Digital Color Camera Systems

DX 40 – 285 | 274 | 205 | 1020 CL

Digital camera system
Color
CameraLink
12 bit digital signal processing
Progressive scan
Megapixel resolution
Up to 30 fps (full frames)
External trigger, reset/restart
Partial scan | Binning
Gamma correction
Automatic functions
Long time integration
Cooled camera DX 40C – 285 CL

Kappa DX denotes complete and ready-to-use camera systems, which means the scope of delivery includes not only a camera, but also a data cable, frame grabber, power supply unit and the Kappa CameraControl (KCC) software.

The camera series is based on variable camera electronics, low power consumption and advanced circuitry, providing both an extremely rugged design and excellent signal quality.

The user can choose from a range of high-quality CCD sensors with megapixel resolution by Sony and Kodak.

Together with the Kappa ImageBase software the DX systems provide comprehensive solutions for applications such as measurement engineering, process automation and scientific diagnostics.

The cameras of the DX series come in a block housing as standard, but for the individual touch they are also available in a striking hexagonal design housing.

The digital Kappa camera systems comply with the highest standards and offer outstanding Kappa-specific technological highlights, such as rugged design, excellent highly linear signal quality, extraordinary signal-to-noise ratio, long-time exposure and, optionally, a second serial interface with bespoke configuration of functions.
High frame rates are achieved by binning and partial scan, while the image size remains freely adjustable.

Real-time Color Signal Processing

The camera-internal color processing algorithm is FPGA-based and works independently of specific signal processors. Maximum true color rendition is achieved by adapting the color image reproduction for different lighting conditions to the sensor. Reproducibility of the results in other cameras is also ensured. Further features are high detail sharpness, edge enhancement, contrast enhancement and variable Gamma correction.

Standard equipment

Technical Data

Sensor-specific data

DX 40 – 285 CL | DX 40C – 285 CL

CCD sensor	2/3" interline transfer CCD progressive scan with micro lenses (Sony ICX285AQ, EXview HAD)
Pixel size (H x V)	6.45 µm x 6.45 µm
Light-sensitive area (H x V)	8.93 mm x 6.66 mm
Number of pixels (H x V)	1392 x 1040, effective
Spectral sensitivity (without IR-filter)	320 nm – 1100 nm, color: B = 470 nm, G = 540 nm, R = 630 nm (peak sensitivity)
Full well capacity	23 000 e^-
A/D-conversion factor	5.6 e^- / increment
Filter	RGB Bayer filter
Dynamic range	63 dB (measured in dark image, at 66 ms exposure time and 0 dB gain)
Sensitivity	(measured at 18 dB gain, Gamma = 1, and 50 % level, 3000 K) 0.35 lx at 100 ms exposure time 0.00029 lx at 120 s exposure time 0.000029 lx at 20 min exposure time (Cooled camera DX 40C – 285 CL)

DX 40 – 274 CL

CCD sensor	1/1.8" interline transfer CCD progressive scan with micro lenses (Sony ICX274AQ, EXview HAD)
Pixel size (H x V)	4.40 µm x 4.40 µm
Light-sensitive area (H x V)	8.50 mm x 6.80 mm
Number of pixels (H x V)	1628 x 1236, effective
Spectral sensitivity (without IR-filter)	320 nm – 1100 nm, color: B = 460 nm, G = 535 nm, R = 620 nm (peak sensitivity)
Full well capacity	5 500 e^-
A/D-conversion factor	1.3 e^- / increment
Filter	RGB Bayer filter
Dynamic range	52 dB (measured in dark image, at 115 ms exposure time and 0 dB gain)
Sensitivity	(measured at 18 dB gain, gamma = 1, and 50 % level, 3000 K) 0.69 lx at 100 ms exposure time 0.00058 lx at 120 s exposure time

DX 40 – 205 CL

CCD sensor	1/2" interline transfer CCD progressive scan with micro lenses (Sony ICX205AK, EXview HAD)
Pixel size (H x V)	4.65 µm x 4.65 µm
Light-sensitive area (H x V)	7.6 mm x 6.2 mm
Number of pixels (H x V)	1392 x 1040, effective
Spectral sensitivity (without IR-filter)	320 nm – 1100 nm, color: B = 470 nm, G = 540 nm, R = 630 nm (peak sensitivity)
Full well capacity	12 000 e^-
A/D-conversion factor	2.9 e^- / increment
Filter	RGB Bayer filter
Dynamic range	55 dB (measured in dark image, at 66 ms exposure time and 0 dB gain)
Sensitivity	(measured at 18 dB gain, gamma = 1, and 50 % level, 3000 K) 0.61 lx at 100 ms exposure time 0.00051 lx at 120 s exposure time

