Spectral DEVICES INC.

Product Sheet

20 Channel Hyperspectral Imaging System

HSIS-2-20
Version 08
March 10, 2025
Specifications subject to change

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Background information

Trademarks

Spectral Devices Inc., MSLED, MSC2, HSIS

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1. Description

Introducing the HSIS-20, a cutting-edge hyperspectral imaging system designed for precision, speed, and flexibility in a compact form factor. This programmable solution features a 20-channel LED illuminator paired with a high-resolution monochrome camera, offering unparalleled control and customization for a wide range of imaging applications. The HSIS comes in two variants: the 6.3MP version HSIS-20-63-1-A and the 20MP version HSIS-20-200-1-A.

Key Features:

- **High-Speed Hyperspectral Imaging:** Capture a complete set of 20 spectral images in less than 3 seconds thanks to its advanced sequential illumination and rapid image acquisition.
- **Versatile Software Control:** The intuitive Windows-based software allows for the seamless collection of hyperspectral video, offering full control over each spectral channel. Speed up acquisitions by activating only relevant bands.
- **Adjustable Capture Sequences:** Adapts to your imaging needs with capture repetition rates as short as 3 seconds for rapid analysis or as long as 24 hours for time-lapse studies, making the HSIS-20 ideal for both short and long-term data collection.
- **Built-in Reflectance Sensor for Autocalibration:** The system includes an innovative reflectance sensor ensuring accurate, comparable, and quantifiable reflectance images across all channels.
- **Complete Package:** The HSIS-20 comes fully equipped with a 20-channel hyperspectral LED illuminator with built-in tripod mounts, a high-resolution camera with a broadband lens, an reflectance sensor, data cables, AC power adapter, and Windows software.

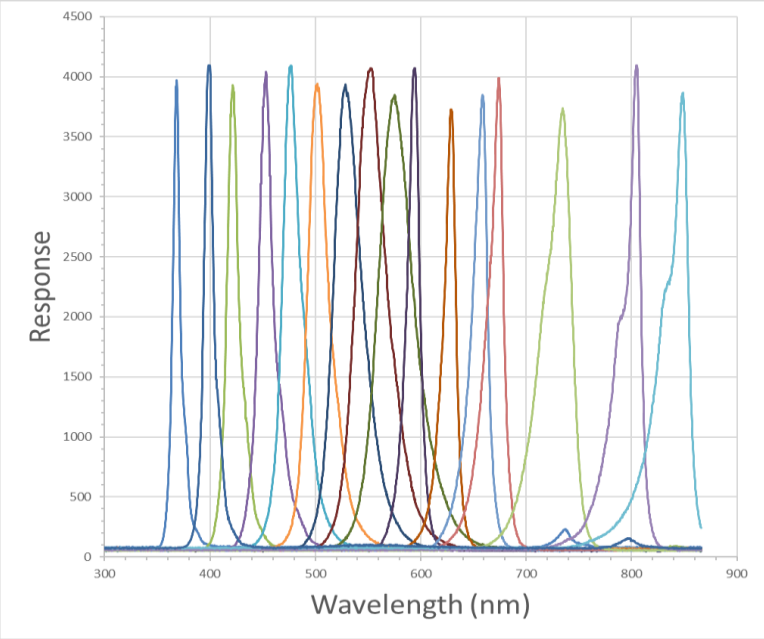
Whether you need fast spectral imaging or precise control for complex experiments, the HSIS-20 is the ultimate tool for reliable and efficient hyperspectral analysis.

2. Key Features

- Wide spectral range from 365 nm to 970 nm.
- 20 independent spectral channels
- Two camera options available:
  - 6 MP (min. acquisition time for 20 channels < 3 s)
  - 20 MP (min. acquisition time for 20 channels < 12 s)
- Windows control and analysis software included
- Independent on time, off time, and enable/disable of each channel
- Powerful pulsing circuitry for high light output
- Combine multiple units for greater light output
- Compact design

3. Spectral Response

The LED illuminator provides 20 different channels of spectral response.



