

RaySphere and RaySphere 1700 Solar Analysis System Quick Start Instructions

Description

RaySphere is a calibrated high-performance measurement device. It is designed for testing the spectral distribution of all types of Solar Simulators and for validating the simulator for the spectral match test in accordance with the international standard IEC 90604-9: Solar Simulator Performance Requirements.

The RaySphere series of products consists of RaySphere and RaySphere 1700. They provide the following features:

- Intuitive graphical interface
- Graphical and table display of classification results by wavelength bin
- Output of actual spectra in $\text{mW}/\text{cm}^2/\text{nm}$
- Output of actual measurement and triggering timing with $\pm 44 \mu\text{s}$ resolution
- Printable classification report



RaySphere contains one QE65000 spectrometer, while RaySphere 1700 contains two spectrometers (QE65000 and NIRQuest512), a trigger unit to control the measurement procedure and a hub. The trigger sources can be a flash from the solar simulator, an electrical trigger pulse (high level with +5 V or +24 V), or a measurement can be generated manually at any time.

RaySphere software allows full control during the testing and generates a test report with the classification of the simulator.

This document provides you with information for testing a solar simulator with your RaySphere or RaySphere 1700 product. Detailed information for the RaySphere and RaySphere 1700 are provided in the [RaySphere Solar Analysis System Installation and Operation Manual](#).

Parts Included

The RaySphere package consists of the following items:

- **Pelican case:** The transport box for the complete RaySphere System
- **RaySphere** main body
- **Power Supply**
- **Four Power Cables**, one each for USA, Europe, UK, and Australia
- **Power Supply Connection Cable** SubD-type, 3-meter length
- **USB cable (USB-CBL-1):** Connects RaySphere to a computer's USB port (3-meter length)
- **RaySphere CD:** Contains RaySphere software and calibration files and manuals
- **Software and Technical Resources CD:** Contains software, operating instructions, and product information for all Ocean Optics software, spectrometers, and spectroscopic accessories. You need Adobe Acrobat Reader version 6.0 or higher to view these files (version 7.0 is included on the CD). Documentation is also available on our website at <http://www.oceanoptics.com/technical/operatinginstructions.asp>.
- **Passwords:** For any Ocean Optics software that you have purchased. Passwords are located on the back of the *Software and Technical Resources* CD jacket.
- **Calibration documents**

Important Safety Notices

1. Read the instructions first to avoid any damages.
2. Store your RaySphere system at above -10 °C and below 50 °C to avoid any damages.
3. This is a calibrated measurement device. Handle the system with care. The calibration precision may be lost if any dust or other pollutant enters the integrating sphere. When the system is not in use, store it with a dust protector. When removing the dust protector, be sure to keep pollutants from entering the integrating sphere aperture.
4. Recalibration is recommended after one year of use, or sooner if the measurements do not seem to be accurate. More frequent recalibration may be needed if the RaySphere has suffered any heavy shocks or is being used in a dusty environment.
5. The RaySphere is heavy. Take care to keep it from falling.

6. If the seal on the screws is broken, then the calibration is no longer valid.
7. Do not cover vents.
8. Do not cover the holes at the top of the RaySphere's main body.
9. To ship the RaySphere, pack it in the Pelican case, which is optimized for transport. Hand carrying the RaySphere is recommended for all traveling.
10. Contact your Ocean Optics regional headquarters for questions about RaySphere.
11. Be sure to follow all safety instructions for your solar simulator.

Installing Software

Caution

Install the software BEFORE connecting the spectrometer to your PC. The SpectraSuite software installs the drivers required for spectrometer installation. If you do not install SpectraSuite first, the system will not properly recognize the spectrometer.

RaySphere includes special software for operating your RaySphere system. This software is located on the RaySphere CD. The installation instructions are included below.

In addition, if you have purchased and are using SpectraSuite, follow the instructions in the *SpectraSuite Spectrometer Operating Software Installation and Operation Manual* for software installation instructions.

