



# Product Sheet

## Multispectral Imaging System

### MSIS-CUS4-1-A



MSIS-CUS4-1-A  
Specifications subject to change  
Revised February 20, 2022

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# 1. Description

The MSIS-CUS4-1-A is a multispectral imaging system incorporating an MSC2-CUS4-1-A snapshot multispectral camera and a 4-channel LED illuminator into a single waterproof and dustproof camera head. The camera head provides an adjustable mount for fixing the camera head to a user-supplied fixture and adjusting the pointing direction of the camera head in increments of 4.5° around a central axis. The LED illuminator contains 16 or 32 high power LEDs arranged in a ring pattern surrounding the lens of the camera. The camera and LEDs are protected by a 5 mm thick polycarbonate window. The LEDs are arranged into 4 channels. The four LED channels are matched to the spectral transmission characteristics of the snapshot multispectral camera. Each LED channel is controlled with a strobe circuit capable of overdriving the LEDs to achieve high light output. The system is shipped with an external waterproof control module that houses the strobe controller and an embedded computer. Control of the system is through easy-to-use mode and start/stop buttons on the control module, or simple text commands using a network connection. The system is self-contained and requires 48VDC power supplied through an optional desktop power supply, or user supplied battery system. The system is CNC machined from 6061 aluminum with black anodization.

# 2. Key Features

- Snapshot Operation (capture spectral images simultaneously)
- Captures 4 Bands (user chooses wavelengths at time of order)
- Anti-X-Talk™ Technology (enhances contrast and spectral performance)
- High Frame Rate (up to 180 FPS at full frame)
- High Performance (4MP Global Shutter CMOS Sensor)
- USB3 Vision & GenICam Compliant
- High power pulsed LED light source
- Compact waterproof and dustproof camera head (IP67)
- All cable connections removable and waterproof (IP67)
- Waterproof control module with computer and all software included
- Images saved to removable SD card and can also be retrieved over a network connection
- Users can monitor video feed from camera in real-time over HDMI
- Easy camera configuration using configuration file on SD card
- External ports for keyboard and monitor if direct access needed
- Headless operation (no keyboard or monitor required)
- Illuminated and color-coded buttons for instant feedback and control
- All necessary cables included

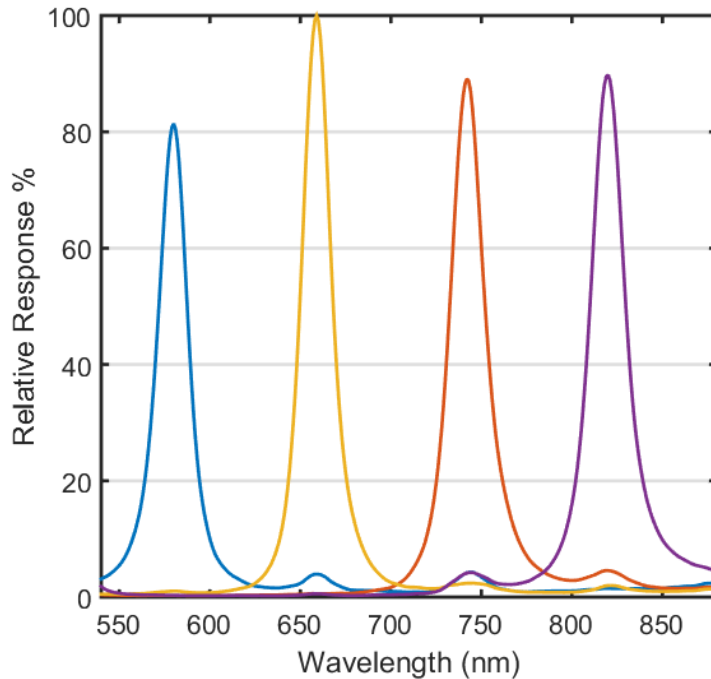
# 3. Applications

- Greenhouse monitoring of plants
- Research and development
- Industrial machine vision