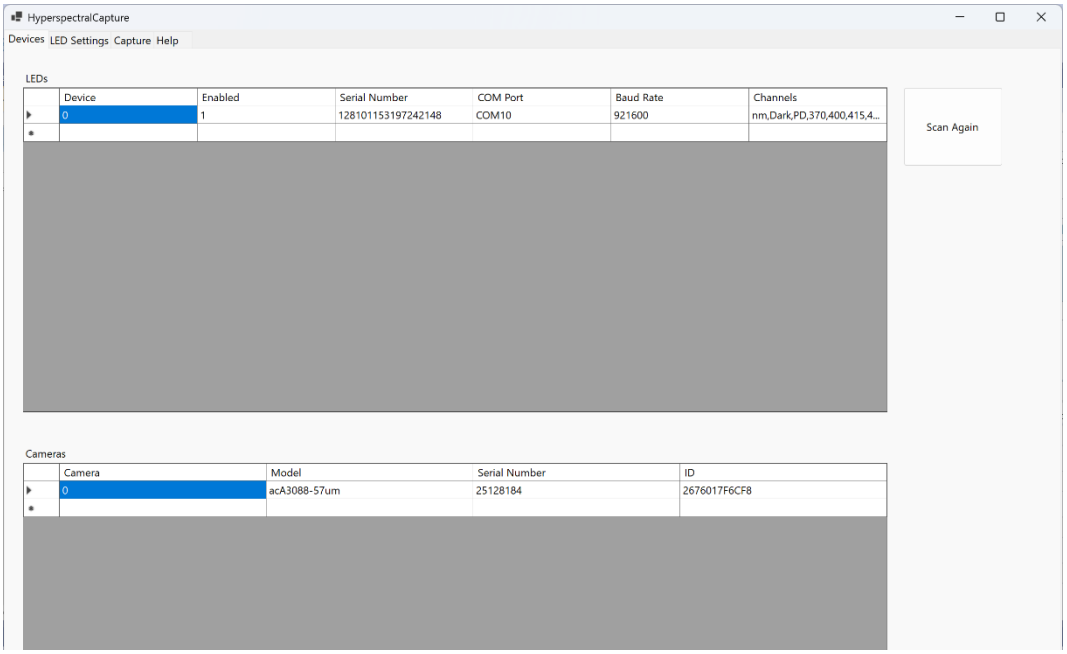
UV, 365-370nm
UV, 400-405nm
UV, 420-425nm
blue, 450-455nm
blue, 470-475nm
cyan, 490-500nm
pure green, 520-525nm
green, 540nm
green-yellow, 570nm
yellow, 590-600nm
red, 620-625nm
deep red, 660nm
IR, 680-690nm
IR, 730nm
IR, 800nm
IR, 850nm
IR, 900nm
IR, 940nm
IR, 970-980nm
full spectrum, 380-850nm

Spectral response (left) and center wavelength (right) of HSIS-20 output channels.