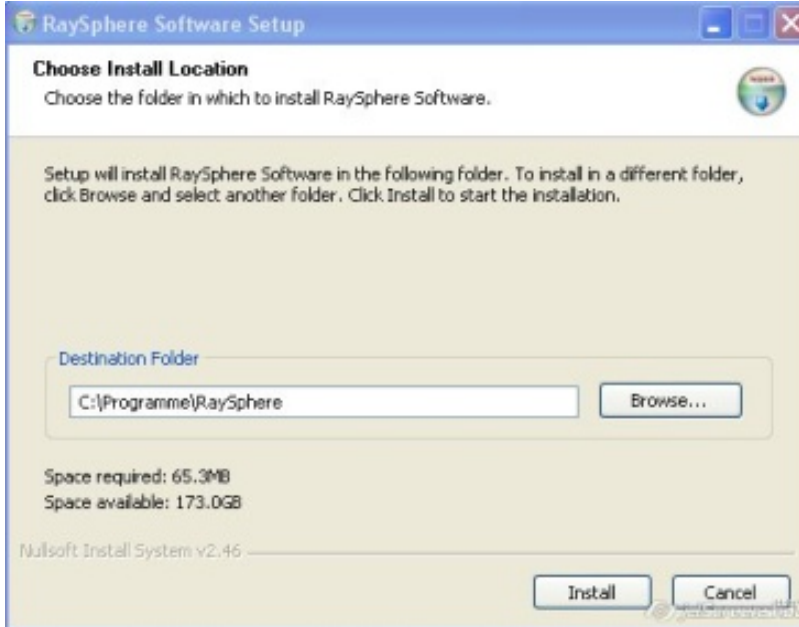
Caution

Do not run SpectraSuite and RaySphere software at the same time on the computer.

► Procedure

To install RaySphere software from the RaySphere CD,

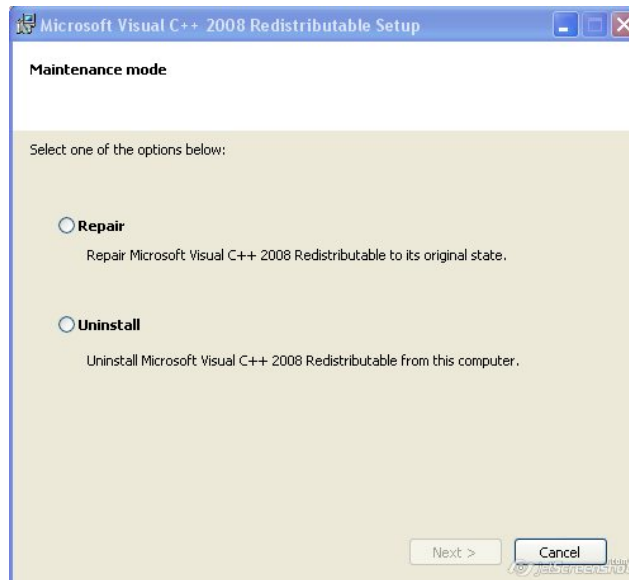
1. Close all other applications running on the computer.
2. Load the RaySphere CD. The CD contains the calibration data, fundamental settings and the software for operating the RaySphere on a 32-bit or 64-bit computer.
3. Select the Setup CD folder.
4. Select the installation file for either a 32- or 64-bit system. The setup process begins and the following screen appears:



5. Click the **Install** button. Then follow the prompts in the installation wizard.

Note

If the following screen appears during the installation, select **Repair**:



6. Click **Close** when the installation is completed. It is not necessary to restart your computer.

Assembling RaySphere

Follow the steps below to set up your RaySphere for use. It is recommended to perform 3 spectrum recordings (and to excite 3 flashes) within 5 minutes and to use the data from the last flash for the validation and certificate.

► Procedure

1. Connect the power cable to the power supply.
2. Connect the RaySphere unit to the power supply with the SubD cable.
3. Switch on the power supply.
4. Connect the RaySphere to your computer using a USB cable.

Caution

Be sure to switch on the power supply before connecting the RaySphere to your computer.

Your RaySphere is now ready to use after 20 minutes of warm-up time.


