**For Sales and Service**
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# SP-5000C-USB

## Technical Datasheet

*See the possibilities*

**Lince5M**

## Apex Series

Spark Series area scan cameras are the perfect choice for machine vision applications demanding high quality images with the highest possible throughput. They feature the latest CMOS imagers delivering high resolution images at speeds as much as 10 times faster than traditional CCD cameras.

For example, 45-megapixel (MP) models can deliver over 50 fps output while some 5-MP models run at 250 fps or more. Using the region-of-interest (ROI) feature, even higher frame rates can be achieved.

## Specification Highlights

| | | | |
|---|---|---|---|
| **SENSOR:** | Lince5M | **SHUTTER:** | Global Shutter |
| **FORMAT:** | 1” | **FRAME RATE:** | 62 fps |
| **PIXEL SIZE:** | 5.0 x 5.0 µm | **INTERFACE:** | USB3 Vision (PoUSB) |
| **LENS MOUNT:** | C-Mount | **RESOLUTION MP:** | 5 MP |
| **SPECTRUM:** | Color (Visible) | **RESOLUTION WxH:** | 2560 x 2048 px |

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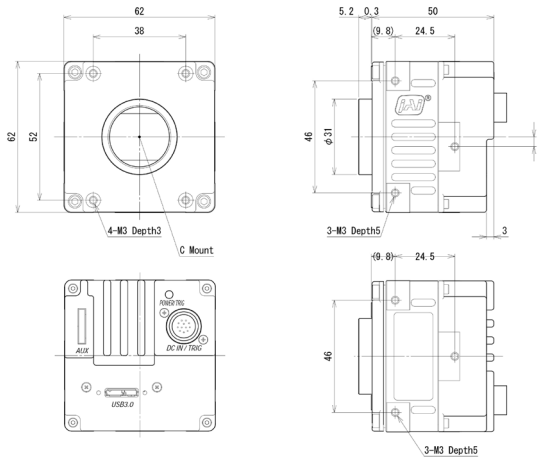
| Specifications | | SP-5000-USB |
|---|---|---|
| Sensor | | 1" CMOS global shutter |
| System clock | | 72 MHz (for pulse generator) |
| Frame rate, full frame | | 62 frames/sec. |
| Active area | | 12.8 mm (h) x 10.2 mm (v), 16.39 mm diagonal |
| Cell size | | 5.0 µm (h) x 5.0 µm (v) |
| Active pixels | | 2560 (h) x 2048 (v) |
| Read-out modes | | |
| Full ROI (mono) | | 2560 (h) x 2048 (v) up to 62 fps<br>1 line to full frame height in 1-line steps, with X offset and width in 16-pixel steps<br>2 lines to full-frame height in 2-line steps, with X offset and width in 16-pixel steps |
| Binning | | 1x2, 2x1, 2x2 (monochrome only) |
| EMVA 1288 Parameters<br>Absolute sensitivity (mono)<br>Absolute sensitivity (color)<br>Maximum SNR (mono)<br>Maximum SNR (color) | | 10-bit output format<br>23.50 p (λ = 525 nm)<br>36.08 p (λ = 525 nm)<br>41.48 dB<br>38.00 dB |
| Traditional SNR* | mono<br>color | >55 dB (0 dB gain)<br>>53 dB (0 dB gain, green) |
| Video signal output | mono<br>color | 8/10/12-bit monochrome<br>8/10/12-bit raw Bayer |
| Auto-iris lens video output | | 0.7Vp-p, with 0.3V horiz. sync |
| Gain | | Manual/automatic 0 dB to +24 dB |
| White balance (SP-5000C) | | Manual, one-push auto, or continuous (3000K to 9000K) |
| Gamma | | 0.45-1.0 (8 steps) or 256-point LUT |
| Synchronization | | Internal |
| Trigger input | | TTL, CXP, Pulse Generators (4), Software, NAND Out (2), GPIO |
| Trigger modes | | EPS, PIV, Trigger Width, Timed RCT (with ALC), Sequence |
| Electronic shutter<br>Timed exposure<br>Auto shutter | | 10 µs to 8 sec in 1 µs steps<br>1/62 to 1/100000 sec. |
| Auto Level Control (ALC) | | Shutter range from 1/62 to 1/100000, gain range from 0 dB to +24 dB, auto iris control. Tracking speeds and max values adjustable. |
| High Dynamic Range function (monochrome only) | | 4 built-in HDR slopes. Selectable up to ~84 dB. |
| Pre-processing functions | | Flat field correction, color shading correction (SP-5000C), blemish compensation (512 pixels) |
| 3-axis control | | Programmable control of motorized lenses, pan/tilt heads, and other analog accessories |
| Operating temperature | | -45°C to +70°C† |
| Storage temperature | | -45°C to +70°C |
| Humidity | | 20 – 80% non-condensing |
| Vibration | | 10 G (20Hz to 200Hz XYZ) |
| Shock | | 80 G |
| Regulations | | CE (EN61000-6-2, EN61000-6-3), FCC Part 15 class B, RoHS/WEEE |
| Power | | 12V to 24V DC ± 10%. 6.24W typical (full frame @ 12V) |
| Lens mount | | C-mount (fixed or adjustable) |
| Dimensions (H x W x L) | | 62 mm x 62 mm x 55.5 mm |
| Weight | | 255 g |
| **Ordering Information** | | |
| SP-5000M-USB | | Monochrome camera with two-channel USB3 Vision |
| SP-5000C-USB | | Color camera with two-channel USB3 Vision |