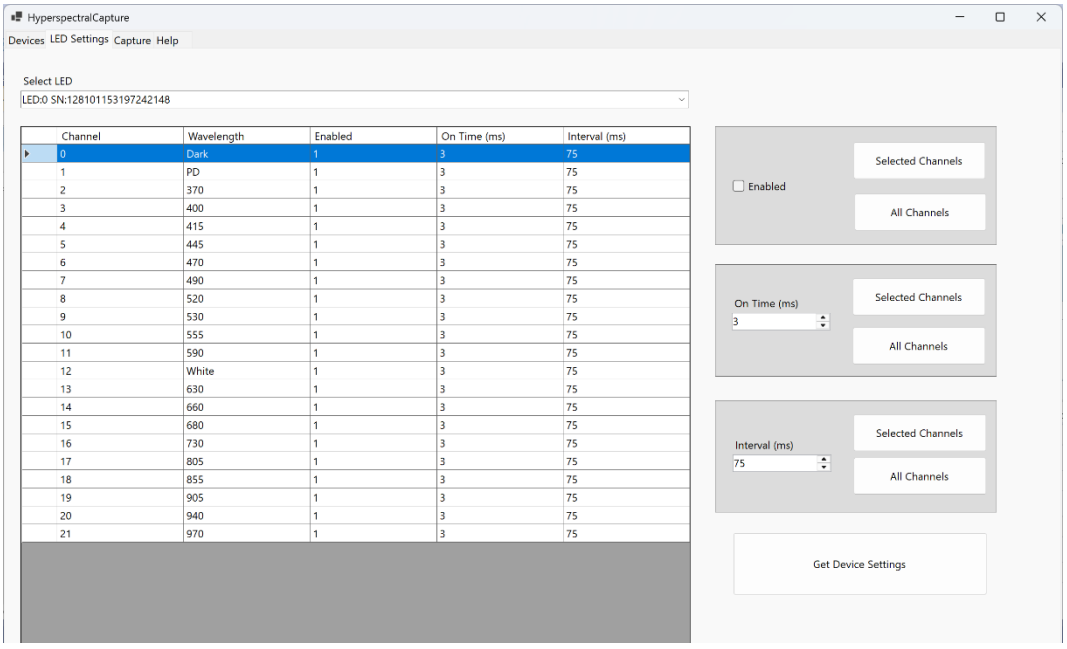
4. Software Features

- Graphical user interface
- Automatic detection of illuminator and camera
- Easily configure illumination parameters using spreadsheet-like interface
- Independently configure channel on-time, inter-channel interval, and inter-sequence interval
- Independently enable/disable channels
- Display images in real-time as they are acquired
- Select one or more regions of interest (ROI) and monitor spectra from each ROI in real-time
- Save images in multiframe tiff format (viewable in Windows without special software)
- Images saved with spectral metadata to aid user-developed post-processing algorithms
- Built-in spectral flattening algorithm (uses reflectance sensor) for quantifiable data

