

Flame rate	Image Size							
	VGA	XGA	SXGA	UXGA	2M Pixel	4M pixels	5M Pixels	12M Pixels
280 fps					● KP-FM200WCL ● KP-FMR200WCL			
150 fps						● KP-FM400WCL ● KP-FMR400WCL		
125 fps	● KP-F31UB ● KP-F21UB ● KP-F31GV ● KP-F21GV							
120 fps	● KP-F31PCL/SCL ● KP-FR31PCL/SCL							
90 fps	● KP-FM30Lite ● KP-FBM30Lite ● KP-F33GV ● ● ● KP-FD33GV							
61 fps		● KP-FM100PCL						
60 fps	● KP-F30PCL/SCL ● KP-FR30PCL/SCL ● KP-FBR30PCL/SCL ● KP-F30Lite							
53 fps				● KP-FM200PCL ● KP-FM200UB ● ● ● KP-FMD200UB ● KP-FM200GV				● KP-FM1200CL
36 fps	● KP-F80PCL/SCL ● KP-FR80PCL/SCL ● KP-F80Lite ● KP-F83GV ● ● ● KP-FD83GV							
30 fps			● KP-F145WCL ● KP-FD140PCL/SCL ● KP-FMD100PCL ● KP-F145GV ● KP-F140GV ● ● ● KP-FD140GV	● KP-F230PCL/SCL ● KP-FR230PCL/SCL ● ● ● KP-FMD200GV ● KP-F202GV ● ● ● KP-FD202GV ● HV-F202SCL ● HV-F202GV ● KP-FMD200PCL				
28 fps								
20 fps								
18 fps								● ● ● KP-FD510UB ● KP-F520WCL ● KP-F510UB ● KP-F510GV ● ● ● KP-F500WCL ● KP-FR500WCL ● KP-F500GV
16 fps								
15 fps		● HV-F22CL-S1 ● HV-F22GV		● KP-F200PCL/SCL ● KP-FR200PCL/SCL ● ● ● KP-F200Lite				
12 fps								● ● ● KP-FD510WCL ● ● ● KP-FD500PCL ● ● ● KP-FD500SCL ● ● ● KP-FD510GV ● ● ● KP-FD500GV
9 fps								
7.5 fps		● ● ● HV-F22F						

■ : 3CCD Color (RGB)
■ : 3CCD Color (YUV)
● : Color (RGB)
● : Color (YUV)
● : Color (RAW)
● : Black & White

GV: GigE Vision
UB: USB3 Vision
WCL: Mini Camera Link (PoCL / non-PoCL auto switching)
PCL: Mini Camera Link (PoCL)
SCL: Mini Camera Link (non-PoCL)
Lite: PoCL-Lite
CL: Camera Link
F: EEE1394.a
*KP-FM1200CL is Mini Camera Link (non-PoCL)

General Catalog

Cameras for Industrial Applications



CAUTION : To ensure safe operation, please read the instruction manual before using this product.

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Camera Overview

Digital Interface Cameras

3CCD Cameras					
GigE Vision (Gigabit Ethernet)					
HV-F202GV	1/1.8" 3CCD	UXGA (1600 x 1200)	28 fps (YUV)	55(W) x 55(H) x 89(D) mm	Page 7
HV-F22GV	1/2" 3CCD	SXGA (1360 x 1024)	15 fps	65(W) x 65(H) x 141(D) mm	Page 8
Camera Link					
HV-F22CL-S1	1/2" 3CCD	SXGA (1360 x 1024)	15 fps	65(W) x 65(H) x 130(D) mm	Page 8
Mini Camera Link					
HV-F202SCL	1/1.8" 3CCD	UXGA (1600 x 1200)	30 fps	55(W) x 55(H) x 89(D) mm	Page 7
IEEE1394.a					
HV-F22F	1/2" 3CCD	SXGA (1360 x 1024)	7.5 fps	65(W) x 65(H) x 130(D) mm	Page 8
1CCD Color Cameras					
GigE Vision (Gigabit Ethernet)					
KP-FD510GV	2/3" 1CCD	5M Pixels (2448 x 2050)	9 fps (YUV)	29(W) x 29(H) x 35(D) mm	Page 9
KP-FMD200GV	1/1.8" 1CMOS	UXGA (1600 x 1200)	30 fps (YUV)	29(W) x 29(H) x 35(D) mm	Page 9
KP-FD500GV	2/3" 1CCD	5M pixel (2448 x 2050)	9 fps (YUV)	44(W) x 29(H) x 72(D) mm	Page 11
KP-FD202GV	1/1.8" 1CCD	UXGA (1620 x 1220)	30 fps (YUV)	44(W) x 29(H) x 72(D) mm	Page 11
KP-FD140GV	1/2" 1CCD	SXGA (1360 x 1024)	30 fps	44(W) x 29(H) x 72(D) mm	Page 11
KP-FD83GV	1/3" 1CCD	XGA (1024 x 768)	36 fps	44(W) x 29(H) x 72(D) mm	Page 11
KP-FD33GV	1/3" 1CCD	VGA (659 x 492)	90 fps	44(W) x 29(H) x 72(D) mm	Page 11
USB3 Vision					
KP-FD510UB	2/3" 1CCD	5M Pixels (2456 x 2058)	18 fps	29(W) x 29(H) x 29(D) mm	Page 10
KP-FMD200UB	1/1.8" 1CMOS	UXGA (1600 x 1200)	53 fps	29(W) x 29(H) x 20(D) mm	Page 10
Mini Camera Link					
KP-FD510WCL	2/3" 1CCD	5M pixel (2456 x 2058)	12 fps	44(W) x 44(H) x 41(D) mm	Page 15
KP-FD500SCL/PCL	2/3" 1CCD	5M pixel (2456 x 2058)	12 fps	44(W) x 44(H) x 41(D) mm	Page 15
KP-FD202SCL/PCL	1/1.8" 1CCD	UXGA (1628 x 1236)	30 fps	44(W) x 44(H) x 41(D) mm	Page 15
KP-FD140SCL/PCL	1/2" 1CCD	SXGA (1392 x 1040)	30 fps	44(W) x 44(H) x 41(D) mm	Page 15
KP-FMD200PCL	1/1.8" CMOS	UXGA (1600 x 1200)	20 fps	29(W) x 29(H) x 20(D) mm	Page 18
KP-FMD100PCL	1/1.8" CMOS	SXGA (1280 x 1024)	30 fps	29(W) x 29(H) x 20(D) mm	Page 18
KP-FMR830CL	1/3" 1CMOS	(640 x 3840) (by 8 cameras)	30 fps	1 Camera: 21.5(W) x 21.5(H) x 21.5(D) mm	Page 21
1CCD Color (RAW) Cameras					
Mini Camera Link					
KP-FR500WCL	2/3" 1CCD	5M pixel (2456 x 2058)	16 fps	44(W) x 44(H) x 41(D) mm	Page 15
KP-FMR400WCL	1" 1CMOS	4M pixel (2048 x 2048)	150 fps	44(W) x 44(H) x 41(D) mm	Page 17
KP-FR230SCL/PCL	1/1.8" 1CCD	UXGA (1628 x 1236)	30 fps	29(W) x 29(H) x 38(D) mm	Page 19
KP-FR200SCL/PCL	1/1.8" 1CCD	UXGA (1628 x 1236)	15 fps	29(W) x 29(H) x 29(D) mm	Page 20
KP-FMR200WCL	2/3" 1CMOS	2M pixel (2048 x 1088)	280 fps	44(W) x 44(H) x 41(D) mm	Page 17
KP-FR80SCL/PCL	1/3" 1CCD	XGA (1034 x 779)	36 fps	29(W) x 29(H) x 29(D) mm	Page 20
KP-FR31SCL/PCL	1/3" 1CCD	VGA (659 x 494)	120 fps	29(W) x 29(H) x 38(D) mm	Page 19
KP-FBR30SCL/PCL	1/3" 1CCD	VGA (659 x 494)	60 fps	Head: 12(W) x 12.5(H) x 47.5(L) mm	Page 19
KP-FR30PCL/SCL	1/3" 1CCD	VGA (659 x 494)	60 fps	29(W) x 29(H) x 29(D) mm	Page 20
1CCD Black & White Cameras					
GigE Vision (Gigabit Ethernet)					
KP-F510GV	2/3" 1CCD	5M Pixel (2448 x 2050)	18 fps	29(W) x 29(H) x 35(D) mm	Page 9
KP-F500GV	2/3" 1CCD	5M pixel (2448 x 2050)	16 fps	44(W) x 29(H) x 72(D) mm	Page 11
KP-F202GV	1/1.8" 1CCD	UXGA (1620 x 1220)	30 fps	44(W) x 29(H) x 72(D) mm	Page 11
KP-FM200GV	1/1.8" 1CMOS	UXGA (1600 x 1200)	53 fps	29(W) x 29(H) x 35(D) mm	Page 9
KP-F145GV	2/3" 1CCD NIR	SXGA (1360 x 1024)	30 fps	44(W) x 29(H) x 72(D) mm	Page 11
KP-F140GV	1/2" 1CCD	SXGA (1360 x 1024)	30 fps	44(W) x 29(H) x 72(D) mm	Page 11
KP-F83GV	1/3" 1CCD	XGA (1024 x 768)	36 fps	44(W) x 29(H) x 72(D) mm	Page 11
KP-F33GV	1/3" 1CCD	VGA (659 x 492)	90 fps	44(W) x 29(H) x 72(D) mm	Page 11
KP-F31GV	1/3" 1CCD	VGA (659 x 492)	125 fps	29(W) x 29(H) x 35(D) mm	Page 9
KP-F21GV	1/2" 1CCD	VGA (659 x 492)	125 fps	29(W) x 29(H) x 35(D) mm	Page 9
USB3 Vision					
KP-F510UB	2/3" 1CCD	5M pixel (2456 x 2058)	18 fps	29(W) x 29(H) x 29(D) mm	Page 10
KP-FM200UB	1/1.8" 1CMOS	UXGA (1600 x 1200)	53 fps	29(W) x 29(H) x 20(D) mm	Page 10
KP-F31UB	1/3" 1CCD	VGA (659 x 494)	125 fps	29(W) x 29(H) x 20(D) mm	Page 10
KP-F21UB	1/2" 1CCD	VGA (659 x 494)	125 fps	29(W) x 29(H) x 20(D) mm	Page 10

Camera Overview

Digital Interface Cameras

1CCD Black & White Cameras					
Mini Camera Link					
KP-FM1200CL	1.7" 1CMOS	12M pixel (4096 x 3072)	53 fps	55(W) x 55(H) x 45(D) mm	Page 13
KP-F520WCL	2/3" 1CCD	5M pixel (2456 x 2058)	18 fps	29(W) x 29(H) x 29(D) mm	Page 14
KP-F500WCL	2/3" 1CCD	5M pixel (2456 x 2058)	16 fps	44(W) x 44(H) x 41(D) mm	Page 15
KP-FM400WCL	1" 1CMOS	4M pixel (2048 x 2048)	150 fps	44(W) x 44(H) x 41(D) mm	Page 17
KP-F230SCL/PCL	1/1.8" 1CCD	UXGA (1628 x 1236)	30 fps	29(W) x 29(H) x 38(D) mm	Page 19
KP-F200SCL/PCL	1/1.8" 1CCD	UXGA (1628 x 1236)	15 fps	29(W) x 29(H) x 29(D) mm	Page 20
KP-FM200WCL	2/3" 1CMOS	2M pixel (2048 x 1088)	280 fps	44(W) x 44(H) x 41(D) mm	Page 17
KP-FM200PCL	1/1.8" 1CMOS	UXGA (1600 x 1200)	53 fps	29(W) x 29(H) x 20(D) mm	Page 18
KP-F145WCL	2/3" 1CCD NIR	SXGA (1392 x 1040)	30 fps	44(W) x 44(H) x 41(D) mm	Page 15
KP-FM100PCL	1/1.8" 1CMOS	SXGA (1280 x 1024)	61 fps	29(W) x 29(H) x 20(D) mm	Page 18
KP-F80SCL/PCL	1/3" 1CCD	XGA (1034 x 779)	36 fps	29(W) x 29(H) x 29(D) mm	Page 20
KP-F31SCL/PCL	1/3" 1CCD	VGA (659 x 494)	120 fps	29(W) x 29(H) x 38(D) mm	Page 19
KP-F30SCL/PCL	1/3" 1CCD	VGA (659 x 494)	60 fps	29(W) x 29(H) x 29(D) mm	Page 20
PoCL Lite					
KP-F200Lite	1/1.8" 1CCD	UXGA (1628 x 1236)	15 fps	29(W) x 29(H) x 29(D) mm	Page 22
KP-F80Lite	1/3" 1CCD	XGA (1034 x 779)	36 fps	29(W) x 29(H) x 29(D) mm	Page 22
KP-F30Lite	1/3" 1CCD	VGA (659 x 494)	60 fps	29(W) x 29(H) x 29(D) mm	Page 22
KP-FM30Lite	1/3" 1CMOS	VGA (752 x 480)	90 fps	21.5(W) x 21.5(H) x 21.5(D) mm	Page 22
KP-FBM30Lite	1/3" 1CMOS	VGA (752 x 480)	90 fps	21.5(W) x 21.5(H) x 21.5(D) mm	Page 22

HDTV Cameras

3CCD Cameras					
DK-H100	2/3" 3CCD	1080i (1920 x 1080)		99(W) x 105(H) x 155(D) mm	Page 23
DK-Z50	2/3" 3CCD	1080i (1920 x 1080)		99(W) x 105(H) x 155(D) mm	Page 23
HV-HD33	1/3" 3MOS	1080i / 720p (1280 x 720)		65(W) x 65(H) x 125(D) mm	Page 24
1CCD Color Cameras					
KP-HD1005	1/3" 1CMOS	1080 30P (1920 x 1080)		64(W) x 63(H) x 135(D) mm	Page 25
KP-HD1005-S2	1/3" 1CMOS	1080 30P (1920 x 1080)		64(W) x 63(H) x 135(D) mm	Page 25
KP-HD1005-S4	1/3" 1CMOS	1080 59.94i/29.97p (1920 x 1080) P type: 1080 50i/25p (1920 x 1080)		64(W) x 63(H) x 103(D) mm	Page 25
KP-HD1005-S5	1/3" 1CMOS	1080 59.94i/29.97p (1920 x 1080) P type: 1080 50i/25p (1920 x 1080)		64(W) x 63(H) x 103(D) mm	Page 25
KP-HD1001	1/3" 1CMOS	1080 30P (1920 x 1080)		64(W) x 63(H) x 135(D) mm	Page 25
KP-HD20A	1/3" 1CMOS	1080 59.94i/50i/29.97p/25p (1920 x 1080)		44(W) x 44(H) x 59(D) mm	Page 25
KP-HD20A-S2	1/3" 1CMOS	1080 60P (1920 x 1080)		44(W) x 44(H) x 59(D) mm	Page 25

Analog Interface Cameras

3CCD Cameras					
HV-D30	1/3" 3CCD	NTSC (768 x 494), PAL (752 x 582)		65(W) x 65(H) x 80(D) mm	Page 27
1CCD Color Cameras					
KP-D20B	1/2" 1CCD	NTSC (768 x 494), PAL (752 x 582)		44(W) x 44(H) x 49(D) mm	Page 28
KP-D20A	1/3" 1CCD	NTSC (768 x 494), PAL (752 x 582)		44(W) x 44(H) x 49(D) mm	Page 28
KP-D5001	1/2" 1CCD	NTSC (768 x 494), PAL (752 x 582)		64(W) x 63(H) x 135(D) mm	Page 29
KP-D5000	1/2" 1CCD	NTSC (768 x 494), PAL (752 x 582)		64(W) x 63(H) x 135(D) mm	Page 29
KP-D5010	1/2" 1CCD	NTSC (768 x 494), PAL (752 x 582)		64(W) x 63(H) x 64(D) mm	Page 29

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KP-FD510UB, KP-F510UB, KP-FMD200UB, KP-FM200UB, KP-F31UB, KP-F21UB	P10
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HDTV Cameras

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Analog Interface Cameras

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KP-D20A, KP-D20B, KP-D20B-S3	P28
KP-D5000, KP-D5001, KP-D5010	P29

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Hitachi Industrial Digital Interface Camera Line-up	Back cover

Digital Interface Cameras

About Digital Interface

GigE Vision (Gigabit Ethernet interface)

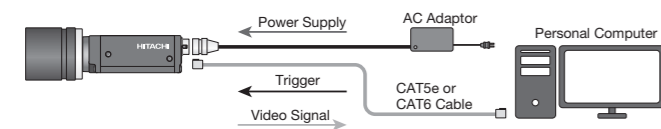
Direct connection is possible to PC by the Gigabit Ethernet cable. This cable is less bulky compared with parallel digital output cabling. GigE Cable length can be extended to maximum 100m without hub and switcher. Based on Industrial camera interface standard GigE Vision, a maximum of 1Gbps high speed data transmission is available and suitable for image processing. Development of camera control system is easy because industrial camera control API "GenICam" lead EMVA (European Machine Vision Association). Power can be supplied via Ethernet cable for PoE enabled models (Power over Ethernet).

Applicable Models (PoE Enabled): KP-F21GV, KP-F31GV, KP-FM200GV, KP-FMD200GV, KP-F510GV, KP-FD510GV, HV-F202GV, KP-F500GV, KP-F202GV, KP-F145GV, KP-F140GV, KP-F83GV, KP-F33GV, KP-FD500GV, KP-FD202GV, KP-FD140GV, KP-FD83GV, KP-FD33GV

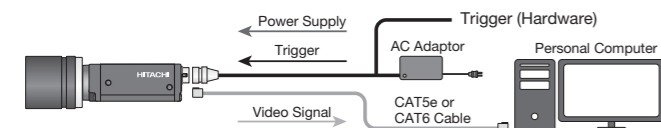
Applicable Models (PoE Non-enabled): HV-F22GV

System Configuration (example)

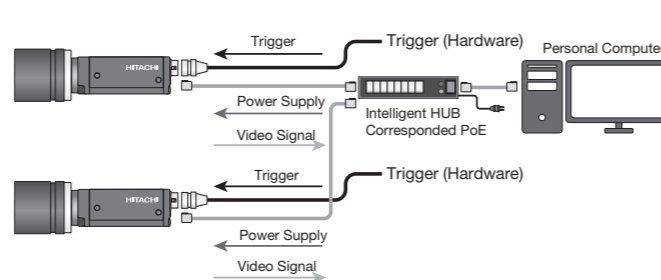
• Direct Connection to PC and Triggered via Ethernet (Software Trigger)



• Direct Connection to PC and Triggered via Multi-connector (Hardware Trigger)



• Connection Via HUB/Switcher to PC and Power Supply via the Ethernet (PoE)



Digital Interface Cameras

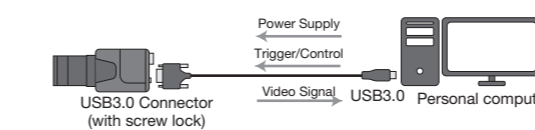
About Digital Interface

USB3 Vision

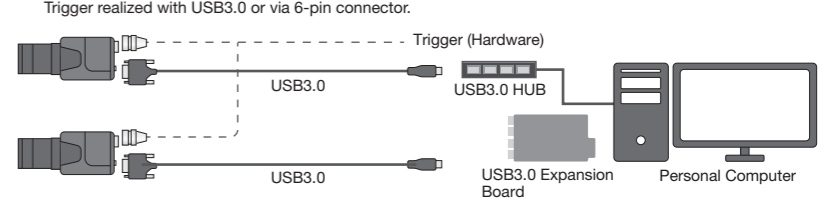
USB3 Vision is the next standard generation for industrial camera interface from the AIA (Automated Image Association), that makes use of the USB3 connector on a PC, to achieve transmission speeds equivalent to the Medium Configuration of Camera Link. USB3 has about 10 times the bandwidth of USB2 and offers a simple and reliable low cost two way transmission system between the camera and the PC. An industrial style screw lock connector provides a reliable plug-and-play connection while providing camera power. Reduced CPU loads due to DMA allow acquisition of stable images with low latency.

Applicable Models: KP-F21UB, KP-F31UB, KP-FM200UB, KP-FMD200UB, KP-F510UB, KP-FD510UB

• Simple Connection example



• Connection example of multiple Cameras using the expansion board or USB3.0 HUB



Camera Link

Camera link is an AIA imaging standard for serial digital interface between a camera and a frame grabber. Camera Link is available in Base, Medium or Full configurations depending on the camera resolution, bit depth and frame rate. In addition there are several different types of Camera Link interfaces including normal, Mini CL, PoCL for power over Camera Link, and PoCL Lite for reduced connector and cable size.

Applicable Models

Model	Type of CameraLink	Configuration
KP-F520WCL	Mini CL (Auto Selection of PoCL or non-PoCL)	Base
KP-FD510WCL		Base
KP-F500WCL		Medium
KP-FR500WCL		Base
KP-F145WCL		Base
KP-FM400WCL		Base
KP-FM200WCL		Medium
KP-FMR400WCL		Full
KP-FD500PCL		Base
KP-FD202PCL		Medium
KP-FD140PCL	Mini CL (PoCL)	Base
KP-FM200PCL		Base
KP-FM100PCL		Base
KP-FMD200PCL		Base
KP-FMD100PCL		Base
KP-F230PCL		Base
KP-F200PCL		Base

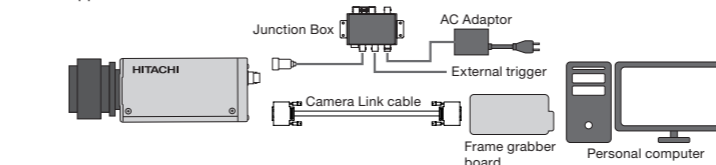
Model	Type of CameraLink	Configuration
KP-F200PCL	Mini CL (PoCL)	Base
KP-F80PCL		Base
KP-F31PCL		Base
KP-F30PCL		Base
KP-FR230PCL		Base
KP-FR200PCL		Base
KP-FR80PCL		Base
KP-FR31PCL		Base
KP-FR30PCL		Base
KP-FBR30PCL		Base
KP-FM1200CL	Mini CL (Non-PoCL)	Base/Medium/Full
KP-FD500SCL		Base
KP-FD202SCL		Medium
KP-FD140SCL		Base
KP-F230SCL	Mini CL (Non-PoCL)	Base
KP-F200SCL		Base

Model	Type of CameraLink	Configuration
KP-F80SCL	Mini CL (Non-PoCL)	Base
KP-F31SCL		Base
KP-F30SCL		Base
KP-FR230SCL		Base
KP-FR200SCL		Base
KP-FR80SCL		Base
KP-FR31SCL		Base
KP-FR30SCL		Base
KP-FBR30SCL		Base
KP-FMR830CL		Base
HV-F202SCL	PoCL-Lite	Base/Medium
KP-F200Lite		Base
KP-F80Lite		Base
KP-F30Lite		Base
KP-FM30Lite	PoCL-Lite	Base
KP-FBM30Lite		Base
HV-F22CL-S1	Camera Link	Base

System Configuration for Camera Link normal (example)

• Base Configuration (When using an external trigger)

Applicable Model: HV-F21CL-S1



Mini CL

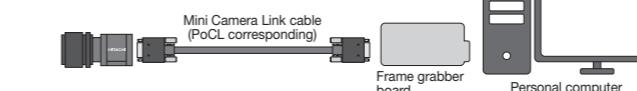
By adopting a Camera Link digital interface, high speed video data transfer is possible. Furthermore, by adopting the small connector (SDR) of a Mini Camera Link standard, the size of the camera has been reduced.