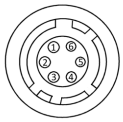
Note: Add -CX to model number for adjustable C-mount

## Dimensions




## Connector pin-out

### DC In / Trigger



HIROSE HR10A-10R-12PB-01

Connector Pin-out

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +12V to +24V DC input |
| 3 | GND |
| 4 | NC |
| 5 | Opto In- |
| 6 | Opto In+ |
| 7 | Opto Out- |
| 8 | Opto Out+ |
| 9 | TTL out 1 |
| 10 | TTL in 1 |
| 11 | +12V to +24V DC input |
| 12 | GND |

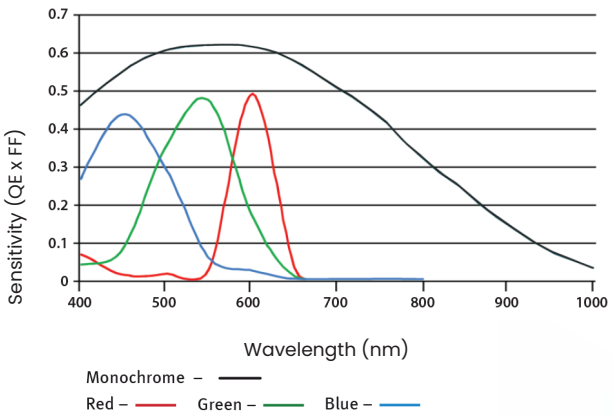
### USB 3.0 Interface

Micro B type - ZX3600-B-10P or equiv.

| Pin | I/O | Signal | Note |
|---|---|---|---|
| 1 | I | VBUS IN | Power (VBUS)[1] |
| 2 | I/O | DM | USB2.0 Differential pair (-)[2] |
| 3 | I/O | DP | USB2.0 Differential pair (+) |
| 4 | - | OTG ID | USB OTG ID for identifying lines |
| 5 | - | GND | GND |
| 6 | O | FX3 SSTXM | USB3.0 Signal Transmission line (-) |
| 7 | O | FX3 SSTXP | USB3.0 Signal Transmission line (+) |
| 8 | - | GND | GND |
| 9 | I | FX3 SSRXP | USB3.0 Signal Receiving line (-) |
| 10 | I | FX3 SSRXM | USB3.0 Signal Receiving line (+) |

[1] *SP-5000-USB does not accept power over USB*
[2] *Does not work with USB 2.0*

## Spectral response




Note: Color response includes IR-cut filter.

*Traditional SNR is based on random noise in a single frame, where EMVA SNR measurements consider more comprehensive noise sources and variance over time. For a more complete description, see the manual.

†Reduced performance may occur when operating outside the standard range of -5°C to +45°C

## Product Highlights

- Large format 5 MP CMOS imager (global shutter)
- Up to 62 fps at full resolution
- 5.0 µm square pixels in a 5:4 aspect ratio
- Monochrome or Bayer color models
- 60 dB linear dynamic range with up to 84 dB piecewise HDR modes (monochrome only)
- Analog front-end gain control for reduced noise in low light images
- On-chip analog gain for individual R, G, + B control (color models)
- Exposure control from 10 µs (1/100,000) to 8 seconds in 1 µs steps
- ROI modes for flexible readout, windowing, or increasing frame rate
- Vertical and horizontal binning on monochrome model
- 8/10-bit digital output over USB3 Vision interface
- C-mount lens mount
- Automatic Level Control (ALC) for dynamic lighting conditions
- Programmable P-iris lens control or 3-axis control for operation of motorized lenses, pan/tilt heads, or other analog accessories

## Additional Product Images

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