- Tractor-mounted imaging applications
- CCTV-like monitoring
- Biomedical research
- Time-lapse multispectral imaging

## 4. Spectral Characteristics

Example spectral response of the MSC2-AGRI-1-A filter set:



## 5. Anti-X-Talk™ Technology

Unique to Spectral Devices is an on-chip technology we refer to as Anti-X-Talk™ technology. Anti-X-Talk™ technology works at the filter level and prevents light leakage between individual filters. Without Anti-X-Talk™ technology, stray light between spectral channels is significant, often exceeding the light leakage due to spectral overlap between adjacent filters. Without Anti-X-Talk™ technology, images suffer from low contrast and spectral ambiguity. Spectral Devices invented Anti-X-Talk™ technology to overcome these problems. It works by blocking stray light between adjacent filters, so the pixel response is predictable and directly related to the actual spectral response of the overlying pixelated filter. The result is multispectral images with better spectral discrimination and higher contrast. Furthermore, high quality image data from the MSIS-CUS4-1-A can be used as is without the need for proprietary post-processing algorithms and the camera can be used with a wide range of lens types, even at large apertures (e.g. f/2).

## 6. Specifications

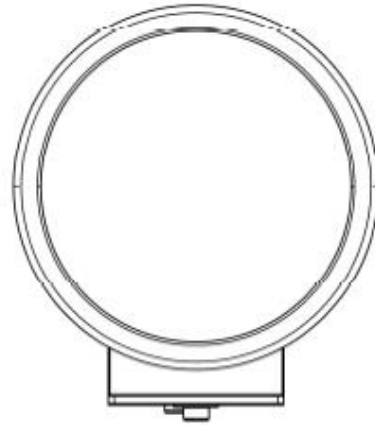
Camera	MSC2-CUS4-1-A Sensor size: 1" Bands: user defined at time of order
Lens	C-mount, 1" sensor, focal lengths available (6mm to 50mm) Manual iris, manual focus, locking screws
Number of LED channels	4
Number of LEDs per channel	4 or 8 (40W or 80W per channel)
LED control	Each channel controllable via software configuration file on SD card. Strobe output from camera flashes all 4 LED channels simultaneously.
LED channels	Customizable to camera bands
Exposure Modes	Timed exposure (22 $\mu$ s – 1.5 s). Timed interframe interval (5.6 ms – years).
External Trigger	Hardware trigger 5-24 Vdc signal (rising or falling edge). Externally triggered through 5-pin M12 connector.
Network	1Gb Ethernet (RJ45)
Operating System	Ubuntu Linux
Software	Embedded image acquisition software
External construction	6061 aluminum, polycarbonate, and 316 stainless steel hardware
Surface finish	Camera head: black anodization, polycarbonate
Power Requirement	24-75 VDC (180 W) Power supplied through panel mounted 4 pin M12 connector (8A Max).
Dimensions	Camera head: 200 mm diameter x 170 mm deep Control module: 146 mm x 200 mm x 270 mm (HxWxD)
Weight	Camera head: 2.5 kg Control box: 4 kg