The PoCL version is connected by a single (PoCL) Mini Camera Link cable directly to a frame grabber supporting PoCL. Simple systems construction is possible.

System Configuration for PoCL (example)

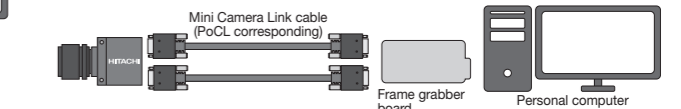
• Base Configuration

Applicable Model: WCL, PCL type all models



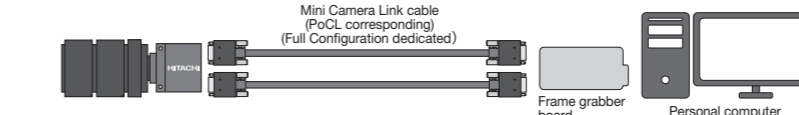
• Medium Configuration

Applicable Model: KP-FD510WCL, KP-F500WCL, KP-FR500WCL, KP-FD500PCL, KP-FD202PCL, KP-FD140PCL, KP-FM400WCL, KP-FMR400WCL, KP-FM200WCL, KP-FMR200WCL



• Full Configuration

Applicable Model: KP-FM400WCL, KP-FMR400WCL, KP-FM200WCL, KP-FMR200WCL



Digital Interface Cameras

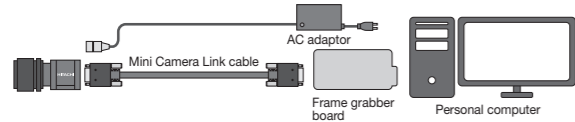
About Digital Interface

Mini CL

System Configuration for Non-PoCL (example)

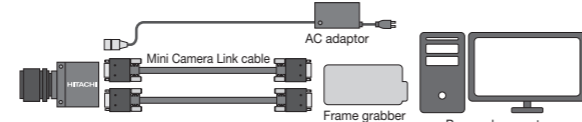
• Base Configuration

Applicable Model: WCL, SCL type all models, KP-FM1200CL, KP-FMR830CL



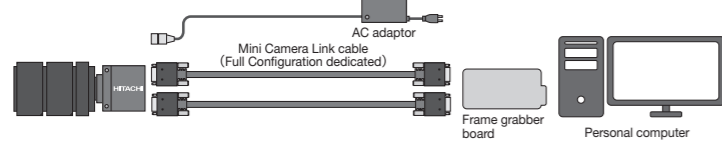
• Medium Configuration

Applicable Model: KP-FM1200CL, KP-FD510WCL, KP-F500WCL, KP-FR500WCL, KP-FD500SCL, KP-FD202SCL, KP-FD140SCL, KP-FM400WCL, KP-FMR400WCL, KP-FM200WCL, KP-FMR200WCL



• Full Configuration

Applicable Model: KP-FM1200CL, KP-FM400WCL, KP-FMR400WCL, KP-FM200WCL, KP-FMR200WCL

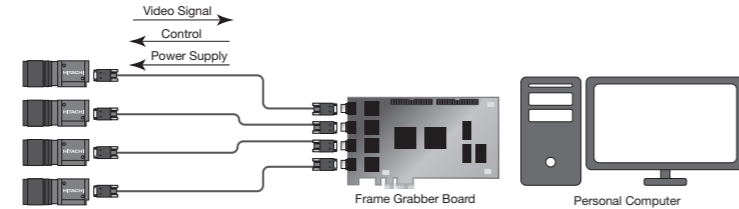


PoCL-Lite

PoCL Lite features a smaller Camera Link connector reducing the pin count from 26 pins to 14 pins along with a smaller cable which allows smaller camera size and more connectors on the frame grabber board allowing the support of up to four cameras by a single frame grabber board. PoCL-Lite supports Base Camera Link configuration and provides power to the camera over the interface along with serial camera data for image and camera control.

Applicable Models: KP-F200Lite, KP-F80Lite, KP-F30Lite, KP-FM30Lite, KP-FBM30Lite

System Configuration (Four camera connection example)

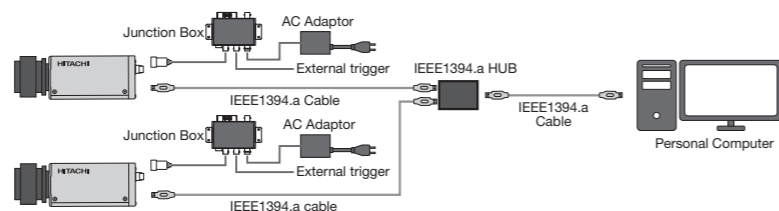


IEEE1394.a

IEEE1394.a, also known as FireWire, is a camera interface standard to a PC that provides image and camera control over a serial data link. The included software allows the user to view the camera image as well as to control the camera parameters over the serial interface.

Applicable Models: HV-F21F

System Configuration (example)



Main Features

A variety of interface

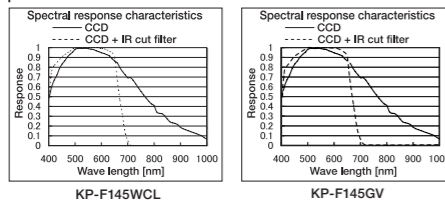
By a variety of interfaces, it is adaptable to a variety of systems.

GigE Vision	-GV models
USB3 Vision	-UB models
Mini Camera Link	Auto Selection of PoCL or non-PoCL
	PoCL
Camera Link	-PCL models
	Non-PoCL
PoCL-Lite	-SCL models
Camera Link	-Lite models
Camera Link	-CL models
IEEE-1394.a	-F models

Near infrared sensitivity

Extended spectral response allows use of the camera in the near infrared region.

Applicable models: KP-F145WCL, KP-F145GV



Raw Data Output (KP-FRxxx Models)

The FR series of cameras use a CCD with an RGB primary color mosaic filter, outputting the image data in a RAW format with minimal processing in order to achieve higher frame rates as compared to a normal color camera. External image processing and software is required to produce a proper color picture.

High color fidelity (KP-FDxxx/KP-FMDxxx Models)

RGB primary color mosaic filter achieve high color fidelity.

High resolution & high speed

High resolution combined with high frame rates is possible with this series of cameras. Can be used for high-precision and high-speed image processing in many applications.

280 fps	2.23 Mpixel: KP-FM200WCL/FMR200WCL
150 fps	4.19 Mpixel: KP-FM400WCL/FMR400WCL
125 fps	VGA: KP-F31UB/F21UB/F31GV/F21GV
120 fps	VGA: KP-F31PCL/F31SCL/FR31PCL/FR31SCL
90 fps	VGA: KP-FM30Lite/FBM30Lite/F33GV/FD33GV
61 fps	SXGA: KP-FM100PCL
60 fps	VGA: KP-F30PCL/F30SCL/FR30PCL/FR30SCL/FBR30PCL/FBR30SCL/F30Lite
53 fps	12.58 Mpixel: KP-FM1200CL, UXGA: KP-FM200PCL/FM200UB/FMD200UB/FM200GV
36 fps	XGA: KP-F80PCL/F80SCL/F80Lite/F83GV/FD83GV
30 fps	SXGA: KP-F145WCL/FD140PCL/FD140SCL/FMD100PCL/F145GV/F140GV/FD140GV UXGA: KP-F230PCL/F230SCL/FD202PCL/FD202SCL/FMD200GV/F202GV/FD202GV, HV-F202SCL
28 fps	UXGA: HV-F202GV
20 fps	UXGA: KP-FMD200PCL
18 fps	5.05 Mpixel: KP-F520WCL//F510UB/FD510UB/F510GV
16 fps	5.05 Mpixel: KP-F500WCL/FR500WCL/F500GV
15 fps	UXGA: KP-F200PCL/F200SCL/FR200PCL/FR200SCL/F200Lite SXGA: HV-F22CL-S1/F22GV
12 fps	5.05 Mpixel: KP-FD510WCL/FD500PCL/FD500SCL
9 fps	5.05 Mpixel: KP-FD510GV/FD500GV
7.5 fps	SXGA: HV-F22F

Four-sided attachment mechanism

Applicable Models: KP-F520WCL/FM200PCL/FMD200PCL/FM100PCL/FMD100PCL/FM1200CL

Can be attached four-side of the camera, making it suitable for camera installation of the narrow portion.

Digital Interface Cameras

Main Features

Compact and lightweight

Compact models featuring a size of 21.5(W) x 21.5 (H) x 21.5 (D) with a PoCL-Lite, Mini Camera Link (PoCL), or USB3 Vision interfaces are available.

	Dimensions WxHxDmm (Not including protrusions and lens)	Models
1CCD (CMOS) Models	21.5 x 21.5 x 21.5	KP-FM30Lite/FBM30Lite, KP-FMR830(1 Camera)
	29 x 29 x 20	KP-FM200PCL/FMD200PCL/FM100PCL/FMD100PCL/FM200UB/ FMD200UB/F31UB/F21UB
	29 x 29 x 29	KP-F520WCL/F200PCL/F200SCL/F80PCL/F80SCL/F30PCL/F30SCL/FR200PCL/FR200SCL/FR80PCL/FR80SCL/FR30PCL/FR30SCL/F200Lite/F80Lite/F30Lite/510UB/FD510UB
	29 x 29 x 35	KP-F510GV/FD510GV/FM200GV/FMD200GV/F31GV/F21GV
	29 x 29 x 38	KP-F230PCL/F230SCL/F31PCL/F31SCL/FR230PCL/FR230SCL/FR31PCL/FR31SCL
	44 x 44 x 41	KP-FD510WCL/F500WCL/F145WCL/FR500WCL/FD500PCL/FD500SCL/FD202PCL/FD202SCL/FD140PCL/FD140SCL/FM400WCL/FM200WCL/FMR400WCL/FMR200WCL
	55 x 55 x 45	KP-FM1200CL
	44 x 29 x 72	KP-F500GV/F202GV/F145GV/F140GV/F83GV/F33GV/FD500GV/ FD202GV/FD140GV/FD83GV/FD33GV
	12 x 12.5 x 47.5	Camera Head: KP-FBR30PCL/FBR30SCL
	3CCD Models	55 x 55 x 89
65 x 65 x 130		HV-F22CL-S1, HV-F22F
65 x 65 x 141		HV-F22GV

Frame Shutter

Higher vertical resolution for moving objects.

Multi-step Shutter

Electronic shutter is provided with multi-step or variable speed.

Frame on Demand

A one-trigger and fixed-shutter mode of frame-on-demand are provided allowing precise timing and exposure for image capture.

Remote Control

Through the digital interface, various setting such as shutter, mode, gain, partial scan, bit depth, etc can be adjusted.

Partial Scan

The vertical startposition and number of lines can be adjusted. Higher frame rates are possible by using partial scan mode. (KP-FM1200CL can be set eight area) (KP-FM200PCL/FMD200PCL/FM100PCL/FMD100PCL/FM200UB/FM200GV/FMD200UB/FMD200GV: The start position and area of H and V direction can be set in one pixel spacing.)

Cropping mode

Applicable Models: KP-FM200PCL/FMD200PCL

A user selectable cropping area featuring reduced resolution (VGA/ XGA/SXGA) can be selected to increase the camera frame rate. The KP-FM200PCL can operate at 130 f/s in the VGA mode.

Vertical subsampling modes

Applicable Models: KP-FM1200CL/FM400WCL/FM200WCL/FMR400WCL/KP-FMR200WCL

Enables high-speed readout by vertical decimation of 2 to 10 times

Vertical 2 pixels additional Modes

Applicable Models: KP-F520WCL/F500WCL/F145WCL/F230PCL/F230SCL/F31PCL/F31SCL

Enables high-speed readout by the vertical 2 pixels addition mode

Temperature detection output

Applicable Models: KP-F520WCL

The internal temperature of the camera can be read.

White spot detecting and correction

White spots that result from radiation or high temperature can be detected and corrected.

Knee adjustment

Applicable Models: KP-F520WCL, FD Model, FMD model, -GV Model, -UB Model, 3CCD model

Gamma adjustment

Applicable Models:

Manual variable: KP-F520WCL, 3CCD model

Correction by LUT: KP-FD510WCL/FD202PCL/FD202SCL/FD140PCL/FD140SCL /FMD200PCL/FMD100PCL, -UB model, -GV model

FLASH output

Applicable Models: KP-F520WCL, -UB model, -GV model

The camera has an output-signal to control and synchronize an external flash to the camera exposure.

Selectable White Balance Adjustment

Applicable Models: (KP-FDXXX/FMDxxx Models, 3CCD Models)

Selectable white balance adjustment method of ATW (auto-tracking), Manual (manual setting of R and B gain) or one-time (one-time auto adjustment).

6-Vector Independent Masking

Applicable Models: (KP-FDXXX/FMDxxx Models, 3CCD Models)

A 6-Vector color correction can be selected, allowing independent adjustment of the hue and saturation of the primary R,G,B, and complementary Cy, Mg, and Ye vectors, for accurate color reproduction of difficult objects.

Selectable bit depth

Bit Depth	Applicable models
8 / 10 / 12	KP-F500WCL/FR500WCL/F145WCL/F510UB/FM200UB/F31UB/F21UB/F500GV/F202GV/F145GV//F140GV/F83GV/F33GV
8 / 16	KP-F510GV/FM200GV/F31GV/F21GV
8 / 10	KP-FM1200CL/F520WCL/FM400WCL/FM200WCL/F500WCL/F145WCL/FMR400WCL/FMR200WCL/FM200PCL/FM100PCL/F230PCL/F230SCL/F200PCL/F200SCL/F80PCL/F80SCL/F31PCL/F31SCL/F30PCL/F30SCL/FR230PCL/FR230SCL/FR200PCL/FR200SCL/FR80PCL/FR80SCL/FR31PCL/FR31SCL/FR30PCL/FR30SCL/FBR30PCL/FBR30SCL/F200Lite/F80Lite/F30Lite/FM30Lite/FBM30Lite
24 / 48	KP-FD510GV/FMD200GV
24 / 30 / 36	KP-FD510WCL/FD500PCL/FD500SCL/FD202PCL/FD202SCL/FD140PCL/FD140SCL/FD510UB/FMD200UB/FD500GV/ FD202GV/FD140GV/ FD83GV/FD33GV/F202SCL/F202GV
24 / 30	HV-F22F
24	KP-FMR830CL/FMD200PCL/FMD100PCL, HV-F22CL-S1/F22GV

Features for 3CCD Models

Adjustable sharpness (DTL) width

Sharpness (DTL) width is adjustable. A feeling of natural definition is provided when set a lower sharpness. A higher setting results in an image with enhanced contours.

Auto shading (ASC)

Color shading (non-uniformity of color distribution) due to lens and lighting can be corrected automatically.

Versatile imaging functions

• Long time integration mode.

• Four application files.

Four different complete camerasetups can be stored and recalled.

• Realtime automatic white balance function (ATW)

Changes in the colortemperature of the of the illumination can be adjusted automatically.

• Auto exposure (ALC: auto level control)

The ALC examines and uses 64 separate areas of the image to continuously control the AGC and AES, providing extremely wide response to variations in light. Peak or Average ALC response can be selected from the camera menu.

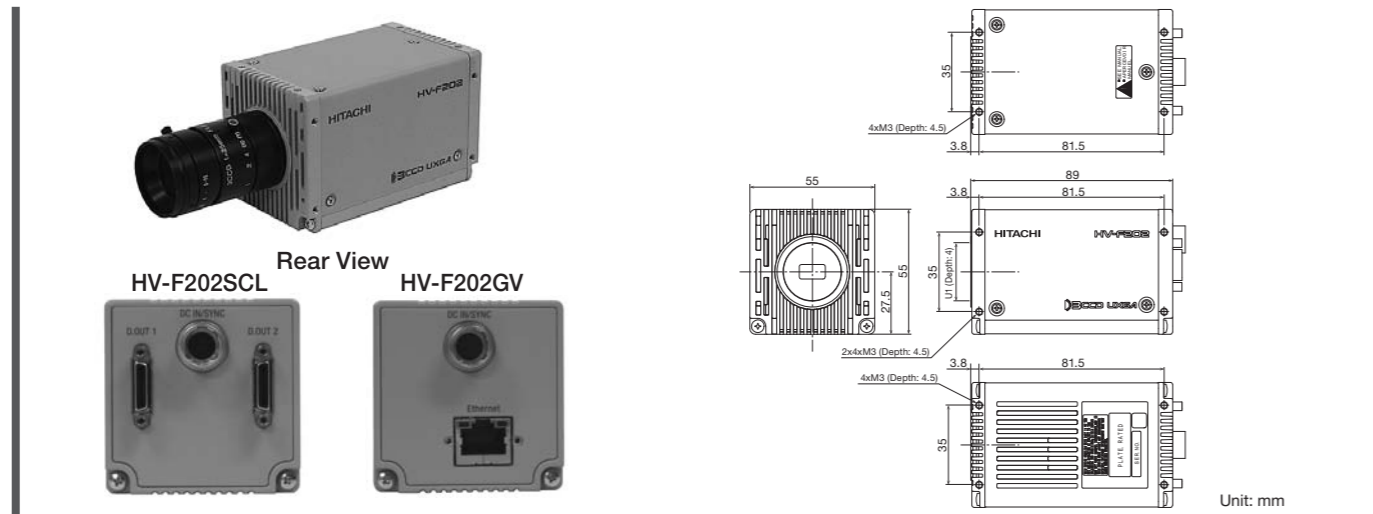
• Two mode gain control

AGC or user-programmable gain in 1 dB steps.

• Master black, R/B black, and R/B gain are adjustable.

Digital Interface Cameras

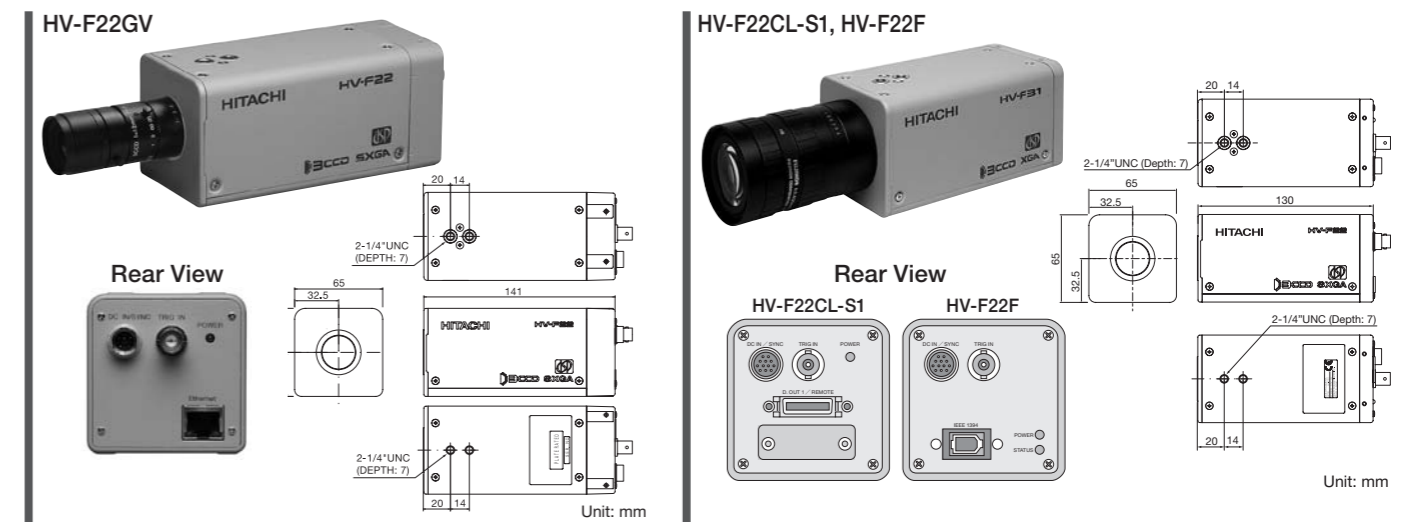
HV-F202GV	GigE Vision	3CCD Color (RGB/YUV)	1/1.8" CCD	UXGA (1.92M pixels) (1600 x 1200)	Max.28 frames per sec. (YUV 24 bits)	55(W) x 55(H) x 89(D) mm
HV-F202SCL	MiniCL (Non-PoCL)	3CCD Color (RGB)			Max.30 frames per sec.	



