SP-20000-USB

20-megapixel CMOS global shutter

USB3 VISION™

- *Large format 20 MP CMOS imager (global shutter)*
- *16 fps at full resolution*
- *6.4 µm square pixels*
- *User selectable ROI*
- *Horizontal and vertical binning (monochrome models) for increased sensitivity*
- *Flat-field and blemish compensation plus in-camera CMOS pattern correction*
- *CMOS imager includes correlated double sampling (CDS) function for improved uniformity*
- *8/10/12-bit digital output over USB3 Vision interface**
- *Monochrome or Bayer color models*
- *F-mount lens mount*
- *Automatic Level Control (ALC) for dynamic lighting conditions*

*Some video processing functions not available with 12-bit output

Specifications for SP-20000-USB

Spark Series

Specifications	SP-20000-USB
Sensor	41 mm CMOS global shutter (CMV20000)
System clock	40 MHz (for pulse generator)
Frame rate, full frame	16 frames/sec.
Active area	32.77 mm (h) x 24.58 mm (v), 41 mm diagonal
Cell size	6.4 µm (h) x 6.4 µm (v)
Active pixels	5120 (h) x 3840 (v)
Horizontal output frequency	62.402 kHz (31.201 kHz for V-binning)
Read-out modes Full ROI Binning (mono)	5120 (h) x 3840 (v) @ 16 fps Any start position. 8-5120 pixels wide x 2-3840 lines high Width in 8 pixels/step Height in 2 lines/step 1x2, 2x1, 2x2 (frame rate does not change)
EMVA 1288 Parameters Absolute sensitivity (mono) Absolute sensitivity (color) Maximum SNR (mono) Maximum SNR (color)	10-bit output format 16.05 p (λ = 525 nm) 18.14 p (λ = 525 nm) 40.24 dB 38.32 dB
Traditional SNR* mono color	 >53 dB (0 dB gain) >51 dB(0 dB gain, green)
Video signal output mono color	8/10/12-bit monochrome 8/10/12-bit Bayer Some video functions not available with 12-bit
Auto-iris lens video output	0.7Vp-p, with 0.3V horiz. sync
Gain	Manual/automatic 0 dB to +24 dB
White balance (SP-20000C)	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, LVDS, Opto In, Pulse Generators (2), Software, User Out (4)
Trigger modes	EPS, Trigger Width, Timed RCT (with ALC), PIV, Sequence
Electronic shutter Timed exposure Auto shutter	 304 µs to 8 sec in 1 µs steps 1/16 to 1/3289 sec.
Auto Level Control (ALC)	Shutter range from 1/16 to 1/3289, gain range from 0 dB to +24 dB. Tracking speeds and max values adjustable.
Pre-processing functions	Flat field correction, color shading correction (SP-20000C), blemish compensation (up to 1000 pixels)
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%. 5.4W typical (full frame @ 12V)
Lens mount	F-mount
Dimensions (H x W x L)	62 mm x 62 mm x 84.5 mm
Weight	350 g

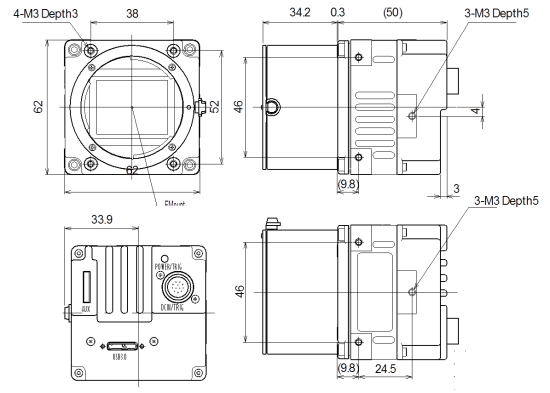
Ordering Information

SP-20000M-USB	Monochrome camera with USB3 Vision
SP-20000C-USB	Color camera with 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.

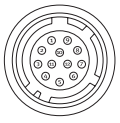
†Reduced performance may occur when operating outside the standard range of -5°C to +45°C

Dimensions



Connector pin-out

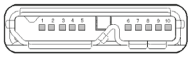
DC In / Trigger



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

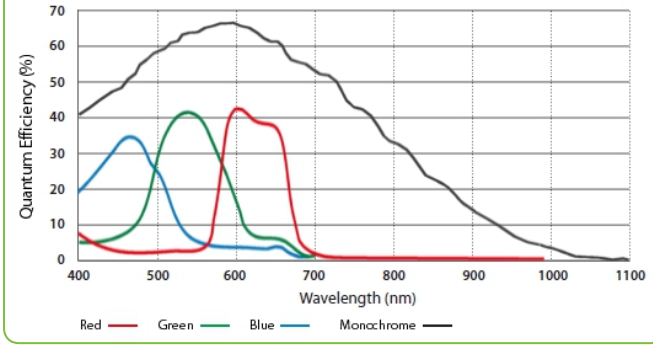


Micro B type - ZX3600-B-10P or equiv.

No	I/O	Name	Note
1	I	VBUS IN	Power (VBUS)[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-20000-USB does not accept power over USB
[2] Does not work with USB 2.0

Spectral Response



Color response includes IR-cut filter

Europe, Middle East & Africa
Phone +45 4457 8888
Fax +45 4491 3252

Asia Pacific
Phone +81 45 440 0154
Fax +81 45 440 0166

Americas
Phone (Toll-Free) 1 800 445 5444
Phone +1 408 383 0300

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July 2018