# SP-20000-USB

20-megapixel CMOS global shutter





- 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



<sup>\*</sup>Some video processing functions not available with 12-bit output

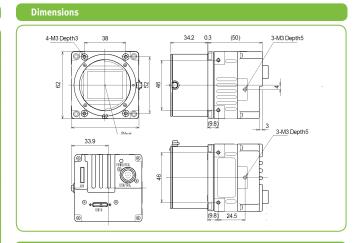
Sensor   41 mm CMOS global shutter (CMV20000)	gonal g)
System clock   40 MHz (for pulse generator)	gonal g)
Active area  Cell size  Active pixels  Active pixels  Horizontal output frequency  Read-out modes  Full  ROI  Binning (mono)  EMVA 1288 Parameters  Absolute sensitivity (mono)  Absolute sensitivity (color)  Maximum SNR (mono)  Maximum SNR (color)  Traditional SNR*  mono  color  Video signal output  Auto-iris lens video output  Gain  Maxima  Mich (N x 24,58 mm (v), 41 mm diagon  6.4 μm (h) x 6.4 μm (v)  62.402 kHz (31.201 kHz for V-binning)  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  Height in 2 lines/step  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  Video signal output  mono color  Video signal output  Mono color  Video signal output  Mono color  Manual/automatic od B to +24 dB  White balance (SP-20000C)  Manual, one-push auto, or continuous (3000K to 9000K)  Gamma  O.45-1.0 (8 steps) or 256-point LUT  Internal	g) x
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Traditional SNR*  mono color  Video signal output mono color  Note of signal output mono color  Manual/automatic o dB to +24 dB  White balance (SP-20000C)  Gamma  Mono Color  Mono Sy3 dB (o dB gain) Sy10/12-bit Bayer Some video functions not available with 12- Some video functions not available with 12- Synchronization  Manual/automatic o dB to +24 dB  Manual, one-push auto, or continuous (3000K to 9000K)  Gamma  O.45-1.0 (8 steps) or 256-point LUT  Synchronization	
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Gamma 0.45-1.0 (8 steps) or 256-point LUT Synchronization Internal	S
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TTL, LVDS, Opto In, Pulse Generators (2), Software, User Out (4)	2),
Trigger modes EPS, Trigger Width, Timed RCT (with ALC), PIV, Sequence	C),
Electronic shutter	
Timed exposure 304 µs to 8 sec in 1 µs steps	
Auto shutter 1/16 to 1/3289 sec.	
Auto Level Control (ALC)  Shutter range from 1/16 to 1/3289, gain range from o dB to +24 dB.  Tracking speeds and max values adjustable	
Pre-processing functions Flat field correction, color shading correction (SP-20000C), blemish compensation	tion
(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

<sup>\*</sup>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



#### 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	12 GND	

### USB 3.0 Interface

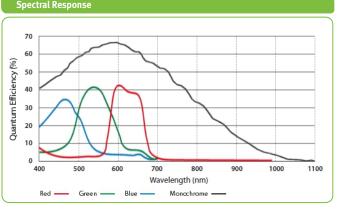


Micro B type - ZX3600-B-10P or equiv.

No	I/O	Name	Note
1	1	VBUS IN	Power (VBUS)1
2	I/O	DM	USB2.0 Differential pair (-) <sup>2</sup>
3	I/O	DP	USB2.o Differential pair (+)
4		OTG ID	USB OTG ID for identifying lines
5		GND	GND
6	0	FX3 SSTXM	USB3.o Signal Transmission line (-)
7	0	FX <sub>3</sub> SSTXP	USB3.o Signal Transmission line (+)
8		GND	GND
9	I	FX3 SSRXP	USB3.0 Signal Receiving line (-)
10	I	FX <sub>3</sub> SSRXM	USB3.o Signal Receiving line (+)

<sup>&</sup>lt;sup>1</sup>SP-20000-USB does not accept power over USB

<sup>&</sup>lt;sup>2</sup> Does not work with USB 2.0



Color response includes IR-cut filter

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