		HV-F202GV	HV-F202SCL		
Imaging device	Effective pixels	1/1.8-inch progressive scan interline CCD (R, G, B 3 CCD)			
	Pixel size	1600(H) x 1200(V)			
	Optical system	4.4 μm(H) x 4.4 μm(V) (Square pixel)			
Scanning area		1/1.8-inch F1.8 prism			
Scanning system		7.04 mm(H) x 5.28 mm(V)			
Sync system		Progressive			
Lens mount		Internal / VD external			
Flange focal distance		C-mount			
Video output		Gigabit Ethernet IEEE802.3ab (1000BASE-T)		Camera Link support	
		GigE Vision Support GenICam Support RGB (24 bit/30 bit/ 36 bit), RAW (24 bit/30 bit/ 36 bit), YUV (24 bit/30 bit/ 36 bit)		Base Configuration / Medium Configuration Base Configuration: RGB 24bit Medium Configuration: RGB 30bit / RGB 36bit	
Frame rate	RGB	Frame rate (frames per second)			30 frames per second
		24 bit	30 bit	36 bit	
	YUV	18	12	9	
	28	18	18		
Sensitivity		2000 lx, F5.6, 3200K (at 1/30 second shutter)			
		OFF / Auto(AES) / Manual (Variable)			
	Variable	1/30 to 1/100,000 second			
Electric shutter	AES	1/30 to 1/100,000 second			
	Long time integration	1/30 to approx. 4 second (1 frame step)			
External trigger	Mode	Fixed shutter, One trigger, VD sync reset		Via Camera Link cable (CC1) or DC IN/SYNC connector	
	Input	Via Gigabit Ethernet cable or DC IN/SYNC connector		Via Camera Link cable (CC1) or DC IN/SYNC connector	
	Input level	5 Vp-p ±0.5 V			
External sync signal (Strobe out)		VD output, Flash out			
Registration		Full Screen: 0.05% (except lens characteristics)			
Vertical Sharpness		2H			
White balance		Manual / One-push auto / Continuous auto			
Gain		Manual: 0 to +12 dB, AGC: 0 to +12 dB (with limit setting)			
Gamma		0.45 / 1.0 / LUT (Look up table: user customizable)			
Color masking		OFF/ON (6 color independent masking)			
Sharpness		Sharpness (DTL) level, Sharpness (DTL) width			
Paint black		Adjustable			
Black level		Adjustable			
Knee		Adjustable (Knee point and knee slope)			
Power supply		DC+12 V ±1 V (from DC IN / SYNC connector), 48V (PoE)		DC+12 V ±1 V (from DC IN / SYNC connector)	
Power consumption		Approx. 7.8 W (DC+12 V)		Approx. 7.2 W (DC+12 V)	
Ambient temperature	Operating	0 °C to +40 °C (without dew condensation)			
	Storage	-20 °C to +60 °C			
Vibration endurance		10 to 200 Hz 24.5 m/s ²			
Shock endurance		392 m/s ²			
External dimensions		55(W) x 55(H) x 89(D) mm (not including lens and protrusions)			
Mass		Approx. 350 g (without lens)			

Digital Interface Cameras

HV-F22GV	GigE Vision	3CCD Color (RGB)	1/2" CCD	SXGA (1.39 M pixels)(1360 x 1024)	Max.15 frames per sec.	65(W) x 65(H) x 141(D) mm
HV-F22CL-S1	CameraLink					
HV-F22F	IEEE1394.a	3CCD Color (RGB/YUV)	1/2" CCD	SXGA (1.39 M pixels) (1360 x 1024)	Max. 7.5 frames per sec.	65(W) x 65(H) x 130(D) mm



		HV-F22GV	HV-F22CL-S1	HV-F22F
Imaging device	Effective pixels	1/2-inch progressive scan interline CCD (R, G, B 3 CCD)		
	Pixel size	1360(H) x 1024(V)		
	Optical system	4.65 μm(H) x 4.65 μm(V) (Square pixel)		
Scanning area		1/2-inch F1.6 prism		
Scanning system		6.32 mm (H) x 4.76 mm(V)		
Sync system		Progressive		
Lens mount		Internal / VD external		
Flange focal distance		C-mount		
Video output	Interface	Gigabit Ethernet IEEE802.3ab (1000BASE-T) GigE Vision Support GenICam Support RGB (24 bit)	Camera Link Base Configuration	IEEE1394.a
	Output Data	RGB 24 bit	RGB 24 bit	RGB 16/24 bit YUV 16/24/48 bit
	Image Size	1360(H) x 1024(V)		
	Frame rate	15 frames per second		7.5 frames per second
Sensitivity		2000 lx, F8, 3200K (at 1/30 second shutter)		
		OFF / Auto(AES) / Manual (Variable)		
	Variable	1/15 to 1/100,000 second		
Electric shutter	AES	1/15 to 1/100,000 second		
	Long time integration	1/15 to approx. 4 second (1 frame step)		
External trigger	Mode	Fixed shutter, One trigger, VD sync reset		
	Input	Via Gigabit Ethernet cable or DC IN/SYNC connector	Via Camera Link cable, DC IN/SYNC connector or BNC connector	Via DC IN/SYNC connector or BNC connector
	Input level	Low: 0 V DC, High: 3 to 24 V DC		
External sync signal (Strobe out)		Flash out		
Screen distortion		All Screen: 0% (except lens characteristics)		
Registration		Full Screen: 0.05% (except lens characteristics)		
Vertical Sharpness		2H		
White balance		Manual / One-push auto / Continuous auto		
Gain		Manual: 0 to +12 dB, AGC: 0 to +12 dB (with limit setting)		
Gamma		0.45 / 1.0 / LUT (Look up table: user customizable)		
Color masking		OFF/ON (6 color independent masking)		
Sharpness		Sharpness (DTL) level, Sharpness (DTL) width		
Paint black		Adjustable		
Black level		Adjustable		
Knee		Adjustable (Knee point and knee slope)		
Power supply		DC+12 V (10.5 V to 15 V DC without ripple)		
Power consumption		Approx. 9.0 W (DC+12 V)	Approx. 6.5 W (DC+12 V)	Approx. 8.5 W (DC+12 V)
Ambient temperature	Operating	0 °C to +40 °C		
	Storage	-20 °C to +60 °C		
Vibration endurance		10 to 200 Hz 24.5 m/s ²		
Shock endurance		392 m/s ²		
External dimensions		65(W) x 65(H) x 141(D) mm (not including lens and protrusions)	65(W) x 65(H) x 130(D) mm (not including lens and protrusions)	
Mass		Approx. 600 g (without lens)		

Digital Interface Cameras

KP-FD510GV	GigE Vision	1CCD Color (RGB/YUV/RAW)	2/3" CCD	5.05 M Pixels (2456 x 2058)	Max. 9 frames per sec. (YUV) Max. 7 frames per sec. (RGB)	29(W) x 29(H) x 35(D) mm
KP-F510GV		1CCD Black & White			Max. 18 frames per sec.	
KP-FMD200GV		1CMOS Color (RGB/YUV/RAW)	1/1.8" CMOS	UXGA (1.92 M Pixels) (1600 x 1200)	Max. 30 frames per sec. (YUV) Max. 18 frames per sec. (RGB)	
KP-FM200GV		1CMOS Black & White			Max. 53 frames per sec.	
KP-F31GV		1CCD Black & White	1/3" CCD	VGA (0.32 M Pixels) (652 x 490)	Max. 125 frames per sec.	
KP-F21GV		1CCD Black & White	1/2" CCD			



	KP-FD510GV KP-F510GV	KP-FMD200GV KP-FM200GV	KP-F31GV	KP-F21GV	
Imaging device	Effective pixels	2/3-inch CCD	1/3-inch CCD (ICX424AL)	1/2-inch CCD (ICX414AL)	
	Pixel size	2456(H) x 2058(D)	1600(H) x 1200(D)	659(H) x 494(D)	
	Color filter (FD/FMD model)	3.45 μm(H) x 3.45 μm(V) (Square pixel)	4.5 μm(H) x 4.5 μm(V) (Square pixel)	7.4 μm(H) x 7.4 μm(V) (Square pixel)	9.9 μm(H) x 9.9 μm(V) (Square pixel)
Scanning area	RGB primary color mosaic filter		-	-	
Scanning system	8.47 mm(H) x 7.10 mm(V)	7.2 mm(H) x 5.4 mm(V)	4.88 mm(H) x 3.66 mm(V)	6.52 mm(H) x 4.89 mm(V)	
Sync system	Progressive				
Sync system	Internal				
Lens mount	C-mount (Flange focal distance: 17.526 mm)				
Video output	Interface	Gigabit Ethernet			
	Protocol	GigE Vision compliant			
	Image format	KP-F510GV/FM200GV: Mono 8/16 bit KP-FD510GV/FMD200GV: RGB 24/48 bit, YUV(4:2:2) 16/32 bit RAW 8/10 bit, Mono 8/16 bit		Mono 8/16 bit	
	Image size	2448(H) x 2050(D)	1600(H) x 1200(D)	652(H) x 490(D)	
Frame rate	KP-FD510GV: 9 frames per second (YUV) 7 frames per second (RGB) KP-F510GV: 18 frames per second	KP-FMD200GV: 30 frames per second (YUV) 18 frames per second (RGB) KP-FM200GV: 53 frames per second	125 frames per second		
	Sensitivity	KP-FD510GV: 2000 lx, F5.6, 3200K KP-F510GV: 400 lx, F6, 3200K	KP-FMD200GV: 2000 lx, F5.6, 3200K KP-FM200GV: 500 lx, F5.6, 3200K	550 lx, F4, 3200K	
S/N	50 dB	45 dB	50 dB		
Electric shutter	Mode	OFF / Auto (AES) / Manual (PRESET or VARIABLE), OFF is normal exposure (frame rate)			
	PRESET	1/60, 1/100, 1/200, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, 1/50000 second	1/125, 1/200, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, 1/50000 second		
	VARIABLE	10 to 1/100,000 second	1 to 1/100,000 second	10 to 1/100,000 second	
External trigger	Mode	Fixed shutter (9 steps or Variable)		Fixed shutter (8 steps or Variable)	
	Input	Via Gigabit Ethernet cable (Software trigger), 6-pin connector (Hardware trigger)			
External sync signal	VD output: 5 Vp-p ±0.3 V, Strobe out: 5 Vp-p ±0.3 V				
Partial scan	Selectable start position and width of picture grabbing in 1H step	Selectable start position and width of picture grabbing in 1 pixel step	Selectable start position and width of picture grabbing in 1H step		
Binning mode	OFF/ON (Vertical)				
ALC (Auto level control)	Adjustable for video level				
White balance (FD/FMD model)	ATW / MANUAL / One-Push		-		
Color masking (FD/FMD model)	OFF / ON (6 vector independent masking)		-		
Gain	0 to 18 dB by 0.1 dB steps				
Gamma	OFF (γ=1) / LUT (0.45 to 1)				
Image adjustment function	Sharpness, Black level, Knee				
Power supply	DC +12 to 24 V ±1 V (via 6 pin connector), 48V(PoE)				
Power consumption	Approx. 5.3 W (440 mA)	Approx. 4.2 W (350 mA)	Approx. 4.3 W (360 mA)		
Ambient temperature	Performance	0 °C to +40 °C / 90 %RH or less			
	Operation	-10 °C to +50 °C / 90 %RH or less			
	Storage	-20 °C to +60 °C / 70 %RH or less (without dew condensation)			
Vibration endurance	15 to 200 to 15 Hz (98.6 m/S ²), 10 minutes for each 3 axis				
Shock endurance	490.3 m/s ² (Once for each side of top, under, left and right)				
External dimensions	29(W) x 29(H) x 35(D) mm (not including lens and protrusions)				
Mass	Approx. 70 g (without lens)				

Digital Interface Cameras

KP-FD510UB	USB3 Vision	1CCD Color (RGB/YUV/RAW)	2/3" CCD	5.05 M Pixels (2456 x 2058)	Max. 18 frames per sec. (YUV) Max. 12 frames per sec. (RGB)	29(W) x 29(H) x 29(D) mm
KP-F510UB		1CCD Black & White			Max. 18 frames per sec.	
KP-FMD200UB		1CMOS Color (RGB/YUV/RAW)	1/1.8" CMOS	UXGA (1.92 M Pixels) (1600 x 1200)	Max. 53 frames per sec.	
KP-FM200UB		1CMOS Black & White			Max. 125 frames per sec.	
KP-F31UB		1CCD Black & White	1/3" CCD	VGA (0.32 M Pixels) (652 x 490)	Max. 125 frames per sec.	
KP-F21UB		1CCD Black & White	1/2" CCD			



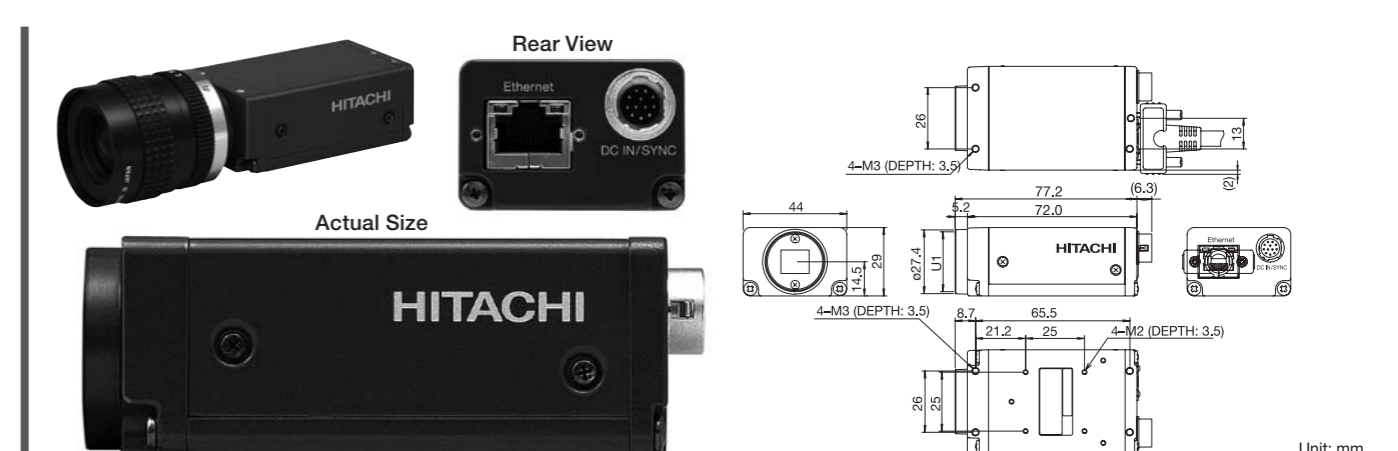
	KP-FD510UB KP-F510UB	KP-FMD200UB KP-FM200UB	KP-F31UB	KP-F21UB	
Imaging device	Effective pixels	2/3-inch CCD	1/3-inch CCD (ICX424AL)	1/2-inch CCD (ICX414AL)	
	Pixel size	2456(H) x 2058(D)	1600(H) x 1200(D)	656(H) x 494(D)	
	Color filter	3.45 μm(H) x 3.45 μm(V) (Square pixel)	4.5 μm(H) x 4.5 μm(V) (Square pixel)	7.4 μm(H) x 7.4 μm(V) (Square pixel)	9.9 μm(H) x 9.9 μm(V) (Square pixel)
Scanning area	RGB primary color mosaic filter (KP-FD510UB/FMD200UB)		-	-	
Scanning system	8.47 mm(H) x 7.10 mm(V)	7.2 mm(H) x 5.4 mm(V)	4.88 mm(H) x 3.66 mm(V)	6.52 mm(H) x 4.89 mm(V)	
Sync system	Progressive				
Sync system	Internal				
Lens mount	C-mount (Flange focal distance: 17.526 mm)				
Video output	Interface	USB 3.0 Interface			
	Protocol	USB3 Vision compliant			
	Image format	KP-FD510UB/FMD200UB: RGB 24/30/36 bit, YUV(4:2:2) 24/30/36 bit RAW 8/10/12bit, Mono 8/10/12bit		Mono 8/10/12 bit	
	Image size	2456(H) x 2058(D)	1600(H) x 1200(D)	652(H) x 490(D)	
Frame rate	KP-FD510UB: 18 frames per second (YUV) 12 frames per second (RGB) KP-F510UB: 18 frames per second	53 frames per second	125 frames per second		
	Sensitivity	KP-F510UB: 400 lx, F8, 3200K KP-FD510UB: 2000 lx, F5.6, 3200K	KP-FM200UB: 500 lx, F5.6, 3200K KP-FMD200UB: 2000 lx, F5.6, 3200K	550 lx, F4, 3200K	
S/N	50 dB	45 dB	50 dB		
Electric shutter	Mode	OFF / Auto (AES) / Manual (PRESET or VARIABLE), OFF is normal exposure (frame rate)			
	PRESET	1/60, 1/100, 1/200, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, 1/50000 second	1/125, 1/200, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, 1/50000 second		
	VARIABLE	10 to 1/100,000 second	1 to 1/100,000 second	10 to 1/100,000 second	
External trigger	Mode	Fixed shutter (9 steps or Variable)		Fixed shutter (8 steps or Variable)	
	Input	Via USB3.0 cable (Software trigger), 6-pin connector (Hardware trigger)			
External sync signal	VD output: 5 Vp-p ±0.3 V, Strobe out: 5 Vp-p ±0.3 V				
Partial scan	Selectable start position and width of picture grabbing in 1H step	Selectable start position and width of picture grabbing in 1 pixel step	Selectable start position and width of picture grabbing in 1H step		
Binning mode	OFF/ON (Vertical)				
ALC (Auto level control)	Adjustable for video level				
White balance (FD/FMD model)	ATW / MANUAL / One-Push		-		
Color masking (FD/FMD model)	OFF / ON (6 vector independent masking)		-		
Gain	0 to 18 dB by 0.1 dB steps				
Gamma	OFF (γ=1) / LUT (0.45 to 1)				
Image adjustment function	Sharpness, Black level, Knee				
Power supply	DC +5 V ±5 % (via USB3.0 cable)				
Power consumption	Approx. 4 W (800 mA)	Approx. 1.6 W (320 mA)	Approx. 2.5 W (500 mA)		
Ambient temperature	Performance	0 °C to +40 °C / 90 %RH or less			
	Operation	-10 °C to +50 °C / 90 %RH or less			
	Storage	-20 °C to +60 °C / 70 %RH or less (without dew condensation)			
Vibration endurance	15 to 200 to 15 Hz (98.6 m/S ²), 10 minutes for each 3 axis				
Shock endurance	490.3 m/s ² (Once for each side of top, under, left and right)				
External dimensions	29(W) x 29(H) x 29(D) mm (not including lens and protrusions)		29(W) x 29(H) x 20(D) mm (not including lens and protrusions)		
Mass	Approx. 60 g (without lens)		Approx. 45 g (without lens)		

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Model	Sensor	Resolution	Pixel Size	Frame Rate	Dimensions (W x H x D) mm
KP-FD500GV	1CCD Color (RGB/YUV/RAW)	2/3"	5.05 M Pixels (2456 x 2058)	Max. 9 frames per sec. (YUV)	44(W) x 29(H) x 72(D) mm
KP-F500GV	1CCD Black & White	CCD		Max. 16 frames per sec.	
KP-FD202GV	1CCD Color (RGB/YUV/RAW)	1/1.8"	UXGA (2.01 M Pixels) (1628 x 1236)	Max. 30 frames per sec. (RAW)	
KP-F202GV	1CCD Black & White	CCD		Max. 30 frames per sec.	
KP-F145GV	1CCD Black & White (Near infrared sensitivity)	2/3"	SXGA (1.45 M Pixels) (1392 x 1040)	Max. 30 frames per sec.	
KP-FD140GV	1CCD Color (RGB/YUV/RAW)	1/2"		Max. 30 frames per sec. (YUV)	
KP-F140GV	1CCD Black & White	CCD		Max. 30 frames per sec.	
KP-FD83GV	1CCD Color (RGB/YUV/RAW)	1/3"	XGA (0.81 M Pixels) (1034 x 779)	Max. 36 frames per sec.	
KP-F83GV	1CCD Black & White				
KP-FD33GV	1CCD Color (RGB/YUV/RAW)				
KP-F33GV	1CCD Black & White	CCD	VGA (0.33 M Pixels) (659 x 494)	Max. 90 frames per sec.	

		KP-FD500GV KP-F500GV	KP-FD202GV KP-F202GV	KP-F145GV
Imaging device		2/3-inch progressive scan interline CCD (KP-FD500GV: ICX625AQ, KP-F500GV: ICX625ALA)		2/3-inch progressive scan interline CCD (ICX285AL)
	Total pixels	2536(H) x 2068(V)	1688(H) x 1248(V)	1432(H) x 1050(V)
	Effective pixels	2456(H) x 2058(V)	1628(H) x 1236(V)	1392(H) x 1040(V)
	Pixel size	3.45 μm(H) x 3.45 μm(V) (Square pixel)	4.4 μm(H) x 4.4 μm(V) (Square pixel)	6.45 μm(H) x 6.45 μm(V) (Square pixel)
	Color filter (FD Model)	RGB primary color mosaic filter		-
Scanning area		8.45 mm(H) x 7.07 mm(V)	7.13 mm(H) x 5.37 mm(V)	8.98 mm(H) x 6.71 mm(V)
Scanning system		Progressive		
Sync system		Internal / external		
Lens mount		C-mount (Flange focal distance: 17.526 mm)		
Video output	Interface	Gigabit Ethernet		
	Protocol	GigE Vision compliant		
	Transfer rate	1 Gbps		
	Image format	KP-FD500GV/FD202GV: RGB 8/10/12 bit, YUV 8/10/12 bit, RAW 8/10/12 bit, MONO 8/10/12 bit		MONO 8/10/12 bit
	Image size	2448(H) x 2050(V)	1620(H) x 1220(V)	1360(H) x 1024(V)
	Frame rate	Full pixel readout KP-F500GV: 16 frames per second KP-FD500GV: 9 frames per second (YUV 8 bit, RAW 8/10/12 bit) 7 frames per second (RGB 8 bit, YUV 10/12 bit) 5 frames per second (RGB 10 bit) 3 frames per second (RGB 12 bit)	Full pixel readout KP-F202GV: 30 frames per second KP-FD202GV: 28 frames per second (RAW 8 bit) 28 frames per second (YUV 8 bit, RAW 10/12 bit) 18 frames per second (RGB 8 bit, YUV 10/12 bit) 12 frames per second (RGB 10 bit) 9 frames per second (RGB 12 bit)	30 frames per second
Sensitivity		KP-FD500GV: 2000 lx, F11, 3200K KP-F500GV: 400 lx, F11, 3200K	KP-FD202GV: 2000 lx, F5.6, 3200K KP-F202GV: 2000 lx, F11, 3200K	400 lx, F4, 3200K
Electric shutter		OFF/Auto (AES) / Manual (PRESET or VARIABLE), OFF is normal exposure (frame rate)		
	PRESET	1/9(KP-FD500GV), 1/16(KP-F500GV), 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	1/30, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	
	VARIABLE	From 10 second to approx. 1/100000 second		
External trigger	Mode	Fixed shutter, One trigger, VD Sync, Reset control		
	Input	Via Gigabit Ethernet cable (Software trigger), 12-pin connector (Hardware trigger)		
External sync signal	VD output	5 Vp-p ±0.3 V		
	Strobe out	5 Vp-p ±0.3 V		
Binning mode (No FD model)		OFF / ON		
Partial scan		Grabbing image area is adjustable at 2 pixel step. Frame rate improves when vertical size is reduced.		
ALC (Auto level control)		Adjustable for video level		
White balance (FD model)		ATW/MANUAL/One-push		
Gain		Auto / Manual (0 dB to 12 dB)	Auto / Manual (0 dB to 18 dB)	
Gamma		OFF(γ=1)/LUT		
Image adjustment function		Sharpness, Black level		
Power supply		DC+12 V ±1 V (input from 12-pin connector), 48 V (PoE)		
Power consumption	Normal	KP-FD500GV: Approx. 7.5 W (Approx. 625 mA) KP-F500GV: Approx. 7.8 W (Approx. 650 mA)	KP-FD202GV: Approx. 7.8 W (Approx. 650 mA) KP-F202GV: Approx. 7.5 W (Approx. 625 mA)	Approx. 6.0 W (Approx. 500 mA)
	Partial scan	KP-FD500GV: Approx. 7.8 W (Approx. 650mA) KP-F500GV: Approx. 8.4W (Approx. 700mA) (at 2 pixel height)	KP-FD202GV: Approx. 8.5W (Approx. 710mA) KP-F202GV: Approx. 8.4W (Approx. 700mA) (at 2 pixel height)	Approx. 6.6W (Approx. 550mA) (at 2 pixel height)
Ambient temperature	Performance	0 °C to +40 °C / 90 %RH or less		
	Operating	-10 °C to +50 °C / 90 %RH or less		
	Storage	-20 °C to +60 °C / 70 %RH or less (without dew condensation)		
Vibration endurance		15 to 200 to 15 Hz (98.6m/S ²), 10 minutes for each 3 axis		
Shock endurance		490.3 m/s ² (Once for each side of top, under, left and right)		
External dimensions		44(W) x 29(H) x 72(D) mm (not including lens and protrusions)		
Mass		Approx. 140 g (without lens)		

