

Progressive scan CMOS camera KP-FM500WCL (Tentative) Specifications

1. General

The KP-FM500WCL is 2/3-inch single CMOS black and white camera which utilized the progressive scan global shutter CMOS image sensor with square pixel of 5M pixels.

High resolution image of 5M pixels is output with high frame rate 163 frames per second.

Since the square pixel CMOS is adopted, the suitable images can be obtained for image processing.

2. Outstanding features

(1) High resolution

The 2/3-inch 5,000,000 pixels square lattice progressive scan CMOS is adapted.

Effective pixels are 2448 (H) x 2048 (V) achieves a high resolution image.

(2) Small size

The small SDR connector is adapted for digital output which realizes the small body with 44(W) x 44(H) x 41(D) mm.

(3) Remote control

- Electronic shutter speed (1/24 to 1/50000 second in 8 steps, or variable)

- Selectable frame rate

- Frame on demand (the image capture at desired timing using the external trigger signal)

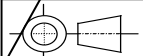
- Partial scan

Various settings, such as above can be controlled via Camera Link cable.

(4) PoCL/non-PoCL auto switchable

It is possible to supply power through the camera link cable from the power supply type frame grabber board. The power supply is also possible from the DCIN / SYNC connector, using conventional frame grabber board. If the power is supplied from both, power supply from the DCIN / SYNC connector is given priority.

-	Jan.15,2016	(first edition)	K.Kageshita	K.Kageshita
SYMBOL	DATE	DESCRIPTION	(DRAWN)	DESIGNED

MODEL KP-FM500WCL				TOLERANCE	Prod. Code - Order No.		
DESIGNED	DATE	APPROVED	DATE	UNIT	TITLE KP-FM500WCL Specifications	REV. 0	
CHECKED	DATE	STORED	DATE				SCALE
Hitachi Kokusai Electric							

3. Specifications

A	(1) Imaging device	2/3-inch global shutter CMOS	A
	Effective pixels	2448 (H) x 2048(V)	
	Pixel size	3.45 um (H) x 3.45 um (V) (square lattice)	
	(2) Sensing area	8.45 mm (H) x 7.07 mm (V)	
	(3) Scanning system	Progressive	
	(4) Frame rate	163 frames per second (full pixel readout)	
B	(5) Pixel frequency	74.25 MHz	B
	(6) Horizontal scanning frequency	Full configuration (High speed mode) (84.857143MHz): 342.165kHz	
		Full configuration (84.857143MHz): 303.061kHz	
		Full configuration (42.4285715MHz): 151.530kHz	
		Medium configuration (84.857143M MHz): 132.589kHz	
		Medium configuration (42.4285715MHz): 66.295kHz	
		Base configuration (84.857143M MHz): 101.020kHz	
Base configuration (42.4285715MHz): 50.510kHz			
C	(7) Vertical scanning frequency	Full configuration (High speed mode) (84.857143MHz): 163.403Hz	C
		Full configuration (84.857143MHz): 144.728Hz	
		Full configuration/8TAP (42.4285715MHz): 72.364Hz	
		Medium configuration (84.857143M MHz): 63.319Hz	
		Medium configuration (42.4285715MHz): 31.659Hz	
		Base configuration (84.857143M MHz): 48.243Hz	
		Base configuration (42.4285715MHz): 24.121Hz	
D	(8) Sync system	Internal	D
	(9) Lens mount	C mount	
	(10) Flange focal distance	17.526 mm	
	(11) Video output	Digital output (Camera Link)	
		Base configuration: 3TAP (84.857143MHz or 42.4285715MHz) Medium configuration 4TAP (84.857143MHz or 42.4285715MHz) Full configuration 10TAP (84.857143MHz or 42.4285715MHz) Output image size: 2448(H) x 2048(V) (full pixel readout)	
E	(12) Resolution	Horizontal/Vertical: 2000TV lines	E
	(13) Sensitivity	400 lx, F8, 3200 K	
	(14) Signal noise to ratio	50 dB	
	(15) Electric shutter	OFF, 1/24, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/10000, 1/50000 second.	
		OFF is normal exposure (frame rate) or adjustable by variable shutter mode	
F			F

	1	2	3	4	
A	(16) Gamma		OFF ($\gamma = 1$) / ON (The factory setting is OFF.) Gamma curve is selectable in 256 steps.		
	(17) Knee		OFF / ON (The factory setting is OFF.) 1. Knee point Selectable between 0 and 32 step (75.0% to 100.00%) (The factory setting is 0.) 0 is the lower level for the start point of knee, 32 goes to higher level. 2. Knee slope Selectable between 0 and 159 step (37.50% to 100.00%) (The factory setting is 0.) 0 is the higher effects for knee, 159 goes to the lower effects.		
B	(18) Sharpness		OFF/ON (The factory setting is 0.) The correction level is selectable in 256 steps.		
	(19) Frame on demand		(A) Fixed shutter mode (8 steps or variable) (B) ONE trigger mode		
C	Mode		Camera Link (CC1) or DCIN/SYNC connector		
	Trigger input		Selectable the start position and the width of picture grabbing in 1H step.		
D	(20) Partial scan		DC12V \pm 1V		
	(21) Power supply voltage		Approx. 320 mA (Approx. 3.8W)		
	(22) Power consumption	Performance	0 to +40°C (+32 to +104 F), less than 90 % RH		
	(23) Ambient	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)		
E	(24) Vibration endurance		10 to 55 Hz (2.37 to 71.7 m/s ²), sweep: 1 min XYZ 30min		
	(25) Shock endurance		490.3 m/s ² (once each top, bottom, left and right)		
	(26) External dimensions		44 (W) x 44 (H) x 41 (D) mm (Not including protrusions)		
	(27) Mass		Approx. 130 g		
	(28) Remote control	(a) Communication system	Control system	Start-stop synchronization system	
			Transmission rate	115200 bps	
F			Data length	8 bits	
			Start bit	1bit	
			Stop bit	1bit	
			Parity	None	
		Bit transfer	LSB first		
			DWG. No. E400530276	SHEET 3 / 11	
	1	2	3	4 DF022-4PE-S1	

(b) Communications control system

Full control by remote control software, data send/receive by text data transfer to camera microprocessor (BSC system handshake)

(c) Control items

- | | | | |
|---|---|--|---|
| A | 1. Shutter