

❖ **SP-5000-USB**
5-megapixel CMOS global shutter

USBTM
VISION



- **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 100 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**

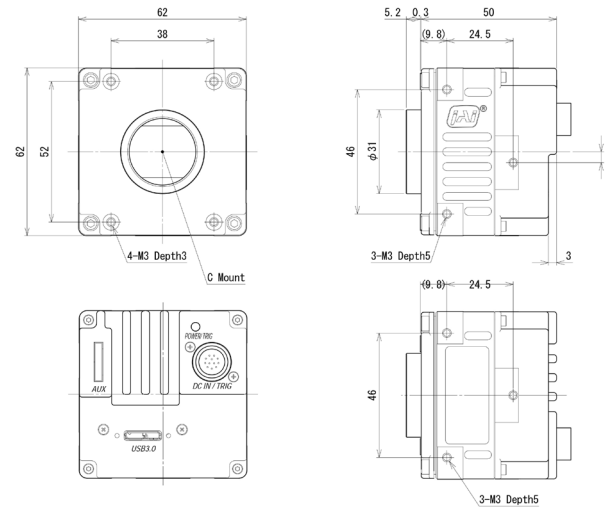


Specifications for SP-5000-USB

Spark Series

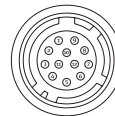
Specifications	SP-5000-USB
Sensor	1" CMOS global shutter
System clock	72 MHz (for pulse generator)
Frame rate, full frame	62 frames/sec.
Active area	12.8 mm (h) x 10.2 mm (v), 16.39 mm diagonal
Cell size	5.0 μm (h) x 5.0 μm (v)
Active pixels	2560 (h) x 2048 (v)
Read-out modes	Full: 2560 (h) x 2048 (v) up to 62 fps ROI (mono): 1 line to full frame height in 1-line steps, with X offset and width in 16-pixel steps 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	10-bit output format
Absolute sensitivity (mono)	23.50 p (λ = 525 nm)
Absolute sensitivity (color)	36.08 p (λ = 525 nm)
Maximum SNR (mono)	41.48 dB
Maximum SNR (color)	38.00 dB
Traditional SNR*	mono: >55 dB (0 dB gain) color: >53 dB (0 dB gain, green)
Video signal output	mono: 8/10/12-bit monochrome color: 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	Opto In, TTL In, Pulse Generators (2), Software, NAND 0, NAND 1
Trigger modes	EPS, PIV, Trigger Width, Timed RCT (with ALC), Sequence
Electronic shutter	Timed exposure: 10 μs to 8 sec in 1 μs steps Auto shutter: 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	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
Dimensions (H x W x L)	62 mm x 62 mm x 55.5 mm
Weight	255 g

Dimensions



Connector pin-out

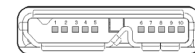
DC In / Trigger



HIROSE HR10A-10R-12PB-01

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

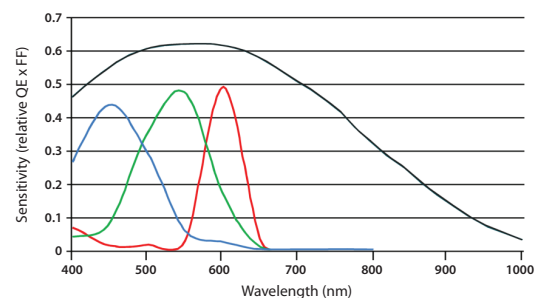


Micro B type - ZX3600-B-10P or equiv.

No	I/O	Name	Note
1	I	VBUS IN	Power (VBUS)†
2	I/O	DM	USB2.0 Differential pair (-)‡
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 (+)

† SP-5000-USB does not accept power over USB
‡ Does not work with USB 2.0

Spectral Response



Note: Color response includes IR-cut filter.

Ordering Information

SP-5000M-USB	Monochrome camera with two-channel USB3 Vision
SP-5000C-USB	Color camera with two-channel USB3 Vision

*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 -10°C to +50°C

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