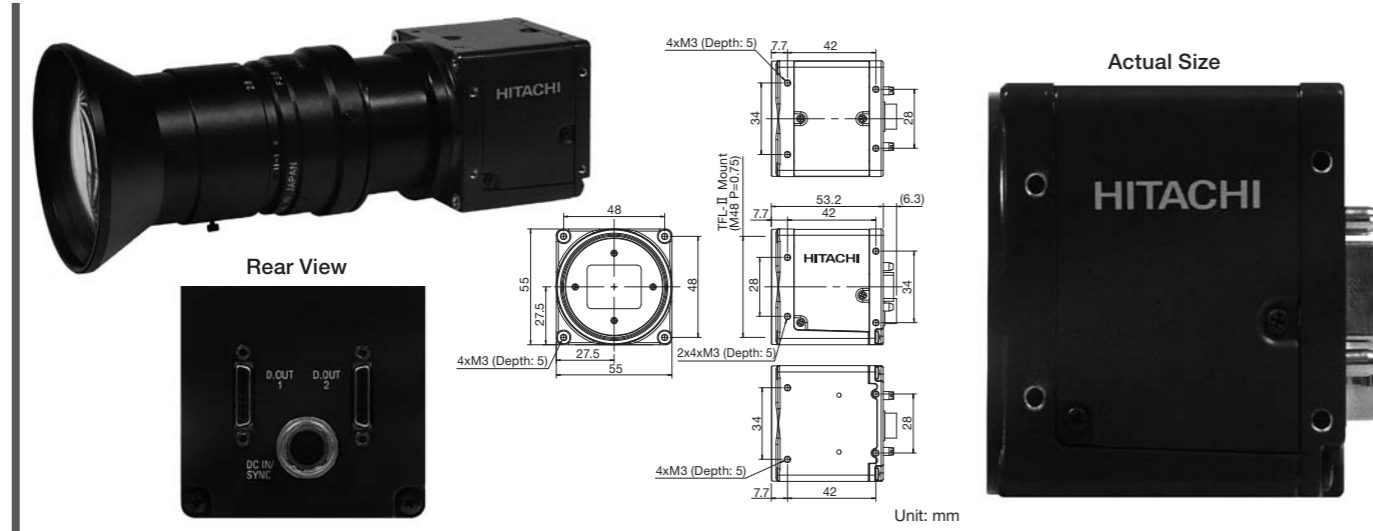
Digital Interface Cameras



		KP-FD140GV KP-F140GV	KP-FD83GV KP-F83GV	KP-FD33GV KP-F33GV
Imaging device		1/2-inch progressive scan interline CCD (KP-FD140GV: ICX267AK, KP-F140GV: ICX267AL)		1/3-inch progressive scan interline CCD (KP-FD33GV: ICX424AQ, KP-F33GV: ICX424AL)
	Total pixels	1434(H) x 1050(V)	1077(H) x 788(V)	692(H) x 504(V)
	Effective pixels	1392(H) x 1040(V)	1034(H) x 779(V)	659(H) x 494(V)
	Pixel size	4.65 μm(H) x 4.65 μm(V) (Square pixel)		7.4 μm(H) x 7.4 μm(V) (Square pixel)
	Color filter (FD Model)	RGB primary color mosaic filter		-
Scanning area		6.32 mm(H) x 4.76 mm(V)	4.76 mm(H) x 3.57 mm(V)	4.88 mm(H) x 3.66 mm(V)
Scanning system		Progressive		
Sync system		Internal / external		
Lens mount		C-mount (Flange focal distance: 17.526 mm)		
Video output	Interface	Gigabit Ethernet		
	Protocol	GigE Vision compliant		
	Transfer rate	1 Gbps		
	Image format	KP-FD140GV/FD83GV/FD33GV: RGB 8/10/12 bit, YUV 8/10/12 bit, RAW 8/10/12 bit, MONO 8/10/12 bit		MONO 8/10/12 bit
	Image size	1360(H) x 1024(V)	1024(H) x 768(V)	659(H) x 492(V)
	Frame rate	Full pixel readout KP-F140GV: 30 frames per second KP-FD140GV: 30 frames per second (YUV 8 bit, RAW 8/10/12 bit) 26 frames per second (RGB 8 bit, YUV 10/12 bit) 18 frames per second (RGB 10 bit) 13 frames per second (RGB 12 bit)	Full pixel readout KP-F83GV: 36 frames per second KP-FD83GV: 36 frames per second (RGB 8 bit, YUV 8/10/12 bit, RAW 8/10/12 bit) 35 frames per second (RGB 10 bit) 24 frames per second (RGB 12 bit)	Full pixel readout KP-F33GV: 90 frames per second KP-FD33GV: 90 frames per second (RGB 8 bit, YUV 8/10/12 bit, RAW 8/10/12 bit) 85 frames per second (RGB 10 bit) 55 frames per second (RGB 12 bit)
Sensitivity		KP-FD140GV/FD83GV/FD33GV: 2000 lx, F5.6, 3200K KP-F140GV/F83GV/F33GV: 2000 lx, F11, 3200K		
Electric shutter		OFF/Auto (AES) / Manual (PRESET or VARIABLE), OFF is normal exposure (frame rate)		
	PRESET	1/30, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	1/36, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second	1/90, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 second
	VARIABLE	From 10 second to approx. 1/100000 second		
External trigger	Mode	Fixed shutter, One trigger, VD Sync, Reset control		
	Input	Via Gigabit Ethernet cable (Software trigger), 12-pin connector (Hardware trigger)		
External sync signal	VD output	5 Vp-p ±0.3 V		
	Strobe out	5 Vp-p ±0.3 V		
Binning mode (No FD model)		OFF / ON		
Partial scan		Grabbing image area is adjustable at 2 pixel step. Frame rate improves when vertical size is reduced.		
ALC (Auto level control)		Adjustable for video level		
White balance (FD model)		ATW/MANUAL/One-push		
Gain		Auto / Manual (0 dB to 12 dB)	Auto / Manual (0 dB to 18 dB)	
Gamma		OFF(γ=1)/LUT		
Image adjustment function		Sharpness, Black level		
Power supply		DC+12 V ±1 V (input from 12-pin connector), 48 V (PoE)		
Power consumption	Normal	KP-FD140GV: Approx. 6.0 W (Approx. 500 mA) KP-F140GV: Approx. 5.5 W (Approx. 450 mA)	KP-FD83GV: Approx. 4.3 W (Approx. 360 mA) KP-F83GV: Approx. 4.1 W (Approx. 340 mA)	KP-FD33GV: Approx. 4.7 W (Approx. 390 mA) KP-F33GV: Approx. 4.3 W (Approx. 360 mA)
	Partial scan	KP-FD140GV: Approx. 7.0 W (Approx. 580 mA) KP-F140GV: Approx. 6.5 W (Approx. 540 mA) (at 2 pixel height)	KP-FD83GV: Approx. 4.7 W (Approx. 390 mA) KP-F83GV: Approx. 4.8 W (Approx. 400 mA) (at 2 pixel height)	KP-FD33GV: Approx. 5.2 W (Approx. 430 mA) KP-F33GV: Approx. 5.0 W (Approx. 420 mA) (at 2 pixel height)
Ambient temperature	Performance	0 °C to +40 °C / 90 %RH or less		
	Operating	-10 °C to +50 °C / 90 %RH or less		
	Storage	-20 °C to +60 °C / 70 %RH or less (without dew condensation)		
Vibration endurance		15 to 200 to 15 Hz (98.6m/S ²), 10 minutes for each 3 axis		
Shock endurance		490.3 m/s ² (Once for each side of top, under, left and right)		
External dimensions		44(W) x 29(H) x 72(D) mm (not including lens and protrusions)		
Mass		Approx. 140 g (without lens)		

Digital Interface Cameras

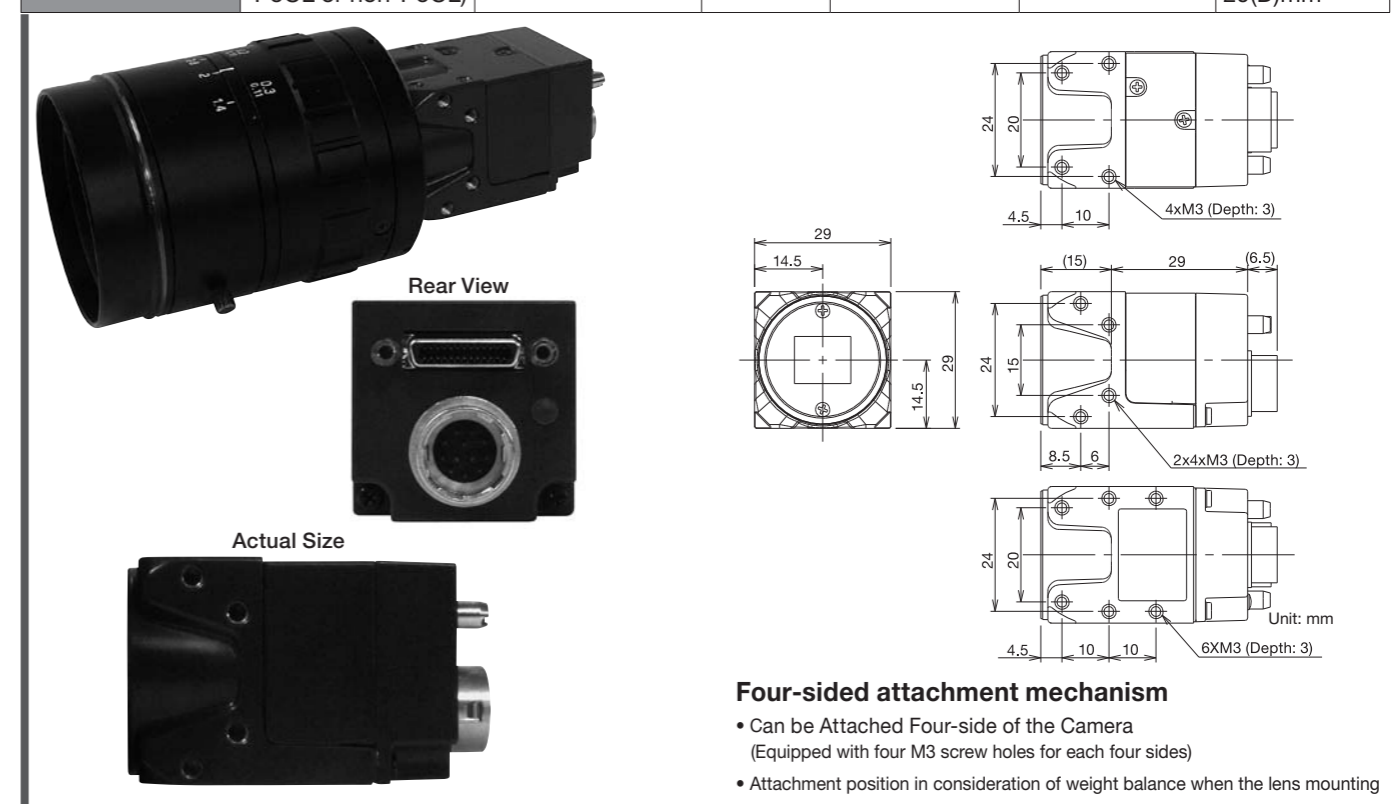
KP-FM1200CL	Mini CL (non-PoCL)	1CMOS Black & White	1.7" CMOS	12.58 M pixels (4096 x 3072)	Max. 53 frames per sec.	55(W) x 55(H) x 45(D) mm
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Imaging device		1.7-inch global shutter system CMOS (CMV12000)	
Effective pixels		4096(H) x 3072(V)	
Pixel size		5.5 μm(H) x 5.5 μm(V) (square lattice)	
Sensing area		22.5 mm (H) x 16.9 mm (V)	
Scanning system		Progressive	
Aspect ratio		4 : 3	
Frame rate (Max.)		53 frames per second (full pixel readout)	
Horizontal drive frequency		42.0000 MHz	
Horizontal Scanning frequency		Full configuration (84 MHz): 162.79 kHz Medium configuration (84 MHz): 81.396 kHz Base configuration (84 MHz): 40.698 kHz	Full configuration (42 MHz): 81.396 kHz Medium configuration (42 MHz): 40.698 kHz Base configuration (42 MHz): 30.348 kHz
Vertical Scanning frequency		Full configuration (84 MHz): 52.752 Hz Medium configuration (84 MHz): 26.426 Hz Base configuration (84 MHz): 13.226 Hz	Full configuration (42 MHz): 26.426 Hz Medium configuration (42 MHz): 13.226 Hz Base configuration (42 MHz): 6.615 Hz
Vertical subsampling Modes		OFF (1 times) / 2 times / 3 times / 4 times / 5 times / 6 times / 7 times / 8 times / 9 times / 10 times	
Sync system		Internal	
Lens mount		TFL-II Mount (Flange focal distance = 17.5 mm), (F-mount adaptor: Option)	
Video output		Base configuration 2TAP (84 MHz or 42 MHz) Medium configuration 4TAP (84 MHz or 42 MHz) Full configuration 8TAP (84 MHz or 42 MHz) Output image size: 4096(H)x3072(V)(pixel readout)	
Resolution		Horizontal/Vertical: 3000 TV lines	
Sensitivity		400 lx, F5.6, 3200 K (Exposure time: 100μs)	
S/N		48 dB	
Electric shutter		OFF, 1/13, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (40.5 μs to 1.0 s, 49.1 μs step)	
Gain		1 to 4 times	
Offset level		0/255 to 127/255	
Gamma		γ=1	
Frame on demand	Mode	Fixed shutter (8 steps or variable), ONE trigger mode	
	Trigger input	Camera Link (CC1) or DCIN/SYNC connector	
Partial scan		Selectable start position and height of picture grabbing in 4H step, Up to 8 areas can be set	
Pulse output		OFF/FLASH OUT/VD OUT	
Power supply voltage		12 ± 1 VDC	
Current consumption		Approx. 330 mA (approx. 4 W)	
Ambient temperature	Performance	0 to +40 °C (+32 to +104 °F), less than 90 % RH	
	Operation	-10 to +50 °C (+14 to 122 °F), less than 90 % RH	
	Storage	-20 to +60 °C (-4 to 140 °F), less than 70 % RH (without dew condensation)	
Vibration endurance		10 to 55 Hz (2.37 to 71.7 m/S ²), Sweep 1 minute, 30 minutes for each 3 axis	
Shock endurance		490.3 m/s ² (Once for each side of top, under, left and right)	
External dimensions		55 (W) x 55 (H) x 45 (D) mm (Not including mount protrusions)	
Mass		Approx. 250 g	

Digital Interface Cameras

KP-F520WCL	Mini CL (Auto Selection of PoCL or non-PoCL)	1CCD Black & White	2/3" CCD	5.05 M Pixels (2456 x 2058)	Max. 18 frames per sec.	29(W) x 29(H) x 29(D)mm
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Four-sided attachment mechanism

- Can be Attached Four-side of the Camera
(Equipped with four M3 screw holes for each four sides)
- Attachment position in consideration of weight balance when the lens mounting

Imaging device		2/3-inch progressive scan interline CCD	
Total pixels		2530(H) x 2068(V)	
Effective pixels		2456(H) x 2058(V)	
Pixel size		3.45 μm (H) x 3.45 μm (V) (square lattice)	
Sensing area		8.47 mm (H) x 7.10 mm (V)	
Scanning system		Progressive	
Aspect ratio		5 : 4	
Frame rate		18 frames per second (full pixel readout)	
Horizontal drive frequency		72.0000 MHz	
Horizontal Scanning frequency		37.422 kHz	
Vertical Scanning frequency		18.00 Hz 45.046 Hz (vertical 2 pixel addition)	
Sync system		Internal	
Lens mount		C-mount (Flange focal distance = 17.526 mm)	
Video output		Camera Link Base configuration: 72.000 MHz x 2TAP 8 bit / 10 bit Output image size: 2456(H) x 2058(V) (full pixel readout)	
Resolution		Horizontal / Vertical: 2000 TV Line	
Sensitivity		400 lx, F8 3200K	
Minimum illumination		1.0 lx (F1.4, MAX GAIN)	
Signal noise to ratio		50 dB	
Electric shutter		OFF, 1/18, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (Minimum 1/100000 second)	
Gamma		γ=1 or Variable	
Frame on demand	Mode	Fixed shutter mode (8 steps or variable), ONE trigger mode, VD reset mode	
	Trigger input	Camera Link (CC1) or DCIN/SYNC connector	
Partial scan		Selectable start position and height of picture grabbing in 1H step.	
Pulse output		OFF, FLASH OUT or VD OUT	
Image adjustmant function		White flaw correction, Left and right balance adjustment, Knee adjustmant	
Power supply voltage		12 ± 1 VDC	
Current consumption		Approx. 265 mA (Approx. 3.18 W)	
Ambient temperature	Performance	0 to +40 °C (+32 to +104 °F), less than 90 % RH	
	Operation	-10 to +50 °C (+14 to +122 °F), less than 90 % RH	
	Storage	-20 to +60 °C (-4 to +140 °F), less than 70 % RH (without dew condensation)	
Vibration endurance		10 to 55 Hz (2.37 to 71.7 m/S ²), Sweep 1 minute, 30 minutes for each 3 axis	
Shock endurance		490.3 m/s ² (Once for each side of top, under, left and right)	
External dimensions		29 (W) x 29 (H) x 29 (D) mm (not including mount protrusions)	
Mass		Approx. 50 g	

Digital Interface Cameras

KP-FD510WCL	Mini CL (Auto Selection of PoCL or non-PoCL)	1CCD Color (RGB)	2/3" CCD	5.05 M Pixels (2456 x 2058)	Max. 12 frames per sec.	44(W) x 44(H) x 41(D) mm
KP-FR500WCL		1CCD Color (RAW)			Max. 16 frames per sec.	
KP-F500WCL		1CCD Black & White				
KP-FD500PCL/SCL	PCL: Mini CL(PoCL)	1CCD Color (RGB)	1/1.8" CCD	UXGA(2.01M Pixels) (1628 x 1236)	Max. 30 frames per sec.	
KP-FD202PCL/SCL	SCL: Mini CL(Non-PoCL)		1/2" CCD	SXGA(1.45M Pixels) (1392 x 1040)		
KP-FD140PCL/SCL	Mini CL (Auto Selection of PoCL or non-PoCL)		1CCD Black & White (Near infrared sensitivity)			

