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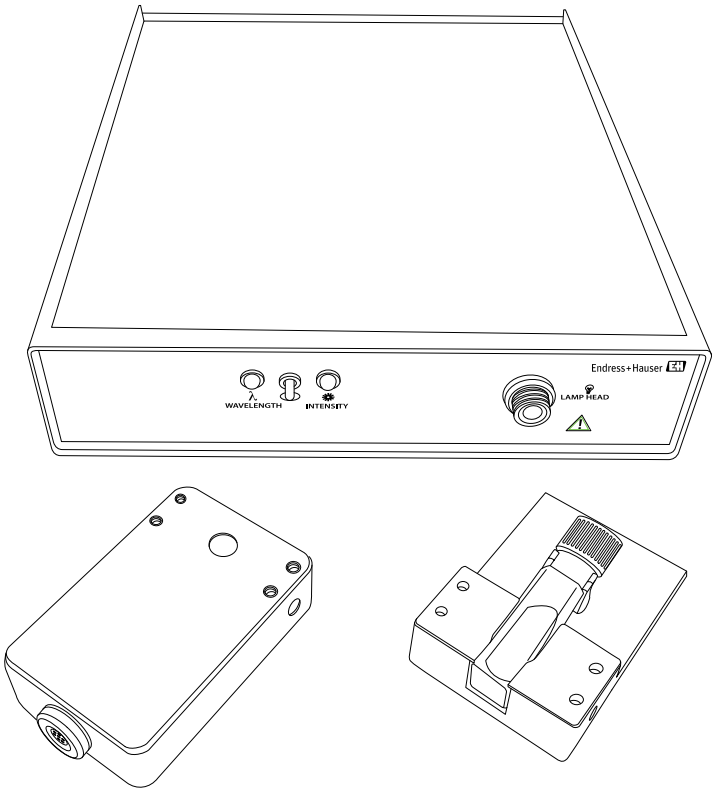
Technical Information

Raman calibration accessory



Endress+Hauser
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Function and system design

Introduction

The Raman calibration accessory is used for standardizing Raman instruments and analyzers in terms of both wavelength and intensity. When used in conjunction with the calibration protocol recommended in this manual, it allows different instruments to be standardized such that they generate similar spectra when measuring a given sample. The Raman calibration accessory was created specifically for use with Raman instruments and analyzers manufactured by Endress+Hauser.

The Raman calibration accessory contains wavelength and intensity reference lamps housed in a compact lamp head. The lamp head is connected to the control unit by a 1.8 m (6 ft) cable with positive locking, quick connectors at both ends. A diffuser window on the lamp head emits a quasi-lambertian pattern of light that, when properly positioned, fills the numerical aperture of a probe lens, microscope objective, or optical fiber.

Some Raman analyzers offered by Endress+Hauser incorporate internal neon calibration hardware. In those cases, the internal hardware approach is used in preference to the neon from a Raman calibration accessory.

For intensity standardization, a long-life, low-voltage tungsten-halogen lamp provides a factory-characterized spectral output. The primary reference source used in the certification process is a National institute of Standards and Technology (NIST) traceable source. The halogen cycle maintains near constant color temperature throughout the operating life of the lamp under constant-current operation. A precision current-regulated power source in the control unit assures consistent spectral output over many hours of operation.

Controls and connections

The controls and connections for the Raman calibration accessory are described below.