# 7. Drawing: Camera Head

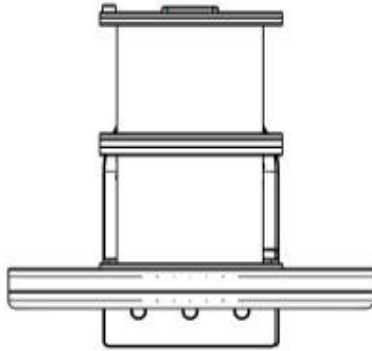
RENDERED VIEW



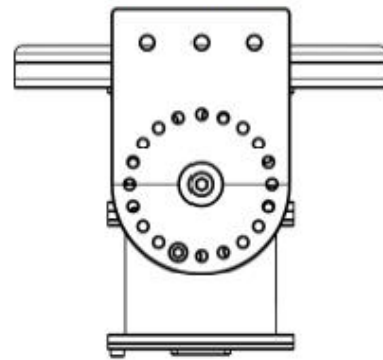
FRONT VIEW



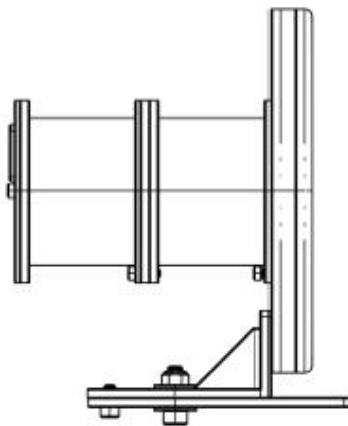
TOP VIEW



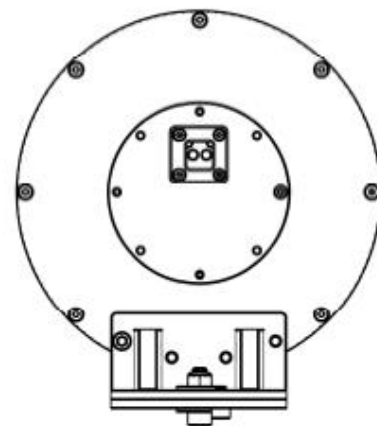
BOTTOM VIEW



SIDE VIEW



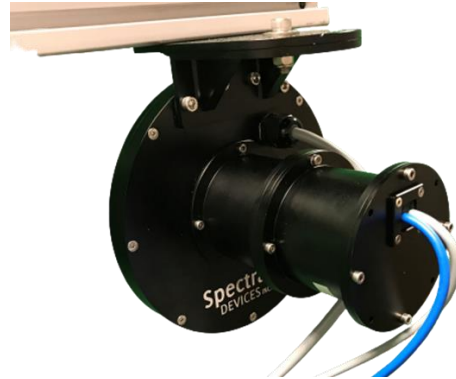
BACK VIEW