KP-FD510WCL



KP-F500WCL, KP-FR500WCL, KP-FD500PCL/SCL, KP-F145WCL



KP-FD202PCL/SCL, KP-FD140PCL/SCL



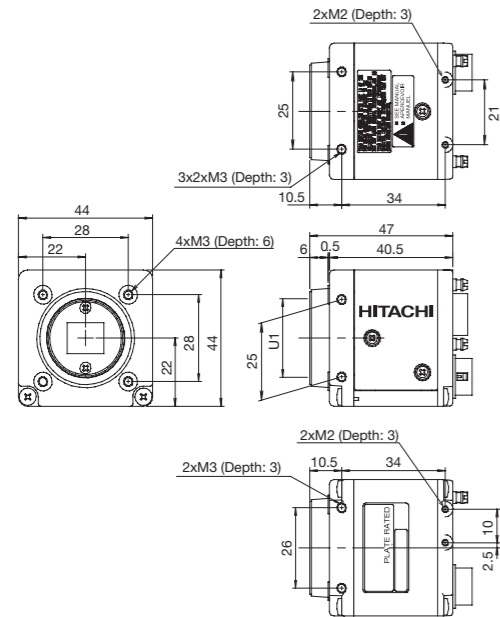
Rear View



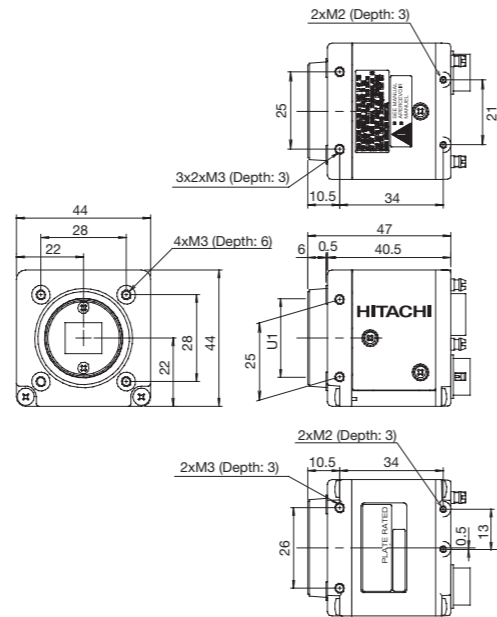
Actual Size



KP-F500WCL, KP-FR500WCL, KP-FD500PCL/SCL, KP-F145WCL, KP-FD202PCL/SCL, KP-FD140PCL/SCL



KP-FD510WCL



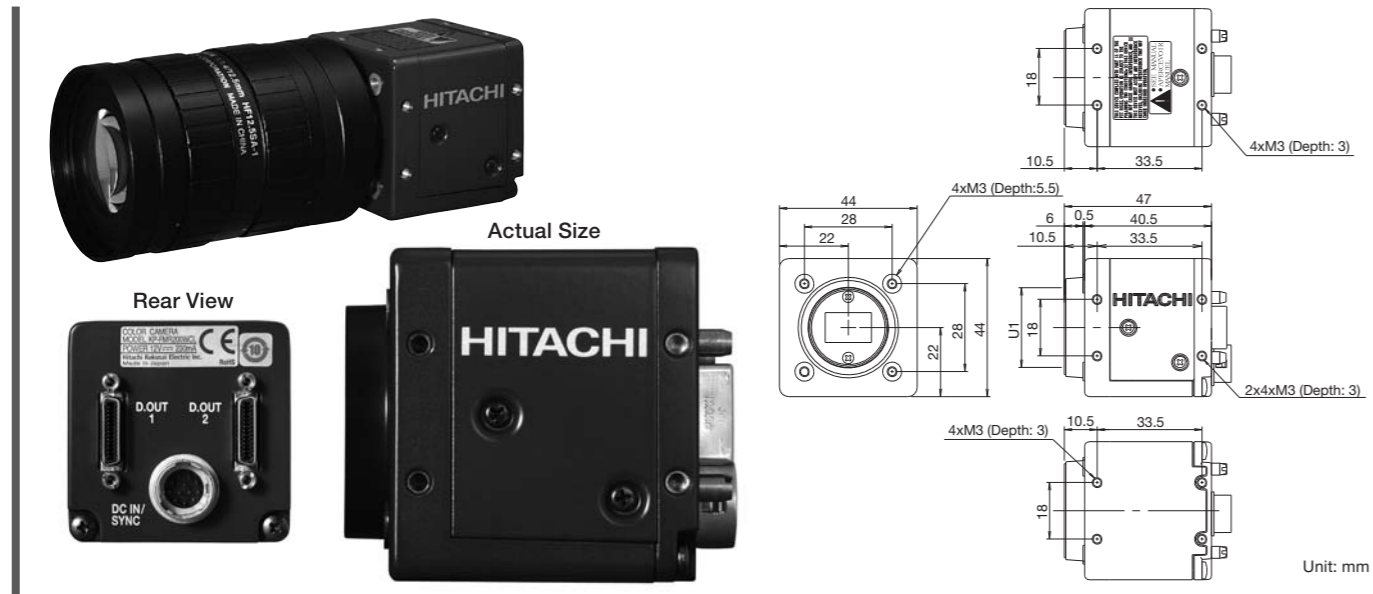
Unit: mm

Digital Interface Cameras

	KP-FD510WCL KP-FD500PCL/SCL	KP-FR500WCL KP-F500WCL	KP-FD202PCL/SCL	KP-FD140PCL/SCL	KP-145WCL	
Imaging device	2/3-inch progressive scan interline CCD (ICX625AQ)		1/1.8-inch progressive scan interline CCD (ICX274AQ)	1/2-inch progressive scan interline CCD (ICX267AK)	2/3-inch progressive scan interline CCD (ICX285AL)	
	Total pixels	2536(H) x 2068(V)	1688(H) x 1248(V)	1434 (H) x 1050 (V)	1432 (H) x 1050 (V)	
	Effective pixels	2448(H) x 2050(V)	2456 (H) x 2058 (V)	1628(H) x 1236(V)	1392 (H) x 1040 (V)	1392 (H) x 1040 (V)
	Pixel size	3.45 μm (H) x 3.45 μm (V) (square lattice)		4.4 μm (H) x 4.4 μm (V) (square lattice)		
	Color filter (FR/FD model)	RGB primary color mosaic filter		4.65 μm (H) x 4.65 μm (V) (square lattice)		
Sensing area	8.45 mm (H) x 7.07 mm (V)	8.47 mm (H) x 7.10 mm (V)	7.13 mm (H) x 5.37 mm (V)	6.32 mm (H) x 4.76 mm (V)	8.98 mm (H) x 6.71 mm (V)	
Scanning system	Progressive					
Aspect ratio	5 : 4		4 : 3			
Frame rate	12 frames per second (full pixel readout)		16 frames per second (full pixel readout) 32 frames per second (vertical 2 pixel addition) FR model: No vertical 2 pixel addition		30 frames per second (full pixel readout) 60 frames per second (vertical 2 pixel addition)	
	30 frames per second (full pixel readout)		30 frames per second (full pixel readout)		30 frames per second (full pixel readout) 60 frames per second (vertical 2 pixel addition)	
Horizontal drive frequency	48.0000 MHz	64.0000 MHz	72.0000 MHz	57.6000 MHz		
Horizontal Scanning frequency	24.922 kHz	33.264	37.5 kHz	32.179 kHz	32.07 kHz	
Vertical Scanning frequency	11.99 Hz		16.00 Hz (full pixel readout) 31.98 Hz (vertical 2 pixel addition mode) FR model: No vertical 2 pixel addition	29.95 Hz	30.13 Hz	30.03 Hz (full pixel readout) 59.95 Hz (vertical 2 pixel addition mode)
Sync system	Internal					
Lens mount	C-mount (Flange focal distance = 17.526 mm)					
Video output	Interface/Protocol	Camera Link 64.0000 MHz Base configuration (1ch: SDR connector x 1pc.) Medium configuration (2ch: SDR connector x 2pcs)	Camera Link Base configuration: 64.0000 MHz x 2TAP Medium configuration: 32.0000 MHz x 4TAP	Camera Link 72.0000 MHz	Camera Link 57.6000 MHz	Camera Link Base configuration: 28.8000 MHz x 2TAP
	Output format	24 bits (Base configuration) 30 bits (Medium configuration) 36 bits (Medium configuration)	8 bit / 10 bit / 12 bit	24 bits (Base configuration) 30 bits (Medium configuration) 36 bits (Medium configuration)		8 bit / 10 bit / 12 bit
	Output image size	2448 (H) x 2050 (V) (full pixel readout)	2456(H) x 2058(V) (full pixel readout)	1620(H) x 1220(V) (full pixel readout)	1360(H) x 1024(V) (full pixel readout)	1392(H) x 1040(V) (full pixel readout)
Sensitivity	2000 lx, F11, 3200 K	500 lx, F11, 3200 K FR Model: 2000 lx, F8, 3200K	2000 lx, F5.6, 3200 K		400 lx, F8, 3200 K	
Minimum illumination	5 lx (F1.4, MAX GAIN)	1.0 lx (F1.4, MAX GAIN) FR model: 15 lx (F1.4 GAIN MAX)	10 lx (F1.4, MAX GAIN)		2.0 lx (F1.4, MAX GAIN)	
Signal noise to ratio	48 dB					
Electric shutter	OFF, 1/12, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (from 10 to 1/100000 second)		OFF, 1/16, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (from 10 to 1/100000 second)		OFF, 1/30, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second. OFF is normal exposure (frame rate) or changeable by variable shutter (from 10 to 1/100000 second)	
Frame on demand	Mode	(A) Fixed shutter mode (8 steps or variable) (B) ONE trigger mode (C) VD reset mode Trigger input: Camera Link (CC1) or DCIN/SYNC connector				
	Trigger input	Camera Link (CC1) or DCIN/SYNC connector				
Partial scan	Selectable start position and height of picture grabbing in 1H step.					
ALC (Auto level control)	Mode: AGC (Auto gain control), AES (Auto electric shutter), AGC & AES Video Level: Adjustable	-	Mode: AGC (Auto gain control), AES (Auto electric shutter), AGC & AES Video Level: Adjustable	-	-	
Gain	Auto/Manual (0 to +12 dB) (Approx. 0.0358 dB step)	Auto/Manual (0 to +18dB) (Approx. 0.0358 dB step)	Auto/Manual (0 to +18 dB) (Approx. 0.0358 dB step)		Auto/Manual (+6 to +18 dB) (Approx. 0.0358 dB step)	
White balance	ATW / MANUAL / One-push	-	ATW / MANUAL / One-push		-	
Gamma	OFF (γ=1) / LUT	γ=1	OFF (γ=1) / LUT		γ=1	
Color masking	OFF / ON (6 vector independent masking)	-	OFF / ON (6 vector independent masking)		-	
Paint black	Adjustable	-	Adjustable		-	
Sharpness	Adjustable	-	Adjustable		-	
Brightness	Adjustable	-	Adjustable		-	
Knee	Adjustable	-	Adjustable		-	
Power supply voltage	12 ± 1 VDC					
Current consumption	Approx. 310 mA (Approx. 3.7 W)	Approx. 260 mA (Approx. 3.1 W) *MAX partial scan 1H: Approx. 330 mA (Approx. 4.0 W)	Approx. 340 mA (Approx. 4.1 W) *MAX partial scan 1H: Approx. 415 mA (Approx. 5.0 W)	Approx. 300 mA (Approx. 3.6 W)	Approx. 230 mA (Approx. 2.8 W) *MAX partial scan 1H: Approx. 350 mA (Approx. 4.2 W)	
Ambient temperature	Performance	0 to +40 °C (+32 to +104 °F), less than 90 % RH				
	Operation	-10 to +50 °C (+14 to +122 °F), less than 90 % RH				
	Storage	-20 to +60 °C (-4 to +140 °F), less than 70 % RH (without dew condensation)				
Vibration endurance	10 to 55 Hz (2.37 to 71.7 m/S ²), Sweep 1 minute, 30 minutes for each 3 axis					
Shock endurance	490.3 m/s ² (Once for each side of top, under, left and right)					
External dimensions	44 (W) x 44 (H) x 41 (D) mm (not including mount protrusions)					
Mass	Approx. 110 g					

Digital Interface Cameras

KP-FMR400WCL	Mini CL (Auto Selection of PoCL or non-PoCL)	1CMOS Color (RAW)	1" CMOS	4.19 M pixels (2048 x 2048)	Max. 150 frames per sec.	44(W) x 44(H) x 41(D)mm
KP-FM400WCL		1CMOS Black & White				
KP-FMR200WCL		1CMOS Color (RAW)	2/3" CMOS	2.23 M pixels (2048 x 1088)	Max. 280 frames per sec.	
KP-FM200WCL		1CMOS Black & White				



	KP-FMR400WCL	KP-FM400WCL	KP-FMR200WCL	KP-FM200WCL
Imaging device	1-inch global shutter CMOS (CMV4000)		2/3-inch global shutter CMOS (CMV2000)	
Effective pixels	2048 (H) x 2048 (V)		2048 (H) x 1088 (V)	
Pixel size	5.5 μm (H) x 5.5 μm (V) (square lattice)			
Color filter	RGB primary color mosaic filter	-	RGB primary color mosaic filter	-
Sensing area	11.264 mm (H) x 11.264 mm (V)		11.264 mm (H) x 5.984 mm (V)	
Scanning system	Progressive			
Aspect ratio	1 : 1		2 : 1	
Frame rate	150 frames per second (full pixel readout)		280 frames per second (full pixel readout)	
Pixel frequency	40.0000 MHz			
Horizontal scanning frequency	Full configuration: 310.078 kHz (80 MHz), 155.039 kHz (40 MHz) Base configuration: 77.519 kHz (80 MHz), 38.759 kHz (40 MHz)		Medium configuration: 155.039 kHz (80 MHz), 77.519 kHz (40 MHz)	
Vertical scanning frequency	Full configuration: 150.523 Hz (80 MHz), 75.445 Hz (40 MHz) Medium configuration: 75.445 Hz (80 MHz), 37.768 Hz (40 MHz) Base configuration: 37.768 Hz (80 MHz), 18.896 Hz (40 MHz)		Full configuration: 281.889 Hz (80 MHz), 141.588 Hz (40 MHz) Medium configuration: 141.588 Hz (80 MHz), 70.956 Hz (40 MHz) Base configuration: 70.956 Hz (80 MHz), 35.519 Hz (40 MHz)	
Sync system	Internal			
Lens mount	C-mount (Flange focal distance = 17.526 mm)			
Video output	Digital output (Camera Link) Base configuration 2TAP (80 MHz or 40 MHz) Medium configuration 4TAP (80 MHz or 40 MHz) Full configuration 8TAP (80 MHz or 40 MHz) Output image size: 2048(H) x 2048(V) (full pixel readout)		Digital output (Camera Link) Base configuration 2TAP (80 MHz or 40 MHz) Medium configuration 4TAP (80 MHz or 40 MHz) Full configuration 8TAP (80 MHz or 40 MHz) Output image size: 2048(H) x 1088(V) (full pixel readout)	
Resolution	Horizontal/Vertical: 1400 TV lines		Horizontal/Vertical: 1000 TV lines	
Sensitivity	2000 lx, F16, 3200K	400 lx, F8, 3200K	400 lx, F11, 3200 K	400 lx, F5.6, 3200 K
Signal noise to ratio	48 dB			
Electric shutter	OFF, 1/38, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (16.125 μs to 211367 μs)		OFF, 1/71, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/10000, 1/50000 second. OFF is normal exposure (frame rate) or changeable by variable shutter (16.125 μs to 211367 μs)	
Gamma	γ = 1			
Frame on demand	Mode (A) Fixed shutter mode (8 steps or variable), (B) ONE trigger mode, (C) Burst trigger mode			
Trigger input	Camera Link (CC1) or DCIN/SYNC connector			
Partial scan	Selectable start position and height of picture grabbing in 1H step.			
Power supply voltage	12 ± 1 VDC			
Current consumption	Approx. 230 mA (Approx. 2.76 W)			
Ambient temperature	Performance 0 to +40 °C (+32 to +104 °F), less than 90 % RH			
	Operation 10 to +50 °C (+14 to 122 °F), less than 90 % RH			
	Storage -20 to +60 °C (-4 to 140 °F), less than 70 % RH (without dew condensation)			
Vibration endurance	10 to 55 Hz (2.37 to 71.7 m/S ²), Sweep 1 minute, 30 minutes for each 3 axis			
Shock endurance	490 m/s ²			
External dimensions	44 (W) x 44 (H) x 41 (D) mm (Not including mount protrusions)			
Mass	Approx. 130 g			

Digital Interface Cameras

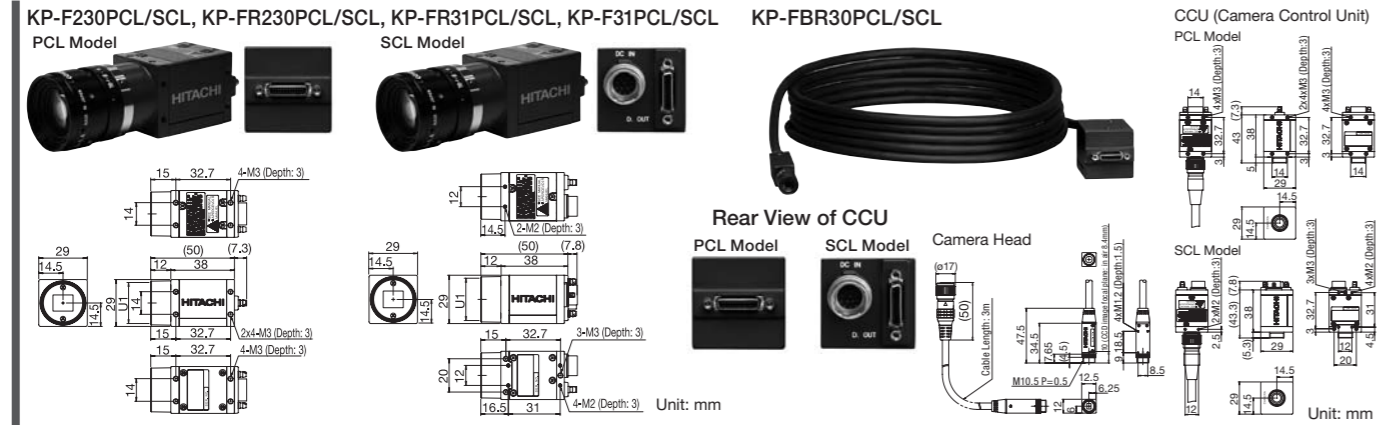
KP-FMD200PCL	Mini CL (PoCL)	1CMOS Color (RGB)	UXGA(1.92 M pixel) (1600 x 1200)	Max. 20 frames per sec.	29(W) x 29(H) x 20(D) mm
KP-FM200PCL		1CMOS Black & White			
KP-FMD100PCL		1CMOS Color (RGB)	SXGA(1.31 M pixel) (1280 x 1024)	Max. 30 frames per sec.	
KP-FM100PCL		1CMOS Black & White			



	KP-FMD200PCL	KP-FM200PCL	KP-FMD100PCL	KP-FM100PCL
Imaging device	1/1.8-inch CMOS		1/1.8-inch CMOS	
Effective pixels	1600(H) x 1200(V)		1280 (H) x 1024 (V)	
Pixel size	4.5 μm(H) x 4.5 μm(V)(square lattice)			
Color filter	RGB primary color mosaic filter	-	RGB primary color mosaic filter	-
Sensing area	7.2 mm (H) x 5.4 mm (V)		6.78 mm (H) x 5.43 mm (V)	
Scanning system	Progressive			
Aspect ratio	4 : 3		5 : 4	
Frame rate	20 frames per second (full pixel readout)	53 frames per second (full pixel readout)	30 frames per second (full pixel readout)	61 frames per second (full pixel readout)
Horizontal Drive Frequency	42 MHz	114 MHz	42 MHz	114 MHz
Horizontal scanning frequency	23.848 kHz	64.773 kHz	32.012 kHz	63.616 kHz
Vertical scanning frequency	19.563 Hz	53.180 Hz	30.72 Hz	61.052 Hz
Sync system	Internal			
Lens mount	C-mount (Flange focal distance = 17.526 mm)			
Video output	Digital output (CameraLink) (PoCL)			
	Base configuration: 42.0000 MHz	Base configuration: 57.0000 MHz x 2 TAP	Base configuration: 42.0000 MHz	Base configuration: 57.0000 MHz x 2 TAP
	24 bits	8 bits / 10 bits	24 bits	8 bits / 10 bits
	Output image size: 1600 (H) x 1200 (V) (full pixel readout)		Output image size: 1280 (H) x 1024 (V) (full pixel readout)	
Sensitivity	2000lx, F5.6, 3200K	400lx, F2.8, 3200K	2000lx, F8, 3200K	400lx, F4, 3200K
S/N	45 dB			
Electric shutter	OFF, 1/60, 1/100, 1/250, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 OFF is normal exposure (frame rate) or changeable by variable shutter (Minimum 1/100000 second)			
Gamma	γ = 1			
Frame on demand	Mode Fixed shutter mode (8 steps or variable),			
Trigger input	Camera Link (CC1)			
Partial scan	Selectable start position and height of picture grabbing in 1 pixel step.(Minimum area :20x20 pixels)			
Gain	Digital: 1 to 2 times (128 steps) Analog: 1/1.33/2 times			
Power supply voltage	12 ± 1 VDC			
Current consumption	Approx. 80mA (Approx. 0.96W)			
Ambient temperature	Performance 0 to +40 °C (+32 to +104 °F), less than 90 % RH			
	Operation 10 to +50 °C (+14 to 122 °F), less than 90 % RH			
	Storage -20 to +60 °C (-4 to 140 °F), less than 70 % RH (without dew condensation)			
Vibration endurance	10 to 200 Hz (98 m/S ²), Sweep 10 minute, 30 minutes for each 3 axis			
Shock endurance	686 m/s ² (Once for each side of top, under, left and right)			
External dimensions	29(W) x 29(H) x 20(D) mm (Not including mount protrusions)			
Mass	Approx. 35 g			

Digital Interface Cameras

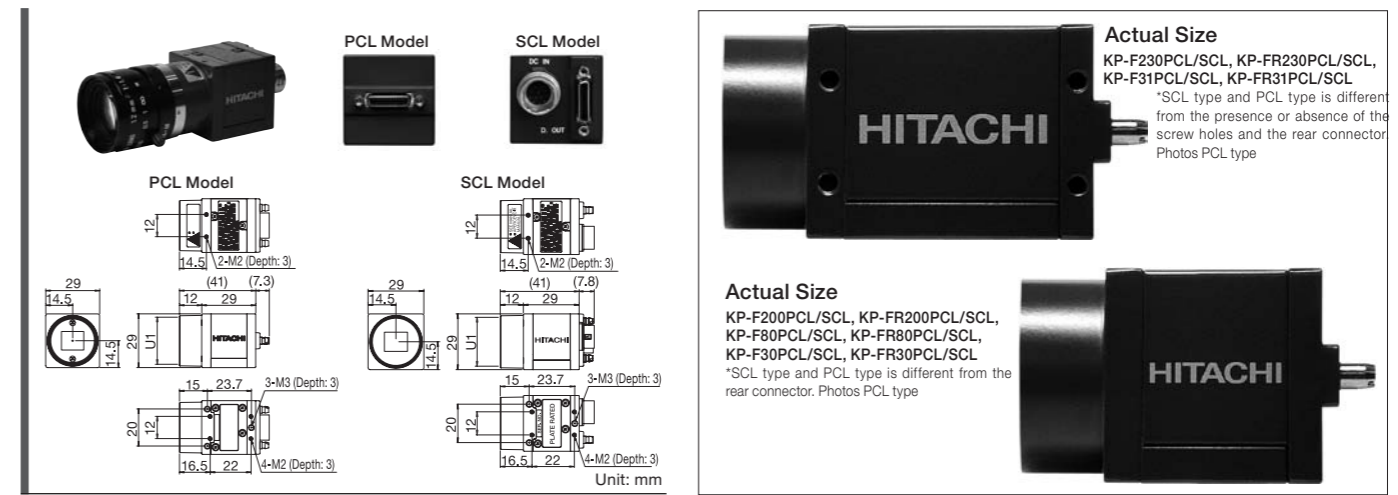
KP-FR230PCL/SCL	PCL: Mini CL(PoCL)	1CCD Color(RAW)	1/1.8" CCD	UXGA (2.01 M pixels) (1628 x 1236)	Max. 30 frames per sec.	29(W) x 29(W) x 38(D) mm
KP-F230PCL/SCL		1CCD Black & White				
KP-FR31PCL/SCL	SCL: Mini CL (Non-PoCL)	1CCD Color(RAW)	1/3" CCD	VGA (0.33 M Pixels) (659 x 494)	Max. 120 frames per sec.	Camera Head: 12(W) x 12.5(H) x 47.5(L)mm
KP-F31PCL/SCL		1CCD Black & White			Max. 60 frames per sec.	
KP-FBR30PCL/SCL		1CCD Color(RAW)				



		KP-FR230SCL/PCL KP-F230SCL/PCL	KP-FR31SCL/PCL KP-F31SCL/PCL	KP-FBR30SCL/PCL
Imaging device	Total pixels	1688 (H) x 1248 (V)	692 (H) x 504 (V)	
	Effective pixels	1628 (H) x 1236 (V)	659 (H) x 494 (V)	
	Pixel size	4.4 μm (H) x 4.4 μm (V) (square lattice)	7.4 μm (H) x 7.4 μm (V) (square lattice)	
	Color filter (FR Model)	RGB primary color mosaic filter		
Sensing area		7.16 mm (H) x 5.44 mm (V)	4.88 mm (H) x 3.66 mm (V)	
Scanning system		Progressive		
Aspect ratio		4 : 3		
Frame rate		30 frames per second(full pixel readout) 54 frames per second (vertical 2 pixel addition) FR model: No vertical 2 pixel addition	120 frames per second (full pixel readout) 219 frames per second(vertical 2 pixel addition) FR model: No vertical 2 pixel addition	60 frames per second (full pixel readout)
Horizontal drive frequency		72.0000 MHz	49.090902 MHz	25.5454 MHz
Horizontal scanning frequency		37.5 kHz , 33.898 kHz (vertical 2 pixel addition)	62.937 kHz, 57.618 kHz (vertical 2 pixel addition)	31.468 kHz
Vertical scanning frequency		29.95 Hz (full pixel readout) 54.06 Hz (vertical 2 pixel addition mode) FR model: No vertical 2 pixel addition	119.88 Hz (full pixel readout) 219.08 Hz (vertical 2 pixel addition mode) FR model: No vertical 2 pixel addition	59.94 Hz
Sync system		Internal		
Lens mount		C-mount (Flange focal distance = 17.526 mm)		Special mount (Flange focal distance = 8.4 mm)
Video output		Digital output (Camera Link) Base configuration: 36.0000 MHz x 2 TAP (Maximum cable length is 10 m) Output image size: 1628 (H) x 1236 (V) (full pixel readout)	Digital output (Camera Link) Base configuration: 24.545451 MHz x 2 TAP (Maximum cable length is 10 m) Output image size: 659 (H) x 494 (V) (full pixel readout)	Digital output (Camera Link) Base configuration: 24.5454 MHz (Maximum cable length is 10 m) Output image size: 659 (H) x 494 (V) (full pixel readout)
Resolution		Horizontal / Vertical: 1200 TV lines		Horizontal: 500 TV lines / Vertical: 490 TV lines
Sensitivity		500 lx, F5.6, 3200 K FR Model: 2000 lx, F5.6, 3200 K	550 lx, F4, 3200 K FR Model: 2000 lx, F4, 3200 K	2000 lx, F4, 3200 K
Minimum illumination		3.9 lx (F1.4, MAX GAIN) FR Model: 20 lx (F1.4, MAX GAIN)	8.6 lx (F1.4, MAX GAIN) FR Model: 35 lx (F1.4, MAX GAIN)	35 lx (F1.4, MAX GAIN)
Signal noise to ratio		45 dB		50 dB
Electric shutter		OFF, 1/30, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (minimum 1/100000 second)	OFF, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (minimum 1/100000 second)	OFF, 1/60, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (minimum 1/100000 second)
Gamma		γ = 1		
Frame on demand	Mode	(A) Fixed shutter mode (8 steps or variable) (B) ONE trigger mode		
	Trigger input	Camera Link (CC1)		
Partial scan		Selectable start position and height of picture grabbing in 1H step.		
Power supply voltage		12 ± 1 VDC		
Current consumption		Approx. 270 mA (approx. 3.2 W) *MAX partial scan 1H: Approx. 360 mA (approx. 4.3 W)	Approx. 190 mA (approx. 2.3 W) *MAX partial scan 1H: Approx. 230 mA (approx. 2.8 W)	Approx. 200 mA (approx. 2.4 W) *MAX partial scan 1H: Approx. 250 mA (approx. 3.0 W)
Ambient temperature	Performance	0 to +40 °C (+32 to +104 °F), less than 90 % RH		
	Operation	-10 to +50 °C (+14 to 122 °F), less than 90 % RH		
	Storage	-20 to +60 °C (-4 to 140 °F), less than 70 % RH (without dew condensation)		
Vibration endurance		10 to 200 Hz (98 m/s ²), Sweep 10 minute, 30 minutes for each 3 axis		
Shock endurance		686 m/s ² (Once for each side of top, under, left and right)		
External dimensions		29 (W) x 29 (W) x 38 (D) mm (Not including protrusions)		Head: 12 (W) x 12.5 (H) x 47.5 (D) mm CCU: 29 (W) x 29 (H) x 38 (D) mm
Mass		Approx. 50 g		

Digital Interface Cameras

KP-FR200PCL/SCL	PCL: Mini CL(PoCL)	1CCD Color(RAW)	1/1.8" CCD	UXGA(2.01 M pixel) (1628 x 1236)	Max. 15 frames per sec.	29(W) x 29(W) x 29(D) mm
KP-F200PCL/SCL		1CCD Black & White				
KP-FR80PCL/SCL	SCL: Mini CL (Non-PoCL)	1CCD Color(RAW)	1/3" CCD	XGA(0.81 M pixel) (1034 x 779)	Max. 26 frames per sec.	
KP-F80PCL/SCL		1CCD Black & White		Max. 60 frames per sec.		
KP-FR30PCL/SCL		1CCD Color(RAW)				
KP-F30PCL/SCL		1CCD Black & White		VGA(0.33M pixel) (659 x 494)	Max. 60 frames per sec.	

