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A HALMA GROUP COMPANY

NE-1 Neon Calibration Light Source

Installation and Operation Instructions

Description

The NE-1 Neon Calibration Source is a wavelength calibration source for UV-VIS-Shortwave NIR spectrophotometric systems. The NE-1 produces Neon lines from 540-754 nm, and is an ideal lamp to use when performing fast, accurate spectrometer wavelength calibrations.

The NE-1 features an SMA 905 Connector for interfacing with our optical fibers. It operates with a 12 VDC power supply (included with the unit) or 9V battery (not included).

The following sections detail the features of the NE-1 Neon Calibration Light Sources.

NE-1 Neon Calibration Light Source

Note

The NE-1 is NOT designed to operate as an excitation source in your experiments. Spectral lines above 922 nm are not easily detectable by Ocean Optics spectrometers.

Parts Included

The NE-1 package includes the following items:

- NE-1 Neon Calibration Light Source
- 12 VDC power supply

WARNING

The beam emerging from the light source contains UV radiation that can cause serious eye injury upon direct contact with the eye. Never look directly into the light source.

The SMA 905 Connector may get extremely hot during operation. After lamp use, allow sufficient time to cool before handling.

Dangerous voltages are present, and there are no user-serviceable parts inside. Never open the NE-1.

Additional Accessories

The following are additional accessories available from Ocean Optics that you may need, depending on your system set-up:

- Spectrometer
- SMA-terminated optical fiber
- Ocean Optics software

Connecting the NE-1

Follow the steps below to set up your NE-1 for use.

► ***Procedure***

1. Plug the 12 VDC power supply into a power outlet, then connect the barrel connector of the power supply to the power input on the rear of the NE-1.

   or

   Alternately, you can use a 9-volt battery (not included) to power the NE-1. Open the battery hatch of the NE-1 and install the 9-volt battery, and then proceed to Step 2.

2. Connect a fiber to the SMA 905 Connector on the NE-1. If your spectrometer does not have an entrance slit, use a 50 µm diameter (or smaller) fiber. Larger fibers and slits result in reduced optical resolution.

Note

If the spectrometer does not have a slit and your experiment requires you to use fibers of varying diameters, you will need to perform a wavelength calibration after changing fibers. You should perform a wavelength calibration each time you unscrew the fiber from the spectrometer and change fiber size.

3. Move the On/Off switch on the NE-1 (next to the SMA 905 Connector) to the On position. The red LED will illuminate to indicate that the NE-1 is powered on.

You have now configured the NE-1 for use.

Calibrating With the Light Source

The information in this section explains how to calibrate your spectrometer's wavelength using the NE-1 light source.

About the Wavelength Calibration

You are going to be solving the following equation, which shows that the relationship between pixel number and wavelength is a third-order polynomial.

$$a_p = I + C_1 p + C_2 p^2 + C_3 p^3$$

Where a = the wavelength of pixel p,
I = the wavelength of pixel 0,
C_1 = the first coefficient (nm/pixel),
C_2 = the second coefficient (nm/pixel^2)
C_3 = the third coefficient (nm/pixel^3)

You will be calculating the value for *I* and the three *C*s.

Calibration Requirements for Ocean Optics Spectrometers

To re-calibrate the wavelength of your Ocean Optics spectrometer using the NE-1, you will need the following items:

- NE-1 Neon Calibration Light Source
- Ocean Optics spectrometer and its manual
- An optical fiber (for spectrometers without a built-in slit, a 50-µm fiber works best)
- A spreadsheet program (Excel or Quattro Pro, for example) or a calculator that performs third-order linear regressions

Note

If you are using Microsoft Excel, choose **Tools | Add-Ins** and check **AnalysisToolPak** and **AnalysisTookPak-VBA.**