- **Unit power on/off.** The switch on the power entry module at the back of the control unit activates power to the unit. Allow the halogen lamp to warm up for 12.5 minutes for the color temperature of the bulb to fully stabilize prior to its use. The Halogen lamp LED indicator will continue blinking as a visual indicator of bulb warm-up time and will be solid when the warm-up period is complete.
- **Lamp head cable/connector.** The 1.8 m (6 ft) cable connecting the lamp head and the control unit has opposing connector genders on both ends. The red dot on the cable plugs must be aligned with the red dot on the sockets for mating. The connector locks when mated. Pulling directly on the spring-loaded connector body releases the connection.
- **Halogen lamp on/off.** Press the front panel switch to the right to turn on the halogen intensity lamp and lights the right green LED. The lamp turns off automatically after 45 minutes. The base unit keeps track of the lamp's elapsed “on” time (to the nearest 0.1 minute). If the lamp time exceeds 450 hours, the LED indicator is continuously yellow when lit. If lamp time exceeds 500 hours, the LED indicator is continuously red when lit. These two indications alert you to return the unit to Endress+Hauser for recertification.
- **Neon lamps on/off.** The neon lamps can be lit by pressing the front panel switch to the left. There is no time-out function.
- **Power.** The Raman calibration accessory uses a universal input switching power supply and will operate over a line input range of AC 100 to 240 V, 50 to 60 Hz. Main (line) power connection is made through a standard power cord with universal IEC320 connector. Power consumption is 30 W maximum.
- **Fuses.** Fuses are user-replaceable through a “drawer” next to the power switch on the back of the control unit. Always replace with two each AC 250 V rated metric (5x20 mm) fuses. For operation at AC 100 to 120 V or AC 220 to 230 V, use 2A time lag fuses.

Specifications

Dimensions

The height, width, and length of the calibration accessory are shown below:

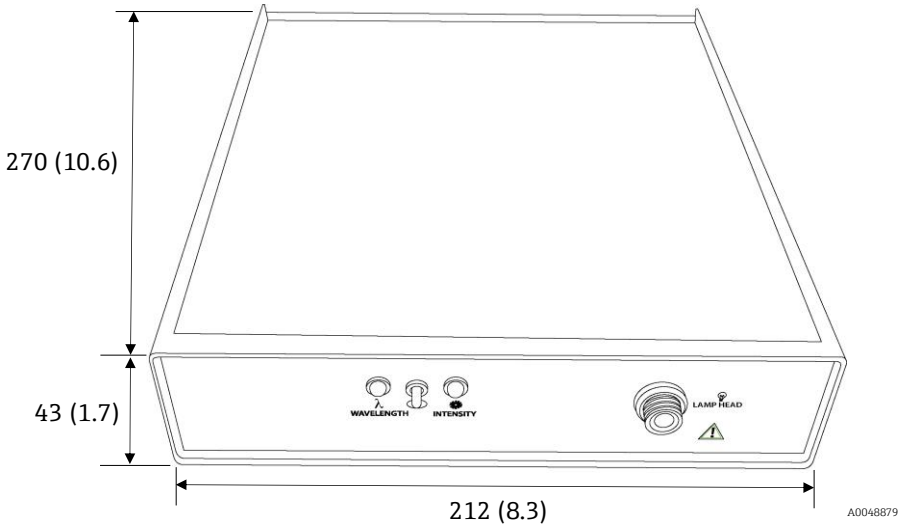

Figure 1. Raman calibration accessory. Dimensions: mm (in)

General

The calibration accessory specifications are listed below:

Item	Description
Spectral intensity reference	Tungsten-halogen
Data file spectral range for given HCA	HCA-532: 534.5 nm to 694.0 nm
Spectral intensity output repeatability (at time of certification)	< ±0.65 %
Spectral intensity output repeatability (over any 4000 cm−1 spectrum, over	±2.65 %
Total long term spectral uncertainty (at any wavelength)	HCA-532: ±2.85 % HCA-785: ±6.05 % HCA-1000: ±10 %
NIST traceable primary standard uncertainty	Available upon request
Power source	AC 100 to 240 V, 50 to 60 Hz
Power consumption	30 W maximum
Control unit dimensions	212 x 270 x 43 mm (8.3 x 10.6 x 1.7 in)
Control unit mass (weight)	1.60 kg (3.5 lbs)
Lamp head dimensions	50 x 80 x 19 mm (2.0 x 3.1 x 0.7 in)
Lamp head mass (weight)	0.10 kg (0.2 lb)
CE certified	Yes

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