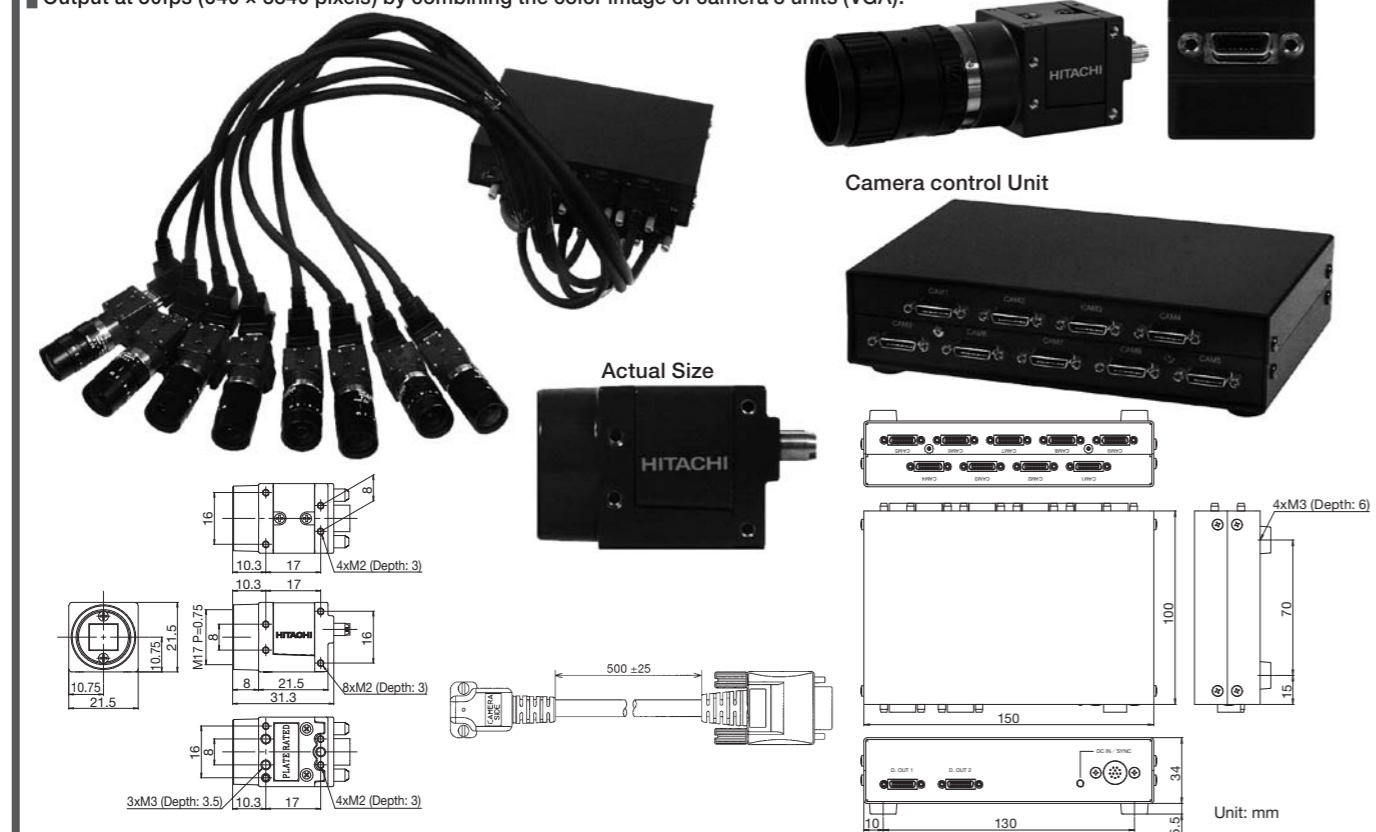


		KP-FR200PCL/SCL KP-F200PCL/SCL	KP-FR80PCL/SCL KP-F80PCL/SCL	KP-FR30PCL/SCL KP-F30PCL/SCL
Imaging device	Total pixels	1688 (H) x 1248 (V)	1077 (H) x 788 (V)	692 (H) x 504 (V)
	Effective pixels	1628 (H) x 1236 (V)	1034 (H) x 779 (V)	659 (H) x 494 (V)
	Pixel size	4.4 μm (H) x 4.4 μm (V) (square lattice)	4.65 μm (H) x 4.65 μm (V) (square lattice)	7.4 μm (H) x 7.4 μm (V) (square lattice)
	Color filter (FR Model)	RGB primary color mosaic filter		
Sensing area		7.16 mm (H) x 5.44 mm (V)	4.76 mm (H) x 3.57 mm (V)	4.88 mm (H) x 3.66 mm (V)
Scanning system		Progressive		
Aspect ratio		4 : 3		
Frame rate		15 frames per second (full pixel readout)	36 frames per second (full pixel readout)	60 frames per second (full pixel readout)
Horizontal drive frequency		36.0000 MHz		25.5454 MHz
Horizontal scanning frequency		18.75 kHz	28.346 kHz	31.468 kHz
Vertical scanning frequency		14.97 Hz	35.79 Hz	59.94 Hz
Sync system		Internal		
Lens mount		C-mount (Flange focal distance =17.526 mm)		
Video output		Digital output (Camera Link) Base configuration: 36.0000 MHz (Maximum cable length is 10 m) Output image size: 1628 (H) x 1236 (V) (full pixel readout)	Digital output (Camera Link) Base configuration: 36.0000 MHz (Maximum cable length is 10 m) Output image size: 1024 (H) x 768 (V) (full pixel readout)	Digital output (Camera Link) Base configuration: 24.5454 MHz (Maximum cable length is 10 m) Output image size: 659 (H) x 494 (V) (full pixel readout)
Resolution		Horizontal / Vertical: 1200 TV lines		Horizontal / Vertical: Approx. 800 TV lines
Sensitivity		400 lx, F4, 3200 K FR model: 2000 lx, F8, 3200 K	400 lx, F2.8, 3200 K FR model: 2000 lx, F4, 3200 K	400 lx, F4, 3200 K FR model: 2000 lx, F5.6, 3200 K
Minimum illumination		1.0 lx (F1.4, MAX GAIN, without IR cut filter) FR model: 5.0 lx (F1.4, MAX GAIN)	1.0 lx (F1.4, MAX GAIN, without IR cut filter) FR model: 20 lx (F1.4, MAX GAIN)	1.0 lx (F1.4, MAX GAIN, without IR cut filter) FR model: 10 lx (F1.4, MAX GAIN)
Signal noise to ratio		50 dB		
Electric shutter		OFF, 1/15, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (minimum 1/100000 second)	OFF, 1/36, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (minimum 1/100000 second)	OFF, 1/60, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 second OFF is normal exposure (frame rate) or changeable by variable shutter (minimum 1/100000 second)
Gamma		γ = 1		
Frame on demand	Mode	(A) Fixed shutter mode (8 steps or variable) (B) ONE trigger mode (C) VD reset mode	(A) Fixed shutter mode (8 steps or variable) (B) ONE trigger mode (C) VD reset mode	(A) Fixed shutter mode (8 steps or variable) (B) ONE trigger mode (C) Reset control mode (D) VD reset mode
	Trigger input	Camera Link (CC1) *When Reset control mode CC1 and CC2 are used		
Partial scan		Selectable start position and height of picture grabbing in 1H step.		
Power supply voltage		12 ± 1 VDC		
Current consumption		Approx. 170 mA (approx. 2.1 W)	Approx. 120 mA (approx. 1.5 W)	Approx. 120 mA (approx. 1.5 W)
Ambient temperature	Performance	0 to +40 °C (+32 to +104 °F), less than 90 % RH		
	Operation	10 to +50 °C (+14 to 122 °F), less than 90 % RH		
	Storage	-20 to +60 °C (-4 to 140 °F), less than 70 % RH (without dew condensation)		
Vibration endurance		10 to 200 Hz (98 m/s ²), Sweep 10 minute, 30 minutes for each 3 axis		
Shock endurance		686 m/s ² (Once for each side of top, under, left and right)		
External dimensions		29 (W) x 29 (W) x 29 (D) mm (Not including protrusions)		
Mass		Approx. 50 g		

Digital Interface Cameras

KP-FMR830CL	Between the control unit and cameras: PoCL-Lite Composite image output from the control unit: Mini CL (Non-PoCL)	Cameras: 1CMOS Color (RAW) Composite image: Color (RGB)	1/3" CMOS	Cameras(Per Single camera): VGA(640 x 480) Composite image (by 8 pieces of camera): (640 x 3840)	Composite image Readout: Max. 30 frames per sec.	One Camera: 21.5(W)× 21.5(H)× 21.5(D)mm
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Output at 30fps (640 × 3840 pixels) by combining the color image of camera 8 units (VGA).



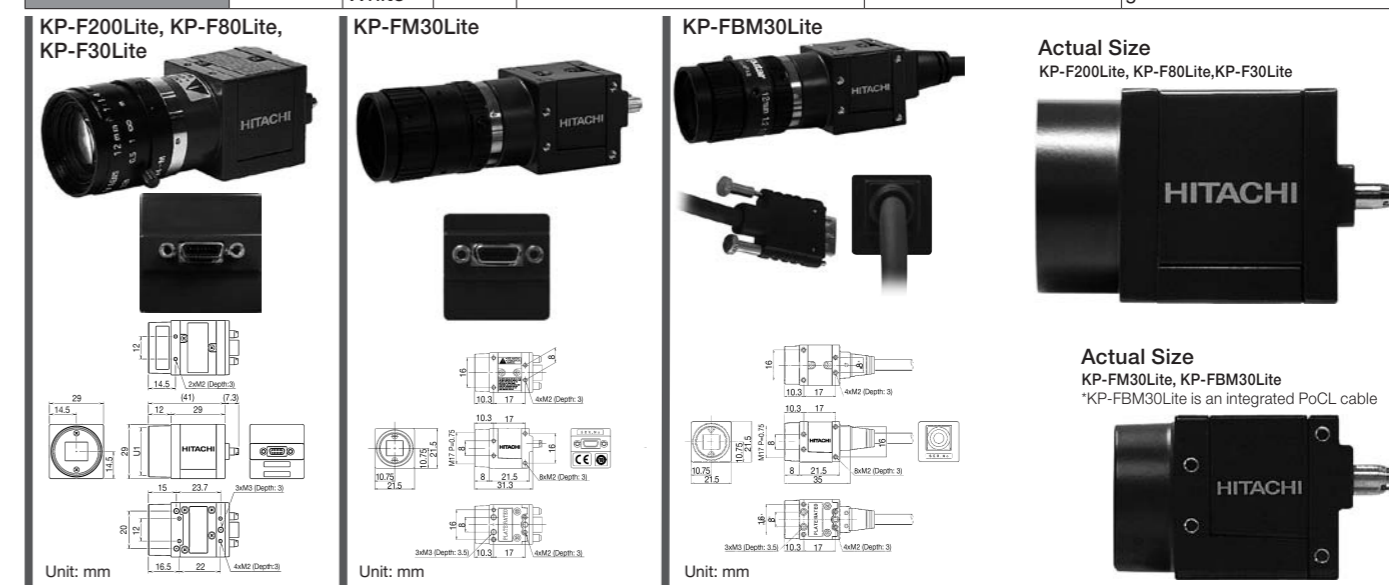
MR-FMR30Lite (Camera) (Per unit)	
Imaging device	1/3-inch CMOS
Effective pixels	752 (H) x 480 (V)
Pixel size	6.0 μm (H) x 6.0 μm (V) (square lattice)
Color filter	RGB primary color mosaic filter
Sensing area	4.51 mm (H) x 2.88 mm (V)
Scanning system	Progressive
Frame rate	90 frames per second (full pixel readout)
Horizontal drive frequency	36.818 MHz
Horizontal scanning frequency	45.29 kHz
Vertical scanning frequency	90 Hz
Sync system	Internal
Lens mount	NF-mount (Flange focal distance = 12 mm)
Video output	Digital output (Between the camera and the CCU): PoCL-Lite: 36.818 MHz Output image size: 752 (H) x 480 (V) (full pixel readout)
Resolution	Horizontal / Vertical: 480 TV lines
Sensitivity	500 lx, F4, 3200K
Minimum illumination	32 lx (F1.4, MAX GAIN)
Signal noise to ratio	50 dB
Electric shutter	OFF 1/90, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/10000 second. OFF is normal exposure (frame rate) or changeable by variable shutter (Minimum 1/20000 second, Maximum 1/90 second)
Frame on demand	Fixed shutter (7 steps or variable)
Power supply voltage	12 ± 1 VDC
Current consumption	Approx. 80 mA (Approx. 0.96 W)
Ambient temperature	Performance: 0 to +40 °C (+32 to +104 °F), less than 90 % RH Operation: -10 to +50 °C (+14 to 122 °F), less than 90 % RH Storage: -20 to +60 °C (-4 to 140 °F), less than 70 % RH (without dew condensation)
Vibration endurance	15 to 200 Hz (98 m/s ²), Sweep 10 minute, 30 minutes for each 3 axis
Shock endurance	700 m/s ² (Once for each side of top, under, left and right)
External dimensions	150 (W) x 34 (W) x 100 (D) mm (Not including protrusions)
Mass	Approx. 20 g

MR-830CCU (Camera Control Unit)	
Video output	CameraLink: 80MHz Base configuration: 24bit (R:8bit G:8bit B:8bit) Output image size: 640(H) x 3840(V) (full pixel readout), 640(H) x 480(V) x Camera 8 units *Upper and lower boundary line (1 line and 480 line) of each camera is not used, please use the cut out within the 478 line
Frame rate	30 frames per second
I/O signal	Trigger input: Input from Camera Link connector: LVDS level Input from DCIN/SYNC connector: High: +2.5 to +5.0 V Low: 0 to +0.3 V FVAL output: High: +5 V Low: 0 V
Power supply voltage	DC12 V ± 1 V
Current consumption	Approx. 1.25 mA (Approx. 15 W) (eight cameras connection)
Ambient temperature	Performance: 0 to +40 °C (+32 to +104 °F), less than 90 % RH Operation: -10 to +50 °C (+14 to 122 °F), less than 90 % RH Storage: -20 to +60 °C (-4 to 140 °F), less than 70 % RH (without dew condensation)
Vibration endurance	15 to 200 Hz (98 m/s ²). Sweep 10 minute, 30 minutes for each 3 axis
Shock endurance	700 m/s ² (Once for each side of top, under, left and right)
External dimensions	150 (W) x 34 (W) x 100 (D) mm (Not including protrusions)
Mass	Approx. 570 g

Component		
KP-FMR830CL		
Products	Model	Quantity
Camera	MR-FM30Lite	8
PoCL-Lite cable (Camera connection: Right Angle type) (Cable length: 500mm)	MR-050Lite	8
Camera control unit	MR-830CCU	1

Digital Interface Cameras

KP-F200Lite	PoCL-Lite	1/1.8" CCD	UXGA(2.01 M pixel)(1628 x 1236)	Max. 15 frames per sec.	29(W)×29(H)× 29(D)mm
KP-F80Lite		1/3" CCD	XGA(0.81 M pixel)(1034 x 779)	Max. 36 frames per sec.	
KP-F30Lite		1/3" CCD	VGA(0.33 M pixel)(659 x 494)	Max. 60 frames per sec.	
KP-FM30Lite	PoCL-Lite	1CMOS Black & White	VGA(0.36 M pixel)(752 x 480)	Max. 90 frames per sec.	21.5(W)×21.5(H)×21.5(D)mm KP-FBM30Lite is an integrated cable
KP-FBM30Lite		1CMOS Black & White	VGA(0.36 M pixel)(752 x 480)	Max. 90 frames per sec.	



	KP-F200Lite	KP-F80Lite	KP-F30Lite	KP-FM30Lite KP-FBM30Lite
Imaging device	1/1.8-inch interline CCD (ICX274AL)	1/3-inch interline CCD (ICX204AL)	1/3-inch interline CCD (ICX424AL)	1/3-inch CMOS
Total pixels	1688 (H) x 1248 (V)	1077 (H) x 788 (V)	692 (H) x 504 (V)	-
Effective pixels	1628 (H) x 1236 (V)	1034 (H) x 779 (V)	659 (H) x 494 (V)	752 (H) x 480 (V)
Pixel size	4.4 μm (H) x 4.4 μm (V) (square lattice)	4.65 μm (H) x 4.65 μm (V) (square lattice)	7.4 μm (H) x 7.4 μm (V) (square lattice)	6.0 μm (H) x 6.0 μm (V) (square lattice)
Sensing area	7.16 mm (H) x 5.44 mm (V)	4.76 mm (H) x 3.75 mm (V)	4.88 mm (H) x 3.66 mm (V)	4.51 mm (H) x 2.88 mm (V)
Scanning system	Progressive			
Aspect ratio	4 : 3			5 : 3
Frame rate	15 frames per second (full pixel readout)	36 frames per second (full pixel readout)	60 frames per second (full pixel readout)	90 frames per second (full pixel readout)
Horizontal drive frequency	36.0000 MHz	36.0000 MHz	24.5454 MHz	36.818 MHz
Horizontal scanning frequency	18.75 kHz (full pixel readout)	28.346 kHz (full pixel readout)	31.468 kHz (full pixel readout)	45.29 kHz (full pixel readout)
Vertical scanning frequency	14.97 Hz (full pixel readout)	35.79 Hz (full pixel readout)	59.94 Hz (full pixel readout)	90 Hz
Sync system	Internal			
Lens mount	C-mount (Flange focal distance = 17.526 mm)			NF-mount (Flange focal distance = 12 mm)
Video output	Digital output (PoCL-Lite) Base configuration: 36.0000 MHz (Maximum cable length is 10 m) Output image size: 1628 (H) x 1236 (V) (full pixel readout)	Digital output (PoCL-Lite) Base configuration: 36.0000 MHz (Maximum cable length is 10 m) Output image size: 1024 (H) x 768 (V) (full pixel readout)	Digital output (PoCL-Lite) Base configuration: 24.5454 MHz (Maximum cable length is 10 m) Output image size: 659 (H) x 494 (V) (full pixel readout)	Digital output (PoCL-Lite) Base configuration: 36.8184 MHz (Maximum cable length is 10 m) (KP-FBM30Lite: Cable length is 2 m) Output image size: 752 (H) x 480 (V) (full pixel readout)
Resolution	Horizontal / Vertical: 1200 TV lines	Horizontal / Vertical: 800 TV lines	Horizontal: 500 TV lines / Vertical: 490 TV lines	Horizontal / Vertical: 480 TV lines
Sensitivity	400 lx, F5.6, 3200 K	400 lx, F4, 3200 K	400 lx, F5.6, 3200 K	400 lx, F2.8, 3200 K
Minimum illumination	1.0 lx (F1.4, MAX GAIN)			
Signal noise to ratio	50 dB			
Electric shutter	OFF 1/15, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second. OFF is normal exposure (frame rate) or changeable by variable shutter (Minimum 1/100000 second)	OFF 1/36, 1/60, 1/125, 1/250, 1/1000, 1/2000, 1/10000, 1/50000 second. OFF is normal exposure (frame rate) or changeable by variable shutter (Minimum 1/100000 second)	OFF 1/60, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/50000 second. OFF is normal exposure (frame rate) or changeable by variable shutter (Minimum 1/100000 second)	OFF 1/90, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/10000 second. OFF is normal exposure (frame rate) or changeable by variable shutter (Minimum 1/100000 second)
Gamma	γ = 1			
Frame on demand	(A) Fixed shutter (8 steps or variable) (B) ONE trigger mode (C) VD reset mode			Fixed shutter (7 steps or variable)
Partial scan	Selectable start position and height of picture grabbing in 1H step.			
Power supply voltage	12 ± 1 VDC			
Current consumption	Approx. 170 mA (Approx. 2.1 W)	Approx. 120 mA (Approx. 1.5 W)	Approx. 80 mA (Approx. 0.96 W)	
Ambient temperature	Performance: 0 to +40 °C (+32 to +104 °F), less than 90 % RH Operation: -10 to +50 °C (+14 to 122 °F), less than 90 % RH Storage: -20 to +60 °C (-4 to 140 °F), less than 70 % RH (without dew condensation)			
Vibration endurance	10 to 200 Hz 98 m/s ²			
Shock endurance	686 m/s ²			
External dimensions	29 (W) x 29 (W) x 29 (D) mm (Not including protrusions)			21.5 (W) x 21.5 (W) x 21.5 (D) mm (Not including protrusions) (Not including cable for KP-FBM30Lite)
Mass	Approx. 50 g			Approx. 20 g (Not including cable for KP-FBM30Lite)

HDTV Cameras

DK-H100	HDTV	2/3" IT-3CCD	1080•59.94/50i, 480/59.94i, 576/50i	1100 TV Line	99(W) × 105(H) × 155(D)mm
DK-Z50	HD-SDI/SD-SDI			800 TV Line	

High S/N with HD-SDI

Outstanding Signal-to-noise ratio >60 dB (>58 dB for DK-Z50) measured on the HD-SDI (1080i) output.

