrument. The integrating sphere is composed of a pair of solid sphere halves manufactured from solid high density Spectralon® PTFE mated to form a 3.3 inch diameter spherical integrating chamber enclosed in a robust metal housing with one inlet port and one exit port.

The Full Sky Irradiance Sphere attaches to the SVC i-Series family of spectroradiometers via the foreoptic port on the front of the instrument, which has adequate structural strength to secure the sphere without an additional support. Using the sphere's internal lens relay system results in improved optical throughput versus a fiber optic relay system.

Superior Cosine Response: The SVC Full Sky Irradiance Sphere is the result of years of research and testing of multiple cosine receptor designs involving both reflective and transmissive materials. Spectra Vista, in collaboration with Labsphere Corporation, concluded that the best cosine response is produced using a sphere manufactured of a highly reflective material such as Spectralon®, along with a sharp knife edge inlet port and a specially designed baffled exit port located 90° from the inlet port. The rugged design ensures that the system will continue to perform for many years under typical field conditions.

The fully assembled SVC Full Sky Irradiance Sphere is shown below:

Figure 1 SVC Full Sky Irradiance Sphere (Fully Assembled)

Figure 2 Sphere Removed From Spectroradiometer

Figure 3 Sphere Stored in Field Case

Using the Full Sky Irradiance Sphere

Follow these steps to operate the Full Sky Irradiance Sphere:

1. Attach the SVC i-Series instrument to a tripod using the forward ¼-20 mounting hole on the bottom of the instrument.
2. Remove any existing foreoptic attached to the instrument
3. Attach the SVC Full Sky Irradiance Sphere to the instrument, carefully noting the orientation of the locating pin located on the sphere and the corresponding locating hole on the instrument.
4. Tighten the brass retaining ring in the direction indicated on the instrument. **Do NOT over-tighten the retaining ring**, it should only be finger tight.
5. Orientation, for best results:
   - Level the top of the Sphere in both axes.
   - Always orient the outlet port on the Sphere so that it points south in the northern hemisphere, and points north in the southern hemisphere.
6. Turn on the spectroradiometer, and select the appropriate "optic" for use with the Irradiance Sphere.

Figure 4 Full Sky Irradiance Sphere Mounted On Instrument / Tripod

Specifications

Sphere Size	4.6 in / 11.7 cm flange diameter 1.0 in / 2.5 cm ID inlet port 3.7 in / 9.4 cm height 5.6 in / 14.2 cm total length (includes mount)
Sphere Weight	1.5 lbs. / 0.68 kg
Response	Cosine
Mounting Thread Size	2"-16 UN thread
Compatible Spectroradiometers	SVC HR-1024i®, HR-768i®, HR-768si®, SVC HR-640i®
Environmental	Operating Temperature: -10ºC to +55ºC Storage Temperature: -25ºC to +85ºC Humidity: Up To 95%, non-condensing
Cleaning	Wipe down exterior with soft, dry cloth only.

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Document Revision Sheet

Revision Level	Section	Revised By	Date	Revision
1.0	All	LS	11/5/2010	Initial Release
2.0	All	WJR/LS	10/3/16	Revised for new sphere geometry.