Using RaySphere with a Flash Solar Simulator





► Procedure

1. Place the assembled RaySphere main body close to the test plane so that its aperture is centered in the middle of the test plane.
2. If you are using an electrical trigger signal, select the correct input level for trigger signal at the power supply, and apply the signal cable to the BNC-connector on the power supply.
3. Make sure that the RaySphere software has been installed on the computer you intend to use.
4. Switch on the RaySphere power supply.

Caution

Always be sure to switch on the power supply before connecting the RaySphere to your computer.

5. Connect RaySphere via USB cable with your computer.
6. Start the RaySphere software.
7. Press **Load Config** () on the **System** tab to load your solar simulator configuration file.
8. Wait 20 minutes for RaySphere to reach the thermal equilibrium. Measure the dark spectrum again.

9. Press **QE65000** () and **NIR** () in the **Spectrometer** tab. Use the opening dialog box for recording a dark spectrum measurement.
10. Press **Start** () in the software interface.
11. Generate 5 single flashes with maximum speed of 1 Hz within 3 minutes. RaySphere records the data.
12. Select **Save All** () in the RaySphere software. Include the serial number of the flasher in the name of the file. The test report is generated automatically.






Using RaySphere with a Continuous Solar Simulator

► Procedure

1. Switch on the solar simulator.
3. Make sure that the RaySphere software has been installed on the computer you intend to use.
4. Switch on the RaySphere power supply.

Caution

Always be sure to switch on the power supply before connecting RaySphere to your computer.

5. Connect RaySphere via USB cable with your computer.
6. Start the RaySphere software.
7. Wait 20 minutes for RaySphere to reach thermal equilibrium.
8. Press **Load Config** () on the **System** tab to load your solar simulator configuration file.
9. Cover the RaySphere aperture (you can use the dust protector). Take a dark spectrum measurement by pressing **QE65000** () and **NIR** () in the **Spectrometer** tab.
10. Uncover the RaySphere aperture.
11. Place the assembled RaySphere main body close to the test plane so that its aperture is centered in the middle of the test plane.
12. Press **Sample** () in the RaySphere software interface 5 times each second. The RaySphere records the data.
13. Select **Save All** () in the RaySphere software. Include the serial number of the flasher in the name of the file. The test report is generated automatically.

Validating the Test Results

Check the following to be sure that you are collecting valid data:

- ❑ The RaySphere was allowed to warm up for at least 20 minutes before starting the test.
- ❑ No error or warning messages were received when the calibration file was loaded.
- ❑ The spectra recording was during the stable flash time phase. Check that all marks for Start and End of Recording in the Photocurrent graph are at a stable flash time.

Specifications

Specification	Value
Electrical:	
Input voltages	90 – 164 VAC
Input frequency	47 – 63 Hz
Power	75 W
Overvoltage protection	110 – 130% of main output
Fuse	M1.6 A
Trigger connection	BNC connector
Connector:	SMA 905
Optical:	
Optical input power	150 W to 2000 W
Wavelength range*:	
RaySphere	350 – 1100 nm
RaySphere 1700	300 nm – 1700 nm
Optical Trigger:	
Trigger delay	0 – 160 ms
Time resolution	0.87 μ s
Jitter	150 ns
Internal time resolution	2.54 μ s
Electrical Trigger:	
Electrical trigger type	High level
High level	5 V or 24 V (selected at the power supply. Galvanically isolated input.)
Minimum high time	100 ns
Connector	BNC

RaySphere and RaySphere 1700 Instructions

Specification	Value
Delays and Timing:	
Fixed internal delay*:	
NIRQuest	1030 μ s
QE65000	768 μ s
Internal delay	Selectable in 500 ns increments. Maximum 65500 steps.
External delay	0 – 168 ms
General:	
Operating temperature	15 °C – 33 °C
Storage temperature	-10 °C – 45 °C
Dimensions (l x w x h)	30.7 cm x 23.5 cm x 6.6 cm
Weight	
RaySphere	4.2 kg (main body)
RaySphere 1700	5.7 kg (main body)
USB Cable	No longer than 5 m
*See the specific spectrometer manuals for more details	