14-bit ADC with the latest generation Hitachi DSP

High dynamic range and color fidelity are achieved by employing 14-bit analog-to-digital converters on the RGB CCDs' output. Hitachi is a leading developer for high performance CPU & DSP in broadcasting fields.

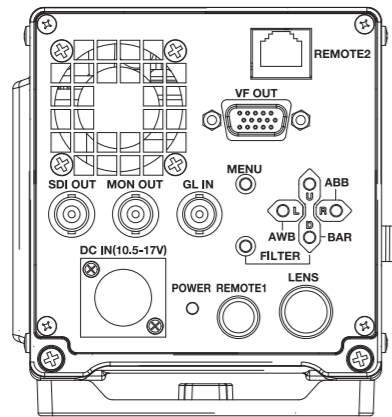
High resolution (DK-H100)

The latest generation 2/3-inch 2.3 million pixels CCD with micro lenses and multi speed signal processing circuits provide a horizontal resolution performance of 1100 TV lines (luminance channel).

High resolution (DK-Z50)

The latest generation 2/3-inch CCD with micro lenses and spatial-offset processing technologies provide a horizontal resolution performance of 800 TV lines (luminance channel).

Small & light weight head



Versatile CCD shutter

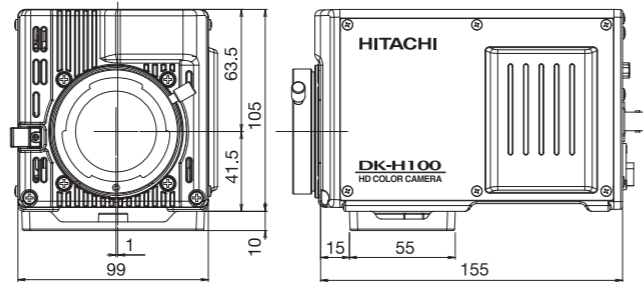
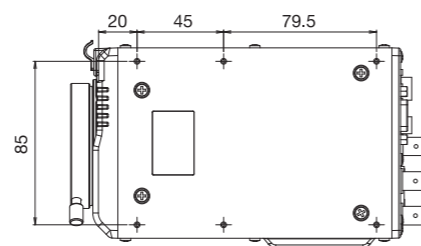
- Five preset shutter speeds
- Lock scan the camera video to image from asynchronous computer monitors, video walls or projectors without flicker
- Automatic electric shutter (AES) maintains the video level with a fixed lens f-stop

DSP provide advanced image handling and adjustment functions

- Knee saturation and auto-knee
- 12-vector and linear matrix masking
- Skin tone masking
- Automatic skin tone detail circuit
- Variable detail boost frequency
- Ultra gamma
- Gray scale automatic setup
- Automatic shading correction

Extensive user-friendly features

- Eight scene files are provided to store and recall functions such as gain, detail, masking, gamma and other settings
- White balance memories are provided for each scene files for a total on nine memories by the remote control panel
- Menu access is provided for iris level (fine adjustment) and iris peak/average selection
- Computer controlled real-time auto-white balance
- ECC (Electric Color Compensating) Filter



Unit: mm

	DK-H100	DK-Z50
CCD	2/3" IT-3CCD	
Total pixels	2010(H) x 1120(V) 2.3 million pixels	1.0 million pixels
Effective pixels	1920(H) x 1080(V)	-
Aspect ratio	16:9 (HD/SD), 4:3 (SD) switchable	
TV signal format	1080/59.94i, 1080/50i, 480/59.94i, 576/50i	
Horizontal resolution	1100 TV lines	800 TV lines
Standard sensitivity	2000 lx / F10 (1080/59.94i), 2000 lx / F11 (1080/50i), 3200K, 89.9 reflectance	
Minimum illumination	0.002 lx (F1.4, +72 dB) +72 dB at +36 dB Gain and CCD charge accumulation	
S/N	Typical 60 dB (HD-SDI output decode Y channel Band: 27.5 MHz)	Typical 58 dB (HD-SDI output decode Y channel Band: 27.5 MHz)
Lens mount	Bayonet mount	
Optical filter	Clear, 1/4ND, 1/16ND, 1/64ND	
ECC filter	3200K, 4300K, 5600K, 6300K, 8000K	
Shutter	PRESET	1/100, 1/250, 1/500, 1/1000, 1/2000 second (59.94i) 1/60, 1/250, 1/500, 1/1000, 1/2000 second (50i)
	Lock Scan	1/59.94 to 1/10000 second, 1.07 (+36 dB) to 0.03 second (+6 dB) (59.94i) 1/50.00 to 1/10000 second, 1.28 (+36 dB) to 0.04 second (+6 dB) (50i)
Gain selection	L (low): -3/0 dB M (medium): 0 to +33 dB, 3 dB steps H (high): +3 to +36 dB, 3 dB steps	
Dimensions (W x H x D)	99 (W) x 105 (H) x 155 (D) mm (excluding protrusions)	
Power consumption	approx. 17 W (DC 12 V)	
Mass	approx. 1.5 kg (3.3 lbs)	
Input signals(Genlock)	Tri-level sync / BB	
Output signals	HD-SDI: SMPTE292M 0.8 Vp-p/1.5 Gbps	SD-SDI: SMPTE259M-C 0.8 Vp-p/270 Mbps

HDTV Cameras

HV-HD33	HDTV HD-SDI/SD-SDI	1/3" 3MOS	1080•59.94i/50i (16:9), 720•59.94p/50p (16:9), 480•59.94i (16:9), 576•50i (16:9), 480•59.94i (4:3), 576•50i (4:3)	720 TV Line	65(W) × 65(H) × 125(D)mm
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New MOS sensors with improved sensitivity rise of 6 dB.

Multi format HDTV SDTV output

- | | |
|--------------------------|-------------------------|
| 1080 • 59.94i/50i (16:9) | 720 • 59.94p/50p (16:9) |
| 480 • 59.94i (16:9) | 576 • 50i (16:9) |
| 480 • 59.94i (4:3) | 576 • 50i (4:3) |

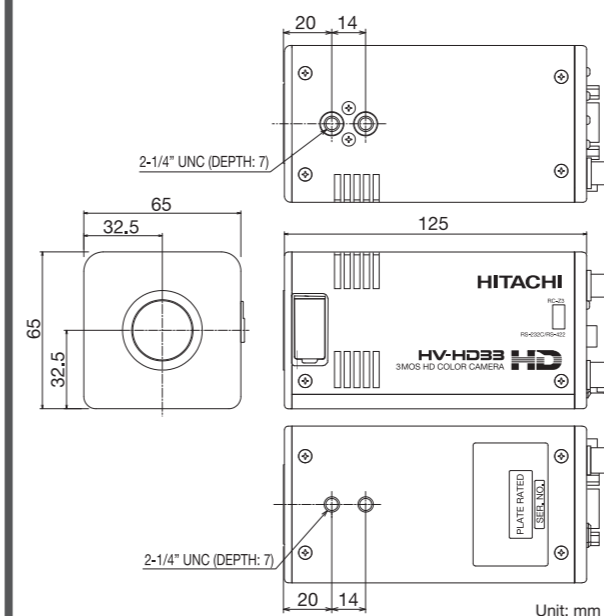
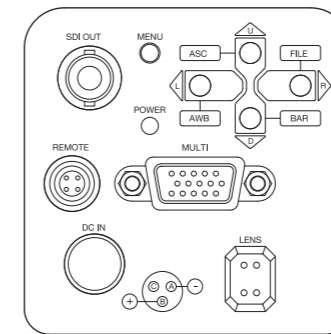
Digital serial output

HD-SDI/SD-SDI 1 output

6 color independent masking & Luminosity independent linear masking

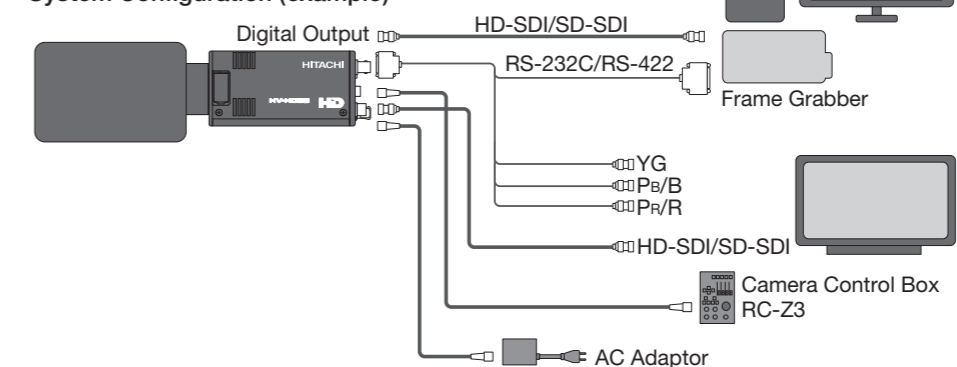
Negative positive conversion & Right and left reversing

Camera control RS-232C/RS-422 remote controller RC-Z3



Unit: mm

System Configuration (example)



Output format	HDTV 1080•59.94i/50i (16:9), 720•59.94p/50p (16:9), SDTV 480•59.94i (16:9), 576•50i (16:9), 480•59.94i (4:3), 576•50i (4:3)
Imaging device	1/3" 3MOS
Total pixels	1376(H) x 1070(V)
Effective pixels	1280(H) x 720(V)
Actual image area	4.80 mm (H) x 3.84 mm (V)
Imaging system	R. G. B. 3MOS
Optical system	1/3" F2.2 prism
Lens mount	C-mount (flange back 17.526 mm in air)
Horizontal resolution	720 TV Line (HD-SDI output, Center of Screen, DTL: OFF, Ych)
Standard sensitivity	F8.0 (2000 lx, 3200K)
Minimum illumination	10 lx (F2.2, Gain: 15 dB, Gamma: ON)
S/N	53 dB (HD-SDI output Decode, Ych, 30 MHz)
Registration	All screen 0.05% (Without lens Characteristic)
Gain	0 dB to +15 dB 1 dB step
Shutter	Preset 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000 Variable 1/60 to 1/11238 (59.94i/p mode, 1H (approx. 23 ms) step) 1/50 to 1/9375 (50i/p mode, 1H (approx. 28 ms) step)
Gamma	0.45 (ON) / 1.0 (OFF)
Scene file	4 Scene file
Color bar	ARIB bar
Power supply voltage	DC 12 V (10.5 V to 15 V)
Power consumption	approx. 8 W
Dimensions	65 mm (W) x 65 mm (H) x 125 mm (D)
Mass	420 g (except lens)
Ambient temperature	Operating: -10 to 40°C Storage: -20 to 60°C
Standard composition	• DC in plug: R03-P3F • Lens plug: E4-191J-100

HDTV Cameras

KP-HD1005	HDTV HD-SDI	1/3" 1 CMOS	800 TV Line	64(W) × 63(H) × 135(D) mm	Power over coaxial DC type	1080 30P	
KP-HD1005-S2						1080 30P	
KP-HD1005-S4						1080 59.94i/50i/29.97p/25p	
KP-HD1005-S5						1080 59.94i/50i/29.97p/25p	
KP-HD1001						AC type	1080 30P
KP-HD20A						Power over coaxial DC type	1080 59.94i/50i/29.97p/25p
KP-HD20A-S2				44(W) × 44(H) × 59(D) mm		1080 59.94P/50P	

KP-HD1001, KP-HD1005,
KP-HD1005-S2



KP-HD1005-S4, KP-HD1005-S5



KP-HD20A, KP-HD20A-S2



HD-SDI output

An HD-SDI output provides a non compressed full bandwidth high quality video signal with a low latency of 17ms or less.

Coaxial cable transmission

A standard 75 ohm coaxial cable of up to 100 meters is used for the HD-SDI output, allowing the use of existing coaxial cable.

Capable of transmitting up to 300 m by the Multiunit use (Except KP-HD1005-S4/-S5)

It is capable of transmitting up to 300m by HD-VLC transmission mode of the Multiunit use.

Multi-format support (KP-HD1005-S4/-S5, KP-HD20A)

1080-59.94i/50i/30p/25p

Wide dynamic range (KP-HD1001, HD1005/-S4/-S5)

Display cleanly also large image of luminance difference.

Adaptive noise reduction (KP-HD1001, HD1005/-S4/-S5)

Bright HDTV color images can be obtained with just 0.3 lx —up to 64-time integration enables night time photographing. In addition, adaptive noise reduction makes it easy to shoot moving objects.

Can be output in four systems of video formats by using the Multiunit (except for the MU-HD104-S1).

Power over coaxial using the Multiunit (except KP-HD1001) Possible because coaxial over power supply, wiring with a single coaxial cable is possible when using Multiunit.

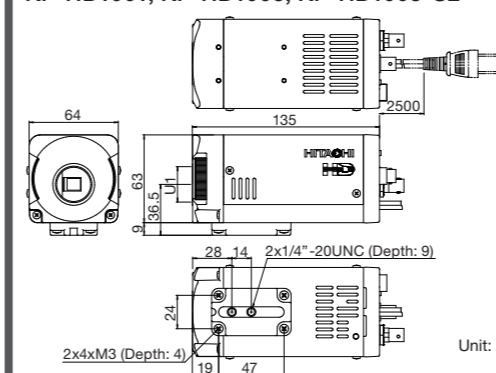
High Sensitivity

With a high sensitivity of 0.2 lx (0.4 lx for KP-HD20A-S2) Minimum Illumination, also enables monitoring of the installation environment that was difficult to look like a dark place of the production line. The black-and-white mode switching in KP-HD1005-S4/-S5 and KP-HD1001, it is capable of high-sensitivity photography of 0.02 lx in black-and-white movie. In addition, it is possible to increase sensitivity of up to 30 times by using accumulation function in KP-HD1005-S4/-S5 and KP-HD1001.

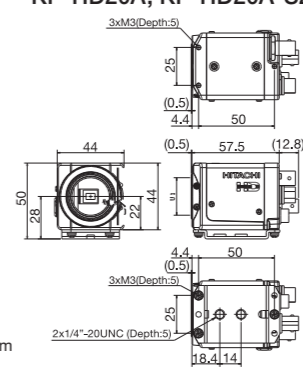
	KP-HD1001	KP-HD1005	KP-HD1005-S4 KP-HD1005-S5	KP-HD1005-S2	KP-HD20A KP-HD20A-S2
Imaging device	1/3-inch CMOS				
Total pixels	2010(H) x 1108(V) 2.2 M pixels				
Effective pixels	1944(H) x 1092(V)				
Sync system	Internal				
Video output	SMPTE 292M Compliance (HD-SDI Standard mode) HD-VLC: Require the Multiunit for transmission Analog output: VBS		-	HD-VLC: Require the Multiunit for transmission Analog output: VBS	
Output Format	HD-SDI output: 1080 30p VBS: NTSC, PAL		HD-SDI output: 1080 59.94i/50i/29.97p/25p	HD-SDI output: 1080 30p	1080 59.94i/50i/29.97p/25p KP-HD20A-S2: 1080p 59.94/50
Transmission distance	HD-SDI Standard mode: Max. 100m (5C-FB 75Ω) HD-VLC mode: Max. 300m (5C-2V 75Ω/When using the optional Multi-unit)		HD-SDI Standard mode: Max. 100m (5C-FB 75Ω)	HD-SDI Standard mode: Max. 100m (5C-FB 75Ω)	HD-VLC mode: Max. 300m (5C-2V 75Ω/When using the optional Multi-unit)
S/N	50 dB (AGC: OFF / Weight: ON)				
Horizontal resolution	800 TV lines				
Minimum illumination	Color: 0.2 lx 30 times accumulation: 0.007 lx B & W: 0.02 lx 30 times accumulation: 0.0007 lx (F1.2, AGC 48 dB, 3200K)		-	Color: 0.2 lx (F1.2, AGC 48 dB, 3200K)	Color: 0.2 lx (F1.2, AGC 48 dB, 3200K) (KP-HD20A-S2: 0.4 lx)
AGC	OFF/Auto (Max. 48 dB) / Manual (0 dB to +48 dB, 1 dB step)				
Accumulation Mode	Max. 30 times				
Electric shutter	OFF/Auto (AES) / Manual (1/30 to 1/14000 second)			OFF/Auto (AES)/ Manual (1/30 to 1/14000 second (KP-HD20A-S2: 1/60 to 100000 second)	
Wide dynamic range	OFF/WDR WDR: Double shutter sampling				
Image quality adjustment	Level / Gamma / Color level / Black level / Detail				
Backlight correction	OFF/ ON (Photometry area can be set)				
Auto iris lens output	DC/VIDEO				
White balance	Auto: ATW / AWC / Manual (2500K to 10000K)				
Remote control	RS-232C		-	RS-232C	
Lens mount	C-/CS- C-: C-mount Adaptor use				
Power supply	AC 100 V to 12 V DC ±10%, Power over coaxial from multi-unit				
Power Consumption	Approx. 11 W (AC 100 V)	Approx. 7.5 W (Power over coaxial)	Approx. 7.8 W (Power over coaxial)	Approx. 4 W (Power over coaxial)	Approx. 5.9 W (KP-HD20A-S2: Approx. 4.7 W (Power over coaxial))
Ambient Temperature	-10 to +50 °C (+14 to +122 °F), 30 to 80 % RH				
Operating Storage	-20 to +60 °C (-4 to +140 °F), 20 to 90 % RH				
Shock endurance	Less than 29.6 m/S ² , 10 to 55 Hz XYZ axis for each 30 minutes)				
External dimensions	64 x 63 x 135 mm (excluding lens and protrusions)	64 x 63 x 103 mm (excluding lens and protrusions)	64 x 63 x 135 mm (excluding lens and protrusions)	44 x 44 x 59 mm (excluding lens and protrusions)	44 x 44 x 59 mm (excluding lens and protrusions)
Mass	Approx. 750 g (excluding lens)	Approx. 550 g (excluding lens)	Approx. 400 g (excluding lens)	Approx. 550 g (excluding lens)	Approx. 200 g (excluding lens)

HDTV Cameras

KP-HD1001, KP-HD1005, KP-HD1005-S2



KP-HD20A, KP-HD20A-S2



Rear View

KP-HD1001



KP-HD1005
KP-HD1005-S4
KP-HD1005-S5



KP-HD1005-S2

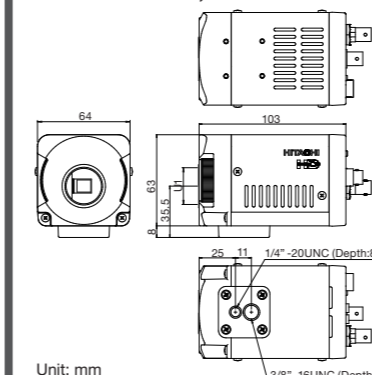


KP-HD20A,
KP-HD20A-S2

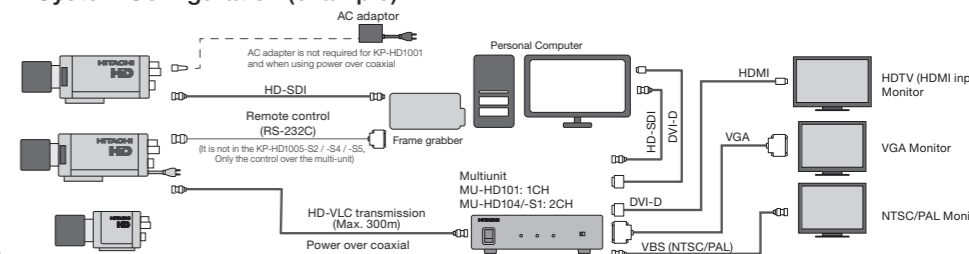


KP-HD1005 and KP-HD1005-S2 does not have AC code on the rear.
KP-HD1005-S2 is different from the rear of the connector.

KP-HD1005-S4, KP-HD1005-S5



System Configuration (example)



Unit: mm

Multiunit

MU-HD101	1CH input	HD-SDI input HD-VLC / HD-SDI transmission	Output: HD-SDI, analog, DVI-D, VGA	160(W) × 42(H) × 170(D)mm
MU-HD104	4CH input	HD-SDI input, HD-VLC transmission	HD-SDI output	420(W) × 44(H) × 257(D)mm
MU-HD104-S1				

MU-HD101



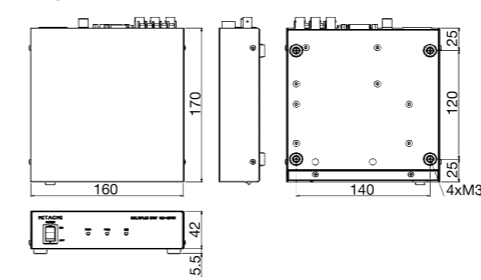
MU-HD104



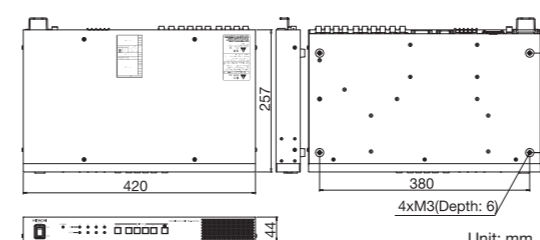
MU-HD104-S1



MU-HD101



MU-HD104 / MU-HD104-S1

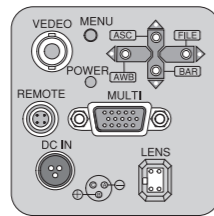


*Front panel display, switch / button / LED, and the rear connector is different in MU-HD104-S1.