DX 40 – 1020 CL

CCD sensor	2/3" interline transfer CCD progressive scan with micro lenses (Kodak KAI 1020 CM)
Pixel size (H x V)	7.4 µm x 7.4 µm
Light-sensitive area (H x V)	7.4 mm x 7.4 mm
Number of pixels (H x V)	1004 x 1004, effective
Quantum efficiency	max. 41% at 470 nm
Spectral sensitivity (without IR-filter)	320 nm – 1000 nm, color: B = 470 nm, G = 535 nm, R = 620 nm (peak sensitivity)
Full well capacity	42 000 e^-
A/D-conversion factor	10.3 e^- / increment
Readout noise	50 e^- rms
Filter	RGB Bayer filter
Dynamic range	57 dB (measured in dark image, at 33 ms exposure time and 0 dB gain)
Sensitivity	(measured at 18 dB gain, gamma = 1, and 50 % level, 3000 K) 0.65 lx at 100 ms exposure time 0.00054 lx at 120 s exposure time

Technical Data

Interface-specific data

DX 40 – 285 CL | DX 40C – 285 CL

Camera output format (YUV 4:2:2)	full frame:	1388 x 1036 pixels, 15 fps		
	b/w-binning:	2 fold	4 fold	8 fold
	image size (pixels):	694 x 518	347 x 259	173 x 129
	frame rate:	25 fps	41 fps	62 fps
	partial scan:	image size freely adjustable		
Exposure	manual:	1 µs to 120 s (Cooled Camera: up to 20 min)		
	automatic (AE):	1 µs to 66 ms at 1280 x 960 pixels		
Power supply	9-36 V DC, 3.2 W			

DX 40 – 274 CL

Camera output format (YUV 4:2:2)	full frame:	1624 x 1232 pixels, 12 fps		
	binning:	2 fold (color or b/w)	4 fold (b/w)	8 fold (b/w)
	image size (pixels):	812 x 616	406 x 308	203 x 154
	frame rate:	15 fps	26 fps	40 fps
	partial scan:	image size freely adjustable		
Exposure	manual:	1 µs to 120 s		
	automatic (AE):	1 µs to 115 ms at 1600 x 1200 pixels		
Power supply	9-36 V DC, 3.2 W			

DX 40 – 205 CL

Camera output format (YUV 4:2:2)	full frame:	1388 x 1036 pixels, 15 fps		
	b/w-binning:	2 fold	4 fold	8 fold
	image size (pixels):	694 x 518	347 x 259	173 x 129
	frame rate:	25 fps	41 fps	62 fps
	partial scan:	image size freely adjustable		
Exposure	manual:	1 µs to 120 s		
	automatic (AE):	1 µs to 66 ms at 1280 x 960 pixels		
Power supply	9-36 V DC, 3.2 W			

DX 40 – 1020 CL

Camera output format (YUV 4:2:2)	full frame:	1000 x 1000 pixels, 30 fps		
	b/w-binning:	2 fold	4 fold	8 fold
	image size (pixels):	500 x 500	250 x 250	125 x 125
	frame rate:	36 fps	60 fps	90 fps
	partial scan:	image size freely adjustable		
Exposure	manual:	1 µs to 120 s		
	automatic (AE):	1 µs to 33 ms at 800 x 600 pixels		
Power supply	9-36 V DC, 3 W			

Signal processing | Software

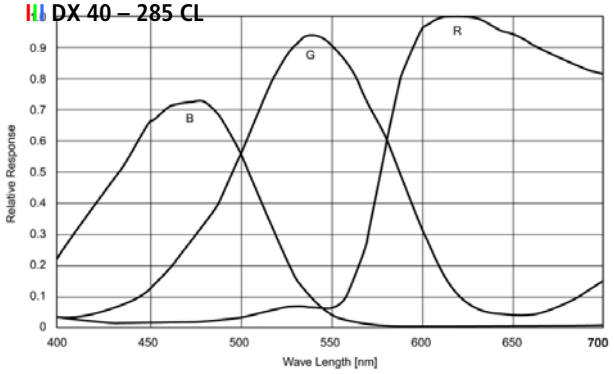
Control software	Kappa CameraControl (KCC)	
System	12 bit digital	
Gain	manual/automatic (AGC): 0 to 18 dB	
Enhancement	contrast:	1.0 to 8.0 fold
	brightness:	subtraction, 0 to 4095 LSB, maximum 50% of the output level
	edges:	adjustable
Color processing	type of light source, color balance (RGB), automatic white set, color saturation	
Gamma	0.3 to 2.2	
Diagnostics	camera name, serial number, revision number, temperature of sensor and camera, built-in test, image size, frame rate, test pattern	
Line generator	2 reticles:	position, color and style adjustable
Measuring window	position and size adjustable	
Synchronization	internal/external, reset/restart (delay <10 µs)	
Hardware trigger	Minimum trigger delay 4.2µs - 8.2µs depending on the sensor type Frame on Demand	