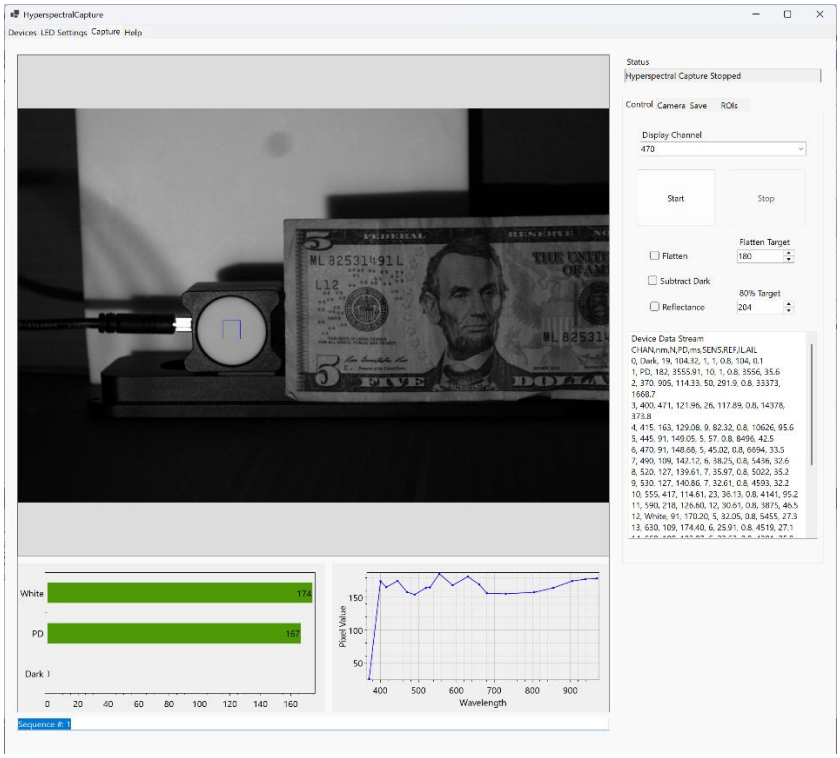
5. Software Screenshots



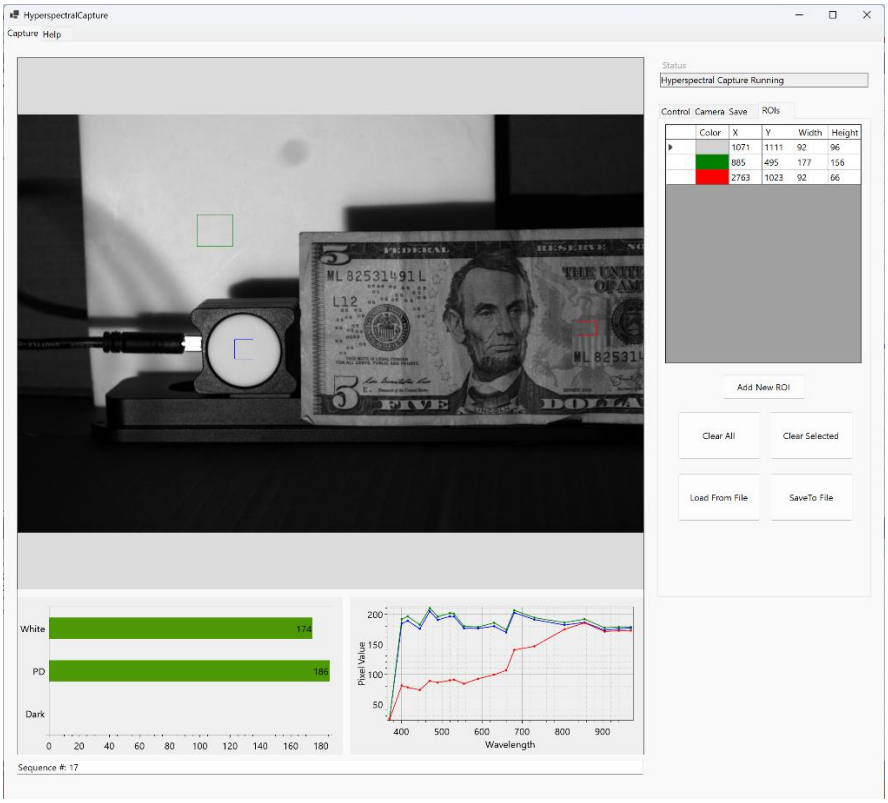
Automatic detection of LED Illuminator and camera



Configure each channel separately or in parallel.



View spectra in images and real-time and save images and data to disk.



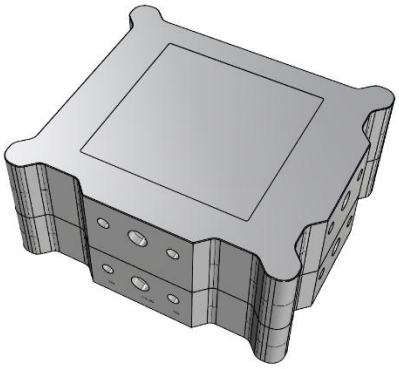
Set up multiple regions of interest for real-time spectral analysis.