	MU-HD101	MU-HD104	MU-HD104-S1
Video input	HD-SDI 1: BNC HD-SDI (SMPTE292M) HD-VLC	HD-SDI 4: BNC	HD-VLC
Video output	HD-SDI output 1: BNC (75Ω) Through 1(MU-HD101), 4(MU-HD104): BNC(75Ω) Analog output 1: BNC (75Ω) DVI-D 1: DVI-D (SINGLE LINK) VGA 1: D-SUB 15pin Full HD: 1920x1080: 59.94i/50i/29.97p/25p SXGA: 1280x1024: 60p XGA: 1024x768: 60p NTSC: 720x486: 59.94i PAL: 768x576: 50i	HD-SDI output 1: BNC (75Ω) Through 4: BNC (75Ω)	Full HD: 1920x1080: 29.97p
Power supply system	Power over Coaxial		
Max. transmission distance (Using KP-HD1001)	HD-SDI: 100 m (5C-FB), 60 m (3C-FB) HD-VLC: 300 m (5C-2V), 170 m (3C-2V)		
Remote control	RS-232C		
Power supply	AC100 V to 230 V ±10% 13 W (Power over coaxial on) 5 W (Power over coaxial off)		
Operating temperature	-10 to +45°C		
External dimensions	160(W) × 42(H) × 170(D)mm	420(W) × 44(H) × 257(D)mm	
Mass	Approx. 700 g	Approx. 3.6 kg	

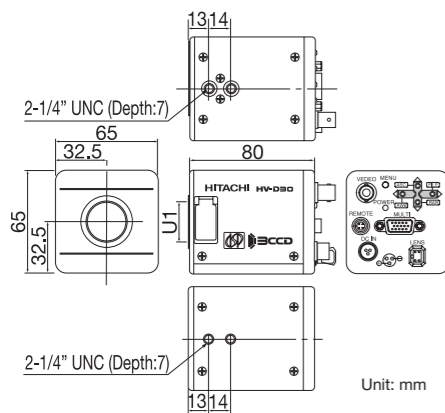
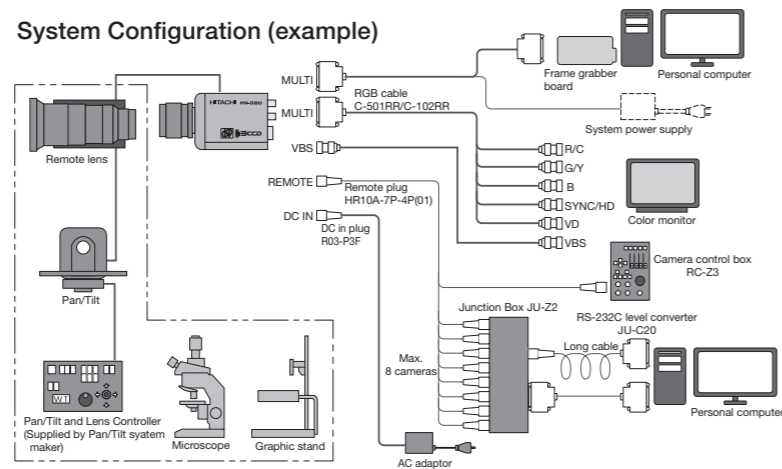
Analog Interface Cameras

HV-D30	NTSC/PAL	3CCD Color	1/3" CCD	800 TV line (luminance signal center)	65(W) × 65(H) × 80(D)mm
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- Compact, high Performance, multi purpose cameras featuring 12 bit A/D converters and a 3 million gate DSP
- High resolution of 800 TV lines
- Auto Shading Compensation (ASC)
- External Trigger functions

System Configuration (example)



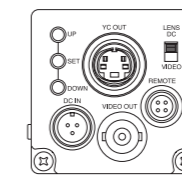
Color system	NTSC, PAL	
Optical system	1/3-inch, F2.2 prism	
	1/3-inch interline CCD (R, G, B 3CCD)	
Imaging device	Total pixels	NTSC 811(H) × 508(V) PAL : 795(H) × 596(V)
	Effective pixels	NTSC 768(H) × 494(V) PAL : 752(H) × 582(V)
Sync system	Internal/external (VBS, BBS or HD/VD auto selection)	
Horizontal resolution	800 TV lines, luminance signal center (Y out and DTL off)	
S/N	NTSC: 64 dB (DNR: ON), PAL: 62 dB (DNR: ON)	
Standard sensitivity	2000 lx, F9.5	
Minimum illumination	0.9 lx (50 IRE, F2.2, GAIN: +24 dB, DIGITAL GAIN: +12 dB)	
Gamma correction	0.45/1.0 (ON/OFF)	
Lens mount	C-mount (flange back 17.25 mm in air)	
Sensitivity selection	AGC (0 to +24 dB) or GAIN (0 to +24 dB step 1 dB or step 3 dB on remote control menu)	
CCD drive functions	Preset	1/100(1/60 PAL), 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/10000, 1/20000, 1/40000, 1/100000 second
	Lock scan	NTSC 1/60.38 to 1/2039 second (step 1H), to 1/100000 second (step approx. 10% video level) PAL 1/50.31 to 1/2024 second (step 1H), to 1/100000 second (step approx. 10% video level)
	Long time integration	Frame/field integration selection 1/30 (NTSC), 1/25 (PAL) to approx. 8 seconds (1 frame step)
Power supply voltage	12 V rated (stable operation at 10.5 to 15 VDC (ripple and noise absent))	
Power consumption	Approx. 4.5 W	
Dimensions	65(W) × 65(H) × 80(D) mm	
Mass	400 g approx. (not including lens)	
Ambient temperature	Operation	-10 to +45°C
	Storage	-20 to +60°C

Analog Interface Cameras

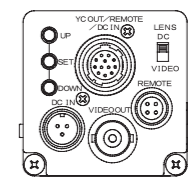
KP-D20A	NTSC/PAL	1CCD Color	1/3" CCD	NTSC: 480 TV line PAL: 470 TV line	44(W) × 44(H) × 49(D)mm
KP-D20B	NTSC/PAL		1/2" CCD		
KP-D20B-S3	PAL				



KP-D20A, KP-D20B



KP-D20B-S3

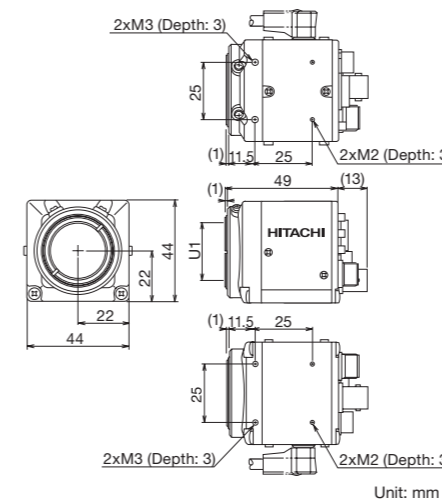
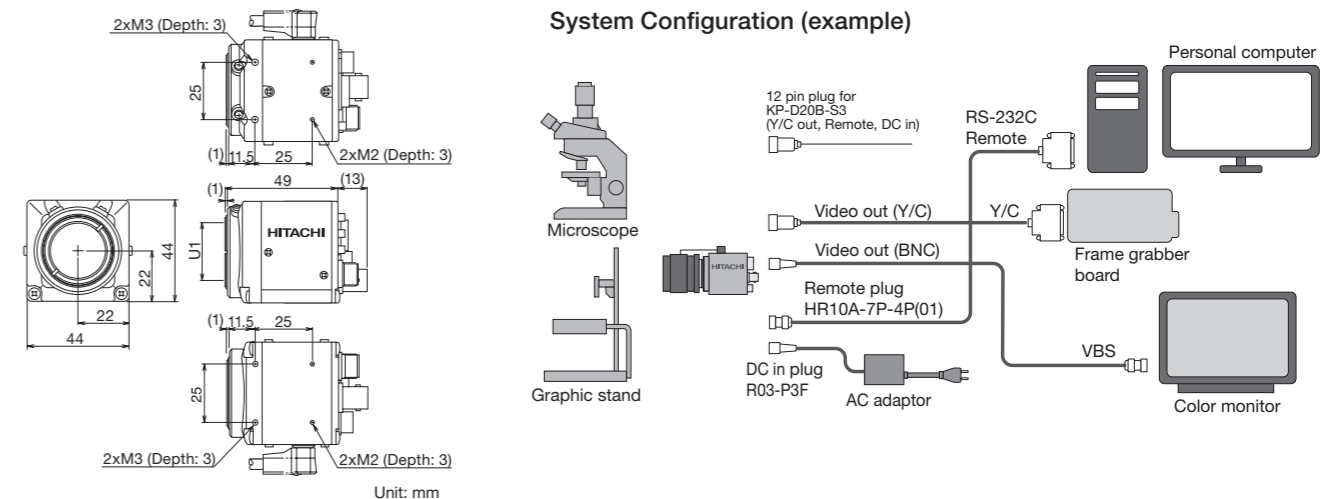


- Compact multi purpose CCD color camera

Featuring high sensitivity and high image quality in a package measuring just 44(W) × 44(H) × 49(D) mm. An on-screen menu system allows optimal adjustment of camera parameters to meet the imaging application.

- KP-D20B-S3 : 12pin type, PAL type only

System Configuration (example)



		KP-D20A	KP-D20B
Imaging device		1/3-inch interline CCD (NTSC: ICX408AK, PAL: ICX409AK)	1/2-inch interline CCD (NTSC: ICX418AKL, PAL: ICX419AKL)
	Total pixels	NTSC: 811 (H) × 596(V) , PAL: 795 (H) × 596(V)	
	Effective pixels	NTSC: 768 (H) × 494(V) , PAL: 752 (H) × 582(V)	
	Pixel size	NTSC: 6.35 μm (H) × 7.4 μm (V), PAL: 6.5 μm (H) × 6.25 μm (V)	NTSC: 8.4 μm (H) × 9.8 μm (V), PAL: 8.6 μm (H) × 8.3 μm (V)
	Color filter	RGB primary color mosaic filter	
Sensing area	NTSC: 4.88 mm (H) × 3.66 mm (V), PAL: 4.89 mm (H) × 3.64 mm (V)	NTSC: 6.45 mm (H) × 4.84 mm (V), PAL: 6.47 mm (H) × 4.83 mm (V)	
Scanning frequency	NTSC; Horizontal: 15.734 kHz, Vertical: 59.94 Hz PAL; Horizontal: 15.625 kHz, Vertical: 50 Hz		
Sync system	Internal		
Lens mount	C/CS-mount (C-mount adaptor optionally)		
Video output	VBS, Y/C		
Horizontal resolution	NTSC: 480 TV Line, PAL: 470 TV Line		
Minimum illumination	0.8 lx (F1.2, Max. gain)	0.3 lx (F1.2, Max. gain)	
Signal noise to ratio	50 dB or more		
Electric shutter	OFF(NTSC:1/60,PAL:1/50),1/100(PAL:1/120),1/25 0,1/500, 1/1000,1/2000,1/4000,1/10000,1/20000,1/30000 second, AES		
White balance	ATW / AWC / MANUAL		
Digital zoom	Enlarged 4 times smoothly		
Backlight compensation	Sensing areas selectable from 9 areas		
Power supply voltage	12 VDC ±10%		
Power consumption	Approx. 220 mA		
Ambient	Operation	-10 to 50°C (+14 to +122°F) , 30 to 80 % RH	
	Storage	-20 to 60°C (-4 to +140°F) , 20 to 90 % RH	
Vibration endurance	10 to 55 Hz 1.96 to 59.3 m/s ²		
External dimensions	44 (W) × 44 (H) × 49 (D) mm (Not including protrusions) KP-D20B-S6: 58 (W) × 44 (H) × 49 (D) mm		
Mass	Approx. 130 g KP-D20B-S6: 170 g		

Accessory List

Interface		USB3 Vision				GigE Vision				IEEE 1394.a	Analog			HD							
Model Name		KP-F510UB	KP-FD510UB	KP-FM200UB/F31UB/F21UB	KP-FDM200UB	KP-F510GV/F200GV/F31GV/F21GV	KP-FD510UB/FDM200GV	HV-F202GV	KP-F500GV / F202GV / F145GV / F140GV KP-F83GV / F33GV	KP-FD500GV / FD202GV / KP-FD140GV KP-FD83GV / FD33GV	HV-F22GV	HV-F22F	KP-M1A / M2A / M3A / M2R-S3	KP-D20A / D20B	KP-D20B-S3	HV-D30	DK-H100 / Z50	HV-HD33	KP-HD1005	KP-HD1001	KP-HD20A
Junction Box	JU-M1A JU-Z2 JU-F30																				
Multiunit	MU-HD101 MU-HD104																				
Remote Control Box	RC-Z3																				
Camera control panel	RU-1000VR RU-1500JY																				
C/CS-mount Adaptor	LA-D20AB																				
Tripod Adaptor	TA-UBGV TA-D20AB TA-F202 TA-M1																				
Camera Cable	(2m) C-201KSM (5m) C-501KSM (10m) C-102KSM																				
RGB Cable	C-501RR C-102RR																				
15 pin Plug	KEC-15P																				
12 Pin Plug	HR10A-10P-12S																				
6 pin Plug	HR10A-7P-6S(74)																				
4 pin Plug	HR10A-7P-4P																				
Lens Plug	E4-191J-100																				
Lens extension cable	ECE-R22 (0.22m) (FUJINON)																				
DC Plug	R03-P3F																				
Dummy Glass	ARC1214																				
IR Cut Filter	IRC650																				

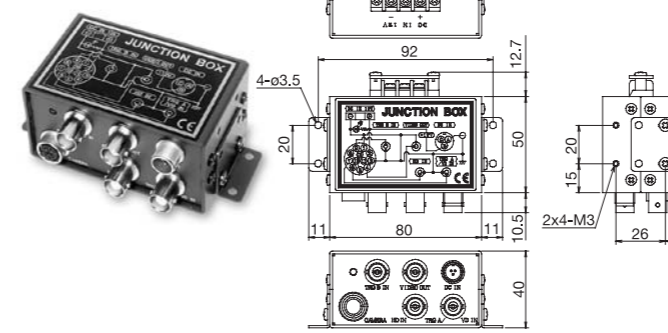
● Standard equipment

Accessories

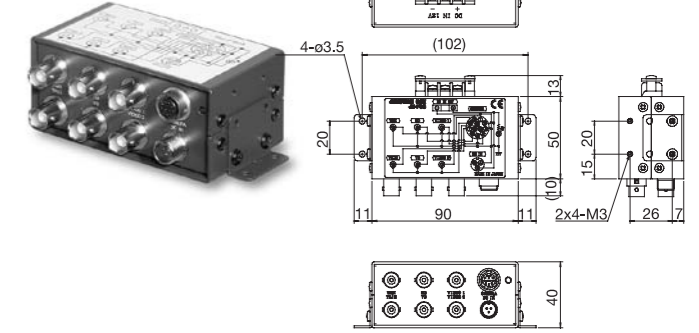
Junction Box

Junction box is used for supplying power or synchronization signal to a camera.

JU-M1A



JU-F30



Tripod Adaptor

Tripod adaptors allow the cameras to be mounted to a tripod.

TA-F500



TA-FM200



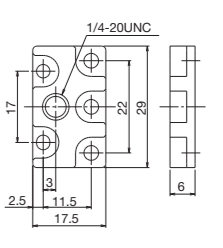
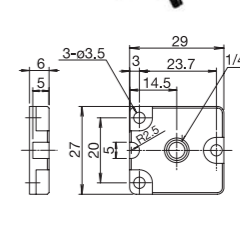
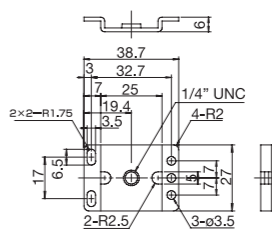
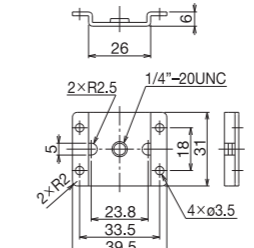
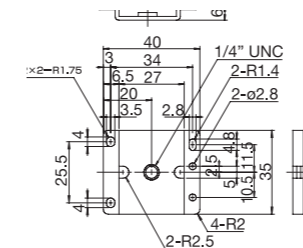
TA-F230



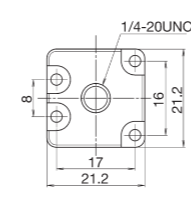
TA-F200S



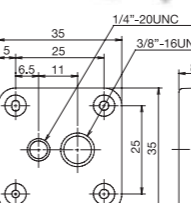
TA-FM100PCL



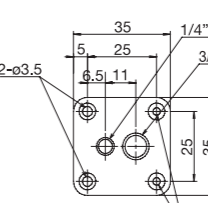
TA-FM30Lite



TA-M1



TA-D20AB



TA-FB30 / FB30P



Camera Cable

C-201/501/102KSM

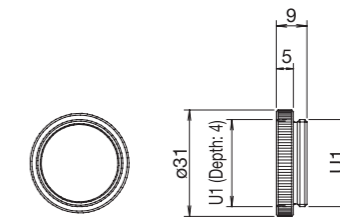


The camera cable is used for connecting camera and junction box. Supply 12VDC or external trigger signal to camera.

- Molded type
- C-201KSM2m
 - C-501KSM5m
 - C-102KSM 10m

C/CS Adaptor

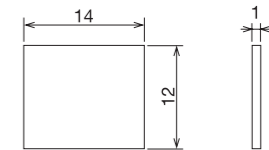
LA-D20AB



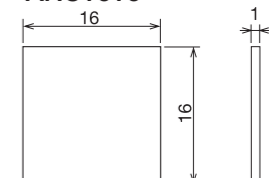
C- to CS-mount adapter. 5 mm adapter ring used when C-mount lenses are used on a CS-mount camera.

Dummy Glass

ARC1214



ARC1616



Dummy glass is attached instead of IR-cut filter when acquiring near infrared range.

List of Optional Lens

KOWA

	Supports 3CCD	Supports 5 megapixels	Supports 4 megapixels	Supports NF-mount
Model	LM**NC*	LM**JC5M/2	LM**XC	LM**NF
Image Format	1/2 type	2/3 type	1 type	1/3 type
Focal Length	4/6/12/25/50mm	12.5/16/25/35mm	12/16/25/35/50mm	2.7/4.5/9mm
Dimensions	ø30 to 48mm	ø38.5 to 43.5mm	ø45 to 57mm	ø21 to 22mm
Mount	C	C	C	NF



Technical Information

• USA: Kowa Optimed, Inc. TEL : +1-(310) 327-1913 FAX : +1-(310) 327-4177 Mail : kowa-usa-info@kowa.com
 • EUROPE: Kowa Europe GmbH TEL : +49-(211) 1793540 FAX : +49-49-(211)-161952 Mail : scope@Kowa-Europe.com

μTRON

	Supports 3CCD Zoom	Supports megapixels Zoom	Supports 5 megapixels	Supports 2 megapixels
Model	PH16x8B	PH33x30	HF**J	HS**J
Image Format	1/2 type (HDTV)	1/2 type	2/3 or 1 type	2/3 type
Focal Length	8 to 128mm	30 to 1000mm	12/16/25/35/50mm	8/12/16/25/35/50mm
Dimensions	80x85mm	122x122mm	ø47.5 to 57mm	ø32.5 to 36mm
Mount	C	C	C	C



Technical Information

• Myutron Inc. URL : http://www.myutron.com/index_e.html
 TEL : +81-3-5612-1884 FAX : +81-3-5612-1890

FUJINON

	Supports 3CCD	Supports 5 megapixels	Supports megapixels	
Model	TF**DA-8	HF**SA-1	CF**HA-1	HF**HA-1B
Image Format	1/3 type	2/3 type	1 type	2/3 type
Focal Length	2.8/4/8/15/25mm	12.5/16/25/35/50/75mm	12.5/16/25/35/50/75mm	9/12.5/16/25/35/50/75mm
Dimensions	ø29 to 34mm	ø51mm	ø51mm	ø26.5 to 31.5mm
Mount	C	C	C	C



Technical Information

• USA URL : www.fujinon.com
 • EUROPE URL : www.fujinon.de TEL : 0 21 54/9 24-0 FAX : 0 21 54/9 24-2 90 Mail : fujinon@fujinon.de
 TEL : +33 (0) 1/39 30 16 16 FAX : +33 (0) 1/30 43 77 21 Mail : fujinon@fujinon.fr

TAMRON

	Supports megapixels		Supports HDTV	
Model	M118FM**	23FM**SP	M13VM288IR	M13VM550
Image Format	1/1.8 type	2/3 type	1/3 type	1/3 type
Focal Length	8/16/25/50mm	16/25/50mm	2.8-8mm Vari-focal	5-50mm Vari-focal
Dimensions	C	C	CS	CS
Mount	ø29mm	ø34mm	ø43.2mm	ø46mm
Note			DC Auto Iris type: M13VG**	



Technical Information

• USA: TAMRON USA, INC. URL : www.tamron.com TEL : 1-631 (858) 8400
 • EUROPE: TAMRON EUROPE GmbH. URL : www.tamron.de TEL : 49 (221) 970325-74

Tokina

	Supports 5 megapixels Telecentric	Long Operation 10X Macro lens	Variable high-zoom lens
Model	KCM-***MP5	KCM-10D-64	KCM-50NII
Image Format	2/3 type	2/3 type	2/3 type
Focal Length	9/12.5/18mm	10X	0.5X to 1.0X
Dimensions	ø48mm	ø43mm	ø36mm
Mount	C	C	C



Technical Information

• Tokina Co.Ltd. URL : <http://www.tokina.co.jp/en/> TEL : +81-49-274-5360

List of Optional Lens

SPACECOM

	Supports HDTV	Supports Megapixels Zoom Day & Night	Supports 5 megapixels	Supports 2 megapixels
Model	TAV2812DCIR-MP	VZ2465RI R-MP	PYXIS**	VELA**
Image Format	1/3 type	1 type	2/3 type	2/3 type
Focal Length	2.8-12mm	24-65mm	8/12/16/25/35mm	8/12/16/25/35mm
Dimensions	CS	C	C	C
Mount	ø41.3mm	80 X 80mm	ø51mm	ø37.5mm
Note	HERCULES	Available DC Auto Iris type MERCURY	PIXIS	VELA



Technical Information

• SPACE inc. URL : http://www.spacecom.co.jp/en_index.html
 USA SPACE COM inc (USA OFFICE) TEL : +1-562-696-0378 FAX : +1-562-696-0797
 Head Office (Japan) TEL : +81-422-31-8180 FAX : +81-422-31-8220

CBC

	Supports Megapixels Manual Iris		Macro Zoom
Model	M0814-MP	M1214-MP	MLH-3XMP
Image Format	2/3 type	2/3 type	2/3 type
Focal Length	8mm	12mm	8.7 to 29.4mm
Dimensions	ø33.5mm	ø33.5mm	ø36.5mm
Mount	C	C	C



Technical Information

• USA: CBC (AMERICA) Corp. URL : www.cbcamerica.com TEL : (1-631) 864-9700 FAX : (1-631) 864-9710
 • EUROPE: CBC (EUROPE) LTD. URL : www.cbceurope.com TEL : (44-20) 8732-3333 FAX : (44-20) 8202-3387

SCHOTT MORITEX

	1 type, Supports 5 megapixels					
Model	ML-U1214MP9	ML-U1614MP9	ML-U2514MP9	ML-U3514MP9	ML-U5016MP9	ML-U7518MP9
Focal Length	12.5mm	16mm	25mm	35mm	50mm	75mm
Fno	1.4	1.4	1.4	1.4	1.6	1.8
Resolution	Center: 150 lp/mm Periphery: 125 lp/mm					
distance of closest approach	0.1	0.1	0.1	0.15	0.3	0.8
Image Format	16.8mm (1-inch support)					



Technical Information

• SCHOTT MORITEX Corporation URL : <http://www.schott-moritex.com>
 North America: SCHOTT North America, Inc. TEL : +1 (408)363-2100 FAX : +1 (408)363-9980
 Outside North America (Japan) TEL : +81-48-218-2525 FAX : +81-48-462-6710

MIKAMI

	Supports 3CCD Manual Zoom	
Model	PH6X8 MACRO	J6X11MACRO
Image Format	1/3 type	2/3 type
Focal Length	8 to 48mm	11.5 to 69 mm
Dimensions	ø50.5x92.8mm	ø49.3x98.2mm
Mount	C	C



Technical Information

• MIKAMI & CO., LTD. URL : www.kk-mikami.co.jp TEL : +81-3-3230-4511 FAX : +81-3-3230-3451