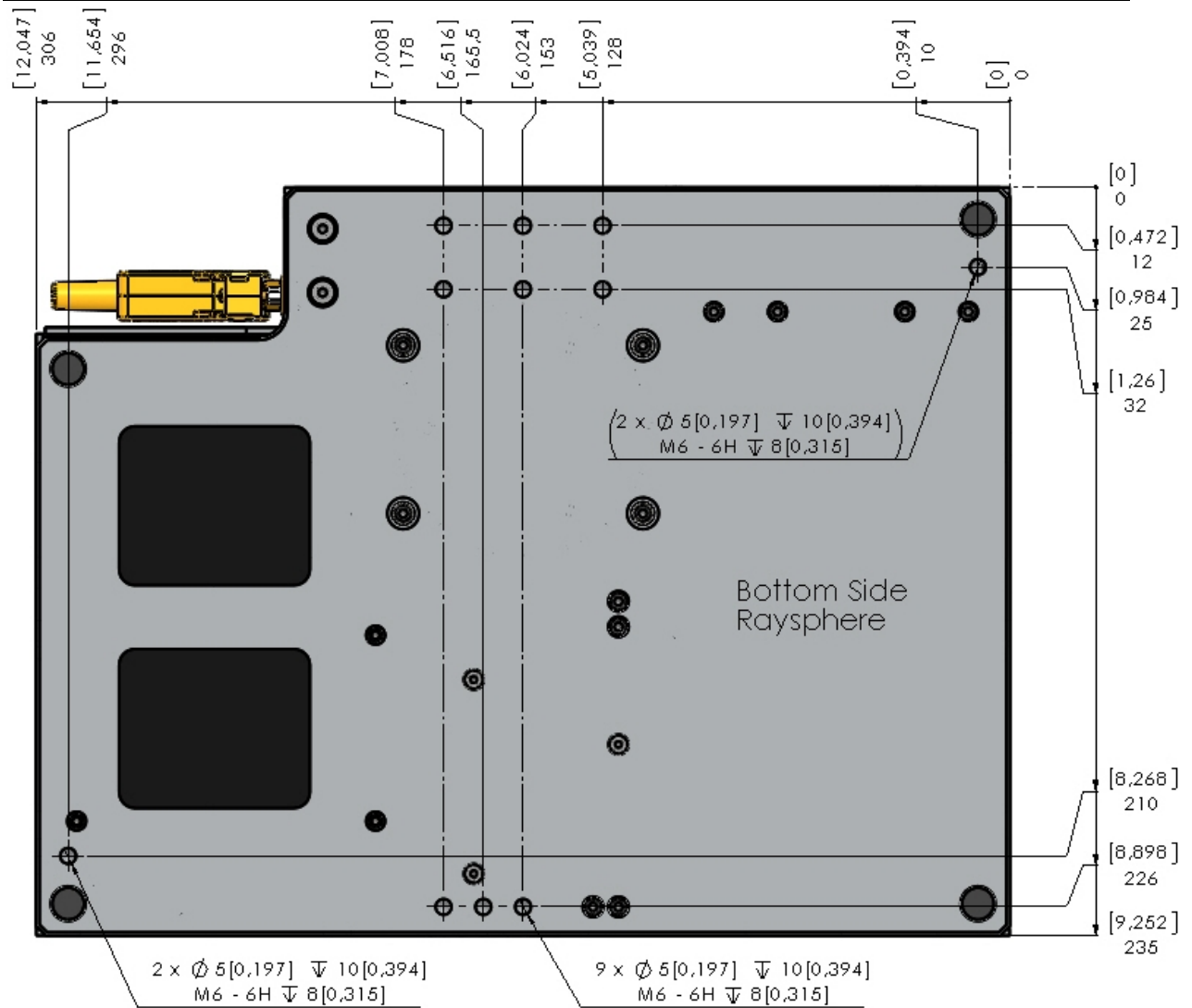
Mounting Options for RaySphere Main Body and Mechanical Diagram

The technical drawing shows the back side of the RaySphere main body. The system can be mounted at the indicated M6 rods only.

WARNINGS

Do not bend the system for tight mounting!

Mounting on uneven surfaces may bend the RaySphere system. This may cause increased measurement uncertainties.



Dimensions in [X.XXX] are INCH.

