

SP-20000M-PMCL

Technical Datasheet

CMV20000*See the possibilities*

Apex Series

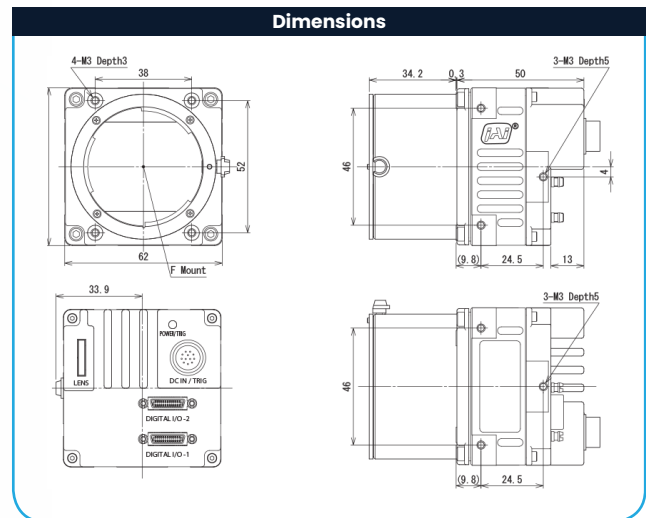
Spark Series area scan cameras are the perfect choice for machine vision applications demanding high quality images with the highest possible throughput. They feature the latest CMOS imagers delivering high resolution images at speeds as much as 10 times faster than traditional CCD cameras.

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:	CMV20000	SHUTTER:	Global Shutter
FORMAT:	41.0 mm	FRAME RATE:	30 fps
PIXEL SIZE:	6.4 x 6.4 μ m	INTERFACE:	Mini Camera Link (PoCL)
LENS MOUNT:	F-Mount	RESOLUTION MP:	20 MP
SPECTRUM:	Monochrome (Visible + NIR)	RESOLUTION WxH:	5120 x 3840 px

Specifications	SP-20000-PMCL
Sensor	41 mm diag. CMOS global shutter (CMV20000)
System clock	40 MHz (for pulse generator)
Frame rate, full frame	30 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	11.37 kHz to 122.2 kHz depending on tap geometry and CL clock frequency
Read-out modes	
Full ROI	5120 (h) x 3840 (v) @ 30 fps Any start position. 8-5120 pixels wide 2-3840 lines high Width in 8 pixels/step Height in 1 line/step (mono) or 2 lines/step (color)
Binning (mono)	1x2, 2x1, 2x2 (frame rate does not change)
EMVA 1288 Parameters	10-bit output format
Absolute sensitivity (mono)	16.05 p ($\lambda = 525 \text{ nm}$)
Absolute sensitivity (color)	18.14 p ($\lambda = 525 \text{ nm}$)
Maximum SNR (mono)	40.24 dB
Maximum SNR (color)	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 or 24-bit RGB 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, CL, Pulse Generators (4), Software, NANDØ, NANDI
Trigger modes	EPS, PIV, Trigger Width, RCT (with ALC)
Electronic shutter	
Timed exposure	304 μs to 8 sec in 1 μs steps
Auto shutter	1/30 to 1/3289 sec.
Auto Level Control (ALC)	Shutter range from 1/30 to 1/3289, gain range from 0 dB to +24 dB, auto iris control Tracking speeds and max values adjustable
Pre-processing functions	Flat field correction, color shading correction (SP-20000C), blemish compensation (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 $\pm 10\%$. 5.4W typical (full frame @ 12V)
Lens mount	F-mount or M42 mount with 16 mm flange back distance
Dimensions (H x W x L)	62 mm x 62 mm x 84.5 mm
Weight	320 g
Ordering Information	
SP-20000M-PMCL-F	Monochrome with Mini Camera Link & F-mount
SP-20000C-PMCL-F	Color with Mini Camera Link & F-mount
SP-20000M-PMCL-M42A	Monochrome with Mini Camera Link & M42 mount
SP-20000C-PMCL-M42A	Color with Mini Camera Link & M42 mount



Connector pin-out

DC In / Trigger

Mini-CL interface

Interface 1

HIROSE HR10A-10R-12PB-01

Connector Pin-out

Pin	-
1	GND
2	+12V to +24V DC input
3	GND
4	Iris video out
5	NC
6	NC
7	NC
8	NC
9	TTL out 1
10	TTL in 1
11	+12V to +24V DC input
12	GND

Pin

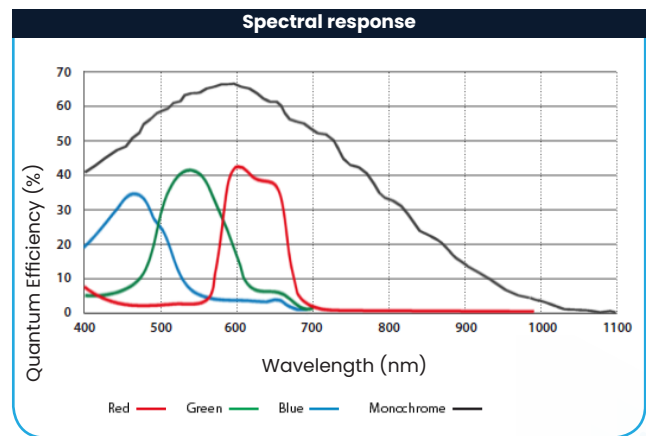
Signal

Function

1	26	Power	+12V to +24V DC in
13	14	GND	Power return
2	15	-/+ TxOUT 0	CL Video Channel 1
3	16	-/+ TxOUT 1	
4	17	-/+ TxOUT 2	
5	18	-/+ TxClk	
6	19	-/+ TxOUT 3	
7	20	+/- RXD	Serial in
8	21	-/+ TXD	Serial out
9	22	CC1-/CC1+	Ext. trigger
10	23	CC2+/CC2-	Not used
11	24	CC3-/CC3+	Not used
12	25	CC4+/CC4-	Not used

For Medium and Full implementations a second Mini-CL interface is provided.

Video Channel 2 is on pin pairs (2,15), (3,16), (4,17), (5,18), and (6,19). Video Channel 3 is on pin pairs (8,21), (9,22), (10,23), (11,24), and (12,25). Consult manual for Specific bit depths and pin assignments.



*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 20 MP CMOS imager (global shutter)
- 30 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 two-channel CoaXPress interface*
- Accepts power over Mini Camera Link connectors (PMCL) or via 12-pin connector for maximum application flexibility
- Monochrome or color models with raw Bayer output
- F-mount or M42 lens mounts
- Automatic Level Control (ALC) for dynamic lighting conditions

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

Additional Product Images



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