6. Specifications

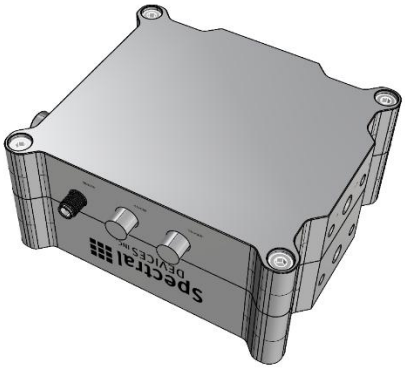
Camera	Two options: • 6 MP – HSIS-20-63-1-A • 20 MP – HSIS-20-200-1-A
Camera interface	USB 3.0 Vision
Number of LED channels	20
LED ON time	User-defined 1-50 ms, independent for each channel
Camera exposure time	50 ms, fixed for all channels
Brightness Adjustment Method	LED ON Time
Power per channel	~9W
Programmable interval between frames (channels)	≥ 75 ms and ≤ 2 s, independent for each channel
Acquisition Time	3 s for 20 channels (6 MP) 12 s for 20 channels (20 MP)
Programmable interval between sequences (20 channels)	≥ 3 s (6 MP) ≥ 12 s (20 MP) Up to 24 h
Lens	16mm broadband coated and corrected lens
Minimum working distance	20 cm
Maximum working distance	2 m
External Trigger	Yes (5V)
Connectors	LED control (USB-C) LED trigger in (SMA) LED strobe out (SMA) LED Power (5.5 mm barrel style) Camera trigger (Hirose) Camera data and power (USB 3.0 Vision)
Operating Temperature	0 – 40 °C
Storage Temperature	-10 – 50 °C
Dimensions	Camera: 29 mm x 29 mm x 50 mm LED Illuminator: 72 mm x 82 mm x 38 mm
Construction	Aluminum with black anodized finish, glass window
Tripod mounting	4 x ¼-20 threaded holes (4.5mm deep) 8 x M4 threaded holes (4.5 mm deep)
Power	12 VDC 2A power adaptor for LED illuminator (85 ~ 264 VAC) Camera draws power directly from USB3.0 data cable
Approvals (power adaptor)	BIS, BSMI, CB, CCC, CE, cULus, EAC, GS, KC, PSE, RCM, SIRIM