General technical data

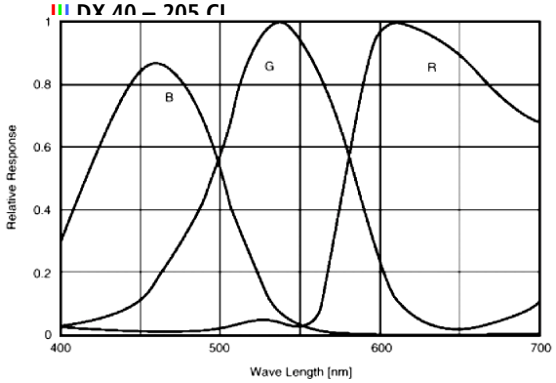
Interfaces	CameraLink connector system connector (power supply, additional RS 232, control and trigger signals)			
Lens mount	C-mount, focal plane adjustable, CS-mount on request			
Filter	IR-filter, removable			
Temperature	operating temperature -20°C to +60°C, storage temperature -30°C to +70°C			
Dimensions | Weight	block housing: 60 x 60 x 47 mm; 235 g design housing: diameter 75, length 41 mm; 370 g cooled camera: 73 x 69 x 107 mm; 820 g			
Cable length	CameraLink up to 10 m (other cable lengths on request)			
System requirements	hardware: bus master enabled PCI slot (or PCMCIA type 2 CardBus interface), minimum 1.8 GHz, minimum 512 MB RAM, DirectX9-enabled graphic card with at least 64 MB operating system: Microsoft Windows 2000 ®, Microsoft Windows XP ® (32 Bit Edition), Microsoft Windows Vista ® (32 Bit Edition)			
Order no. block housing	DX 40-285 CL DX 40-274 CL DX 40-205 CL DX 40-1020 CL	961-1710 961-1714 961-1712 961-1700	DX 40-285 CL PCMCIA DX 40-274 CL PCMCIA DX 40-205 CL PCMCIA DX 40-1020 CL PCMCIA	961-1711 961-1715 961-1713 961-1702
Order no. design housing (yellow)	DX 40-285 CL DX 40-274 CL DX 40-205 CL DX 40-1020 CL	961-1710G 961-1714G 961-1712G 961-1700G	DX 40-285 CL PCMCIA DX 40-274 CL PCMCIA DX 40-205 CL PCMCIA DX 40-1020 CL PCMCIA	961-1711G 961-1715G 961-1713G 961-1702G
Order no. Cooled camera	DX 40C-285 CL	961-1716	DX 40C-285 CL PCMCIA	961-1717
Standard equipment	camera, CameraLink Frame Grabber, CameraLink cable (4 m); power supply cable (4 m), power supply, software CD Kappa CameraControl (KCC) incl. operating manual			
In addition for cooled version	power supply ACC 2 (incl. control cable 4 m and power supply cable)			

Spectral Sensitivity Characteristics (without IR-filter)

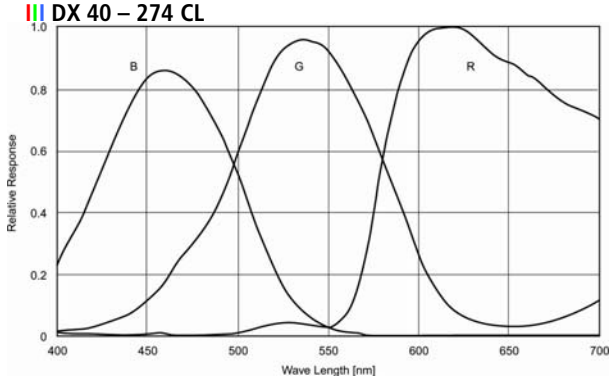
DX 40 – 285 CL



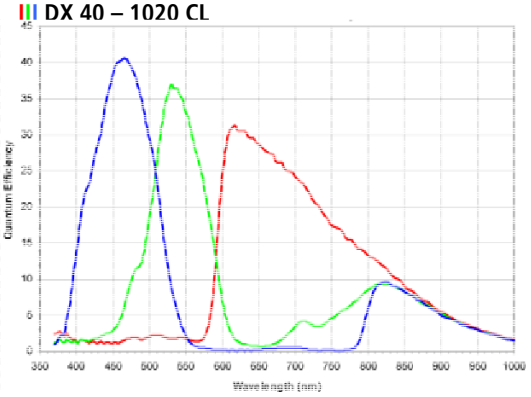
DX 40 – 205 CL



DX 40 – 274 CL



DX 40 – 1020 CL



We are constantly checking the accuracy of the technical data. We are prepared to provide more detailed information on request.
Technical data are subject to change without notice!

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