## 8. Photos: Camera Head



Front View



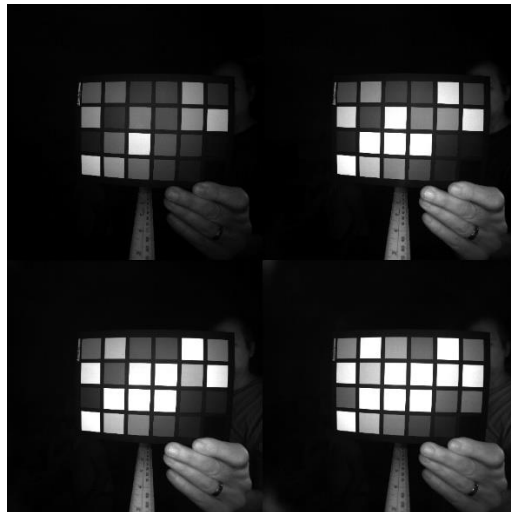
Side View



Back View



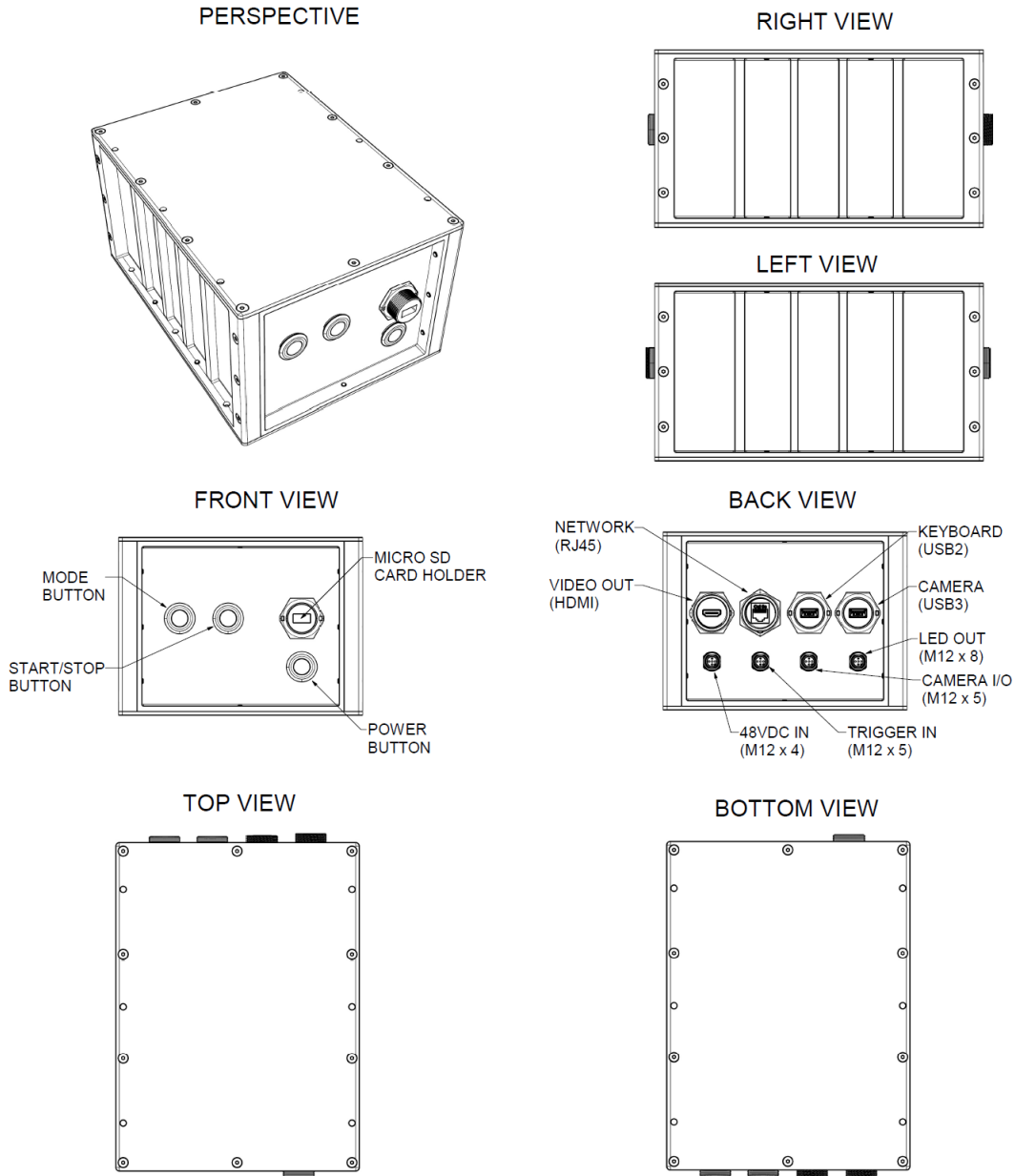
Side View



Color Target (6 mm focal length lens)

MSC2-AGRI-1-A

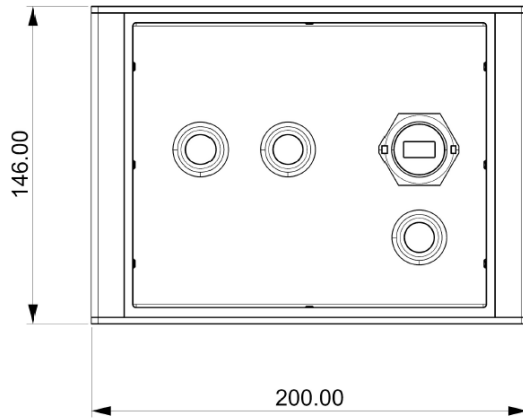
# 9. Drawing: Control Module





# 10. Drawing: Control Module Dimensions

FRONT VIEW



TOP VIEW