7. Drawing – 20 Channel Illuminator

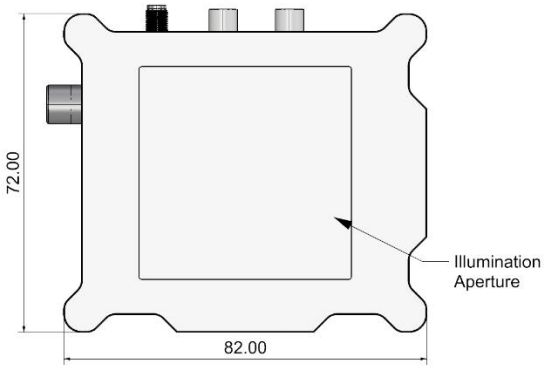
RENDERED TOP VIEW



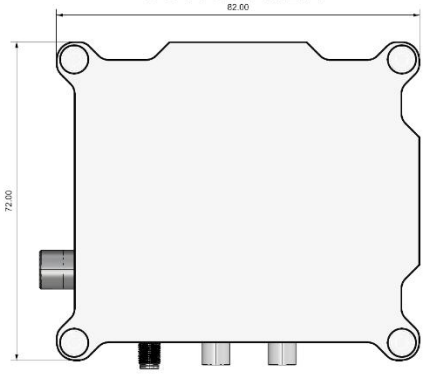
RENDERED BOTTOM VIEW



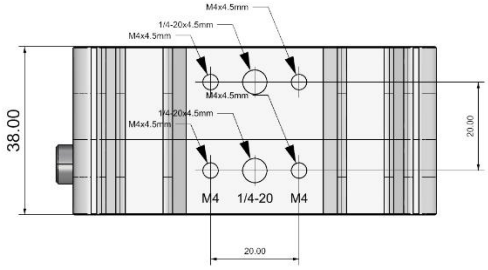
TOP VIEW



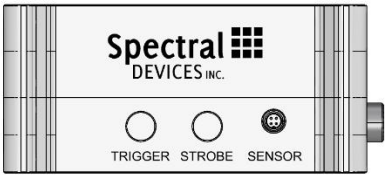
BOTTOM VIEW



FRONT VIEW

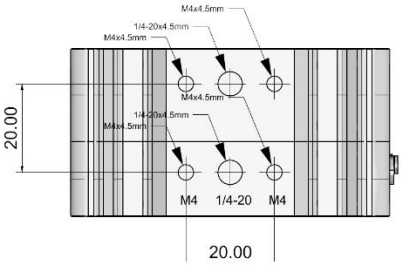


BACK VIEW



LEFT VIEW

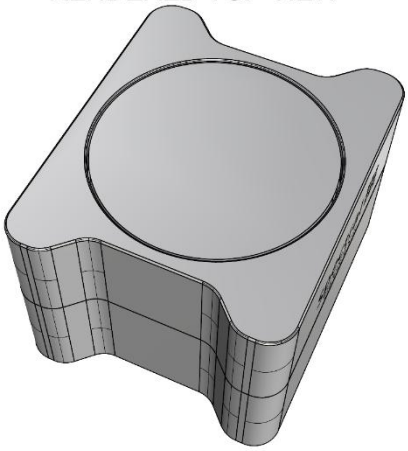
RIGHT VIEW



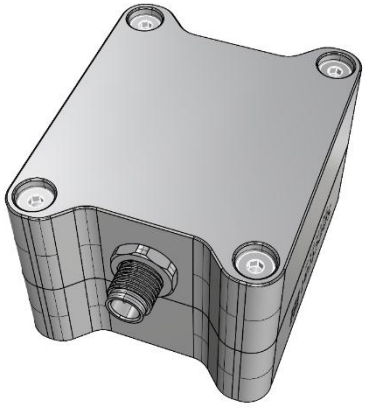
(all dimensions in mm)

