

# SP-12000M-CXP4

## Technical Datasheet

**CMV12000***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.

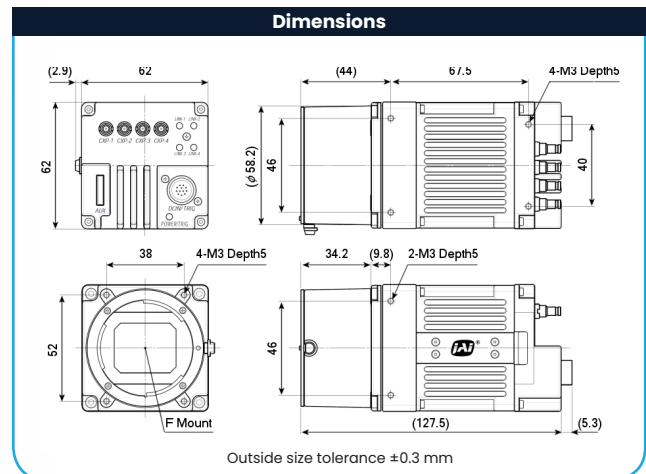
### Specification Highlights

**SENSOR:** CMV12000  
**FORMAT:** APS-C  
**PIXEL SIZE:** 5.5 x 5.5  $\mu\text{m}$   
**LENS MOUNT:** F-Mount  
**SPECTRUM:** Monochrome (Visible)

**SHUTTER:** Global Shutter  
**FRAME RATE:** 189 fps  
**INTERFACE:** CoaXPress-4-Cable (PoCXP)  
**RESOLUTION MP:** 12 MP  
**RESOLUTION WxH:** 4096 x 3072 px

Specifications		SP-12000-CXP4
Sensor		APS-C size CMOS global shutter (CMV12000)
Frame rate, full frame		189 frames/sec. @ 8-bit, CXP6_X4
Active area		22.5 mm (h) x 16.9 mm (v), 28.16 mm diagonal
Cell size		5.5 μm (h) x 5.5 μm (v)
Active pixels		4096 (h) x 3072 (v)
Read-out modes		
Full ROI		4096 (h) x 3072 (v) up to 189 fps 128-4096 in 16-pixel steps 16-3072 in 2-line steps
Binning		1x2, 2x1, 2x2 (monochrome only)
EMVA 1288 Parameters		10-bit output format, 90 fps
Absolute sensitivity (mono)		35.76 p (λ = 525 nm)
Absolute sensitivity (color)		46.58 p (λ = 525 nm)
Maximum SNR (mono)		39.60 dB
Maximum SNR (color)		37.77 dB
Traditional SNR*	mono color	>53 dB (0 dB gain) >50 dB (0 dB gain, green)
Video signal output	mono color	8/10-bit monochrome 8/10-bit Bayer (12-bit available in video process bypass mode)
Interface		CoaXPress v1.1 (CXP-6, DIN 1.0/2.3 connectors) Link Configs: CXP6_X4, CXP6_X2, CXP6_X1 CXP3_X4, CXP3_X2, CXP3_X1
Gain		Manual/automatic 0 dB to +24 dB
White balance (SP-12000C)		Manual, one-push auto, or continuous (3000K to 9000K)
Gamma		0.45-1.0 (9 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, Sequence
Electronic shutter		
Timed exposure		15 μs to 8 sec in 1 μs steps
Trigger width		15 μs to ∞ sec.
Auto Level Control (ALC)		Shutter range from 100 μs to ~5.3 ms, gain range from 0 dB to +24 dB Tracking speeds and max values adjustable.
Pre-processing functions		Flat field correction, color shading correction (SP-12000C), blemish compensation (1000 pixels), black level control, DSNU correction
Operating temperature		-5°C to +30°C
Storage temperature		-25°C to +60°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	12-pin PoCXP	12V to 24V DC ± 10%. 12W typical @ +12V 24V DC ± 2V. 12W typical @ +24V
Lens mount		F-mount (46.5 mm flangeback)
Dimensions (H x W x L)		62 mm x 62 mm x 127.5 mm
Weight		510 g
Ordering Information		
SP-12000M-CXP4		Monochrome camera with four-channel CoaXPress
SP-12000C-CXP4		Color camera with four-channel CoaXPress

\*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.



### Connector pin-out

#### DC In / Trigger

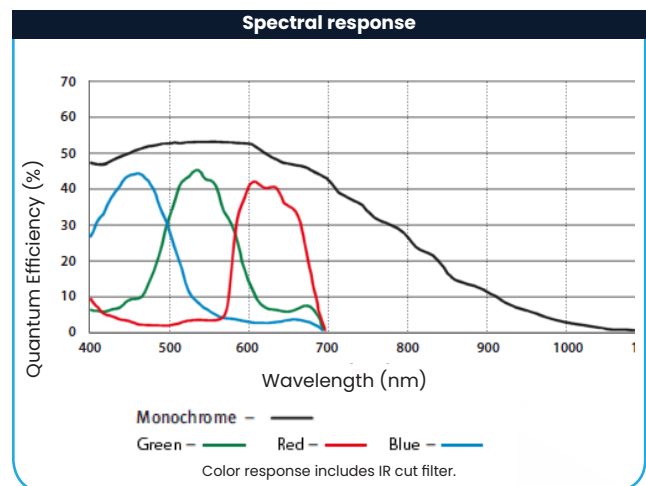
HIROSE HR10A-10R-12PB-01

#### Auxiliary Connector

Type: 3260-10S3(55) HIROSE or equivalent

Connector Pin-out

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



## Product Highlights

- Large format 12 MP CMOS imager (global shutter)
- APS-C optical format with 28.16 mm diagonal
- Up to 189 fps at full resolution
- 5.5  $\mu\text{m}$  square pixels in a 4:3 aspect ratio
- Exposure control from 50  $\mu\text{s}$  (1/20,000) to 8 seconds in 1  $\mu\text{s}$  steps
- Single- and multi-ROI modes for flexible readout, windowing, or increasing frame rate
- Flat-field and blemish compensation plus in-camera CMOS pattern correction
- Built-in high dynamic range function provides up to 90 dB dynamic range (monochrome only)
- 2X binning for increased sensitivity (monochrome only)
- Automatic Level Control (ALC) for dynamic lighting conditions
- 8/10/12-bit digital output over four-channel CoaXPress interface
- Monochrome or color models with built-in color interpolation on color model
- 12-pin connector for power and GPIO, plus additional I/O via 10-pin auxiliary connector
- F-mount lens mount

## Additional Product Images



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