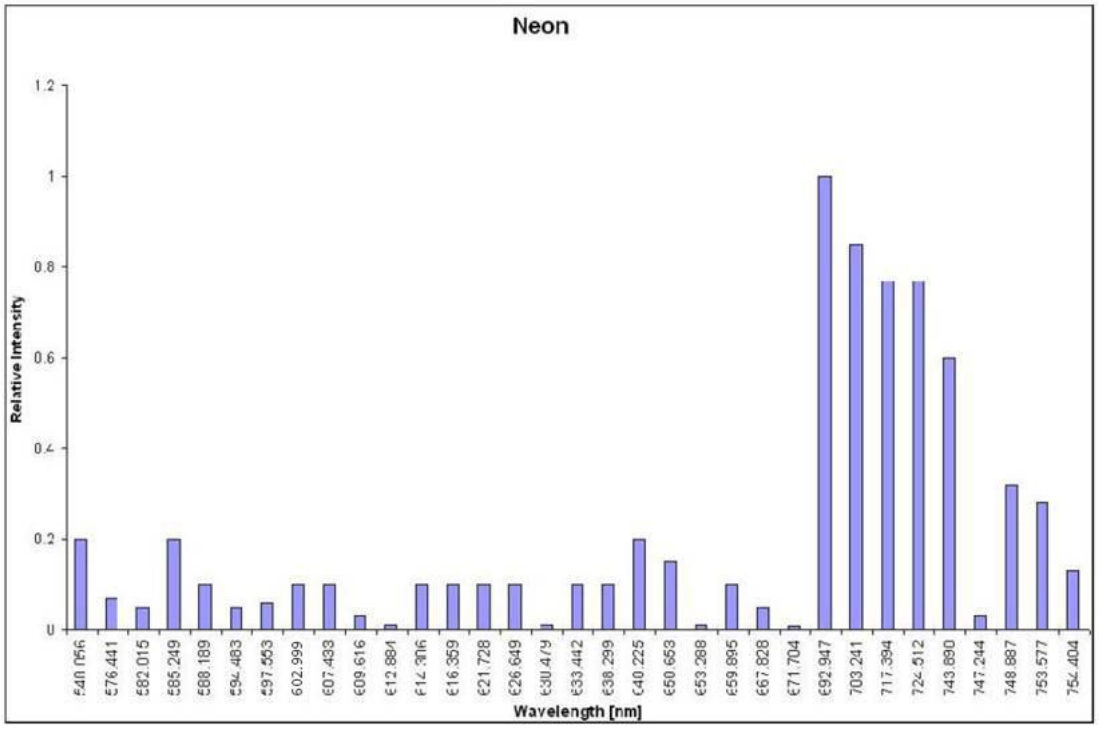
Calibration Procedure

Please see the appropriate manual for your model Ocean Optics spectrometer for instructions on how to calibrate it. Ocean Optics manuals are located at ***http://oceanoptics.com/support/technical-documents/***

NE-1 Specifications

The following sections detail the specifications of the NE-1.

Spectral Output



Strong NE Emission Lines by Wavelength (nm)

There are more emission lines shown below than printed on the label on the NE-1 housing. The label is intended as a quick, convenient reference and does not list every NE emission line that exists. Below is a list of wavelengths for Neon (as well as Krypton and Xenon). Wavelengths listed in blue are the ones listed on the calibration lamp's label.

Wavelength	Lamp	Wavelength	Lamp	Wavelength	Lamp	Wavelength	Lamp
341.790	Ne	503.135	Ne	733.930	Xe	904.545	Xe
342.391	Ne	503.775	Ne	738.600	Xe	**916.265**	Xe
344.770	Ne	508.038	Ne	739.379	Xe	**979.970**	Xe
345.076	Ne	511.367	Ne	740.040	Xe	**992.319**	Xe
345.419	Ne	511.650	Ne	**743.890**	Ne	**1083.837**	Xe
346.052	Ne	**540.056**	Ne	**747.244**	Ne	1117.752	Ne
346.658	Ne	**556.222**	Kr	**748.887**	Ne	1152.275	Ne
347.257	Ne	**557.029**	Kr	**753.577**	Ne	1181.938	Kr
349.806	Ne	**576.441**	Ne	**754.404**	Ne	1220.353	Kr
350.121	Ne	**582.015**	Ne	755.979	Xe	1317.741	Kr
351.519	Ne	**585.249**	Ne	758.468	Xe	1363.422	Kr
352.047	Ne	**587.096**	Kr	**758.741**	Kr	**1365.706**	Xe
359.353	Ne	**588.189**	Ne	**760.155**	Kr	**1414.244**	Xe
360.017	Ne	**594.483**	Ne	764.391	Xe	1442.679	Kr
363.366	Ne	**597.553**	Ne	**768.525**	Kr	**1473.281**	Xe
368.573	Ne	**602.999**	Ne	**769.454**	Kr	1473.444	Kr
370.122	Ne	**607.433**	Ne	780.265	Xe	1537.204	Kr
431.958	Kr	**609.616**	Ne	**785.482**	Kr	**1541.839**	Xe
436.264	Kr	**612.884**	Ne	788.132	Xe	**1605.328**	Xe
437.612	Kr	**614.306**	Ne	**791.343**	Kr	**1672.815**	Xe
439.997	Kr	**616.359**	Ne	796.734	Xe	1689.676	Kr
445.392	Kr	**621.728**	Ne	805.726	Xe	1800.223	Kr
446.369	Kr	**626.649**	Ne	**805.950**	Kr	1816.733	Kr
450.235	Kr	**630.479**	Ne	806.134	Xe	2190.851	Kr
452.186	Xe	**633.442**	Ne	**810.436**	Kr	**1262.339***	Xe
462.420	Xe	**638.299**	Ne	**819.006**	Kr	1520.310*	Kr
466.849	Xe	**640.225**	Ne	823.163	Xe	1620.872*	Kr
469.097	Xe	**650.653**	Ne	**826.324**	Kr	**1647.29***	Xe
469.804	Xe	**653.288**	Ne	826.652	Xe	**1656.023***	Xe
473.415	Xe	**659.895**	Ne	**829.811**	Kr	1755.350*	Kr
479.262	Xe	**667.828**	Ne	837.761	Ne	**1763.882***	Xe
480.702	Xe	**671.704**	Ne	849.536	Ne	1785.738*	Kr
482.971	Xe	**692.947**	Ne	**877.675**	Kr	**1790.45***	Xe
484.329	Xe	**703.241**	Ne	878.375	Ne	**1809.09***	Xe
491.651	Xe	**717.394**	Ne	881.941	Xe	**1832.53***	Xe
492.315	Xe	**724.512**	Ne	**892.869**	Kr	**1959.94***	Xe
						1984.638*	Xe

Specifications Table

Output	Low-pressure gas discharge lines of Neon
Dimensions (in mm):	125.7 x 70 x 25.8
Power consumption:	250 mA at 12 VDC
Power requirements:	12 VDC wall transformer (included) or 9 VDC battery (optional)
Bulb life:	Approx. 3500 hours (at 20 mA)
Internal voltage:	600 volts at 30 kHz
Aperture:	3 mm
Amplitude stabilization:	~ 1 minute
Connector:	SMA 905