8. Drawing – Reflectance Sensor

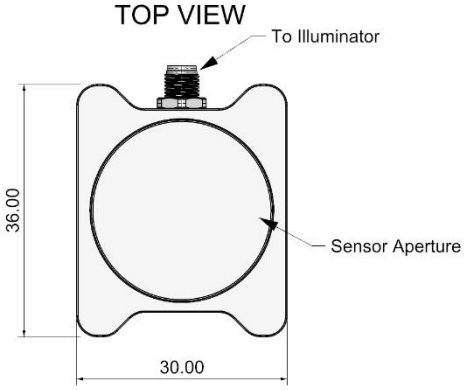
RENDERED TOP VIEW



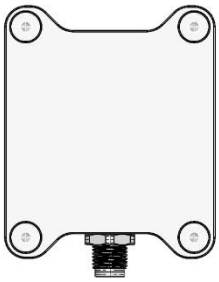
RENDERED BOTTOM VIEW



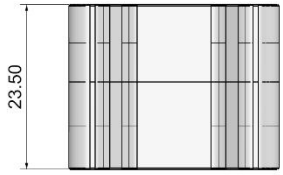
TOP VIEW



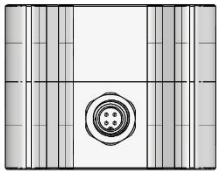
BOTTOM VIEW



FRONT VIEW

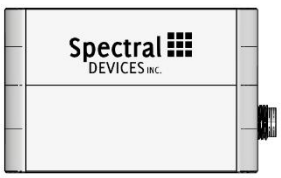


BACK VIEW



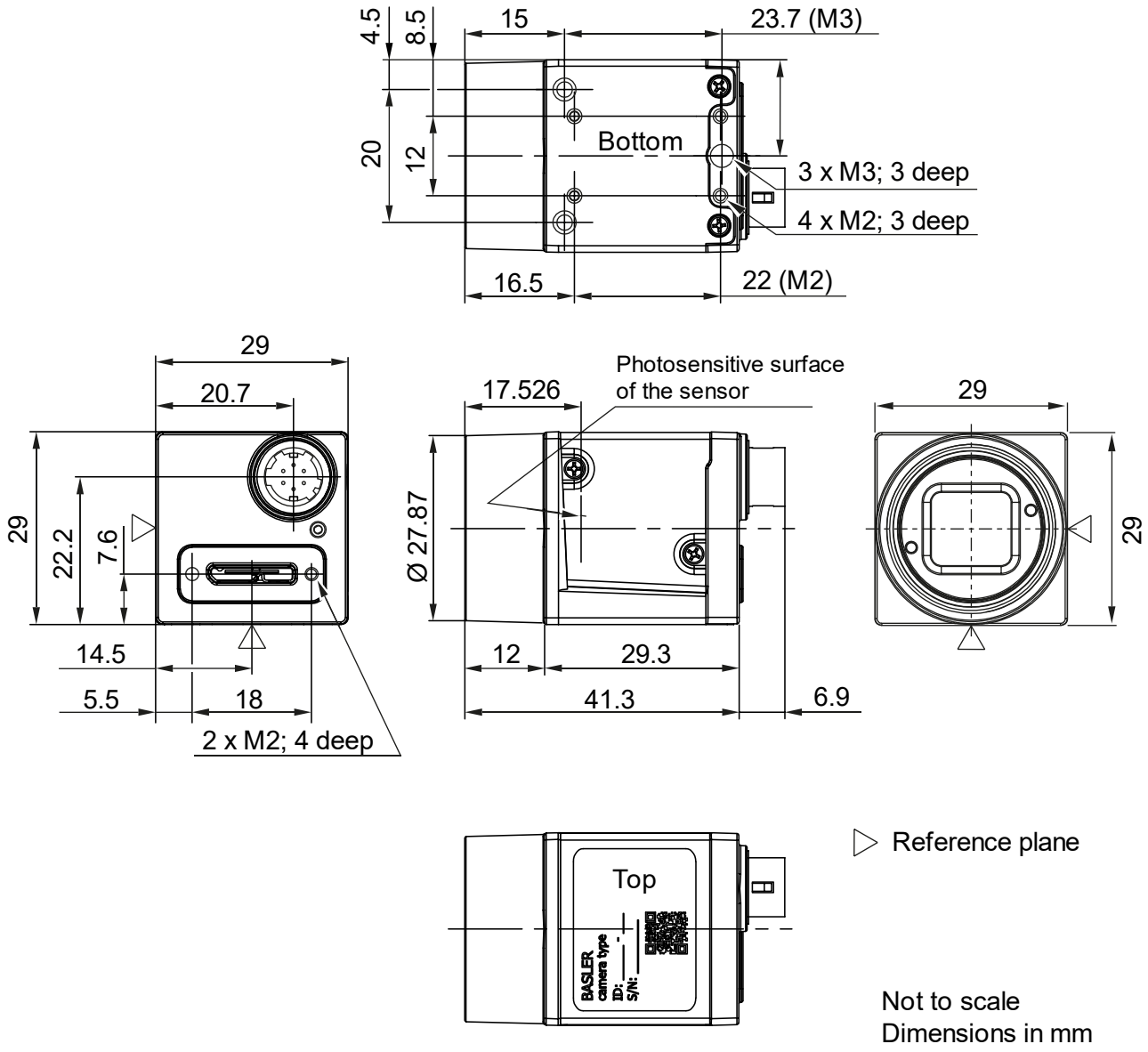
LEFT VIEW

RIGHT VIEW



(all dimensions in mm)

9. Drawing – Camera



10. Package Contents

20 channel hyperspectral LED illuminator x 1

USB 3.0 Vision camera x 1

Reflectance sensor x 1

Lens (focal length specified at time of order) x 1

USB 3.0 Vision cable x 1

USB-C LED communication cable x 1

Camera trigger cable x 1

Power adaptor x 1

Country-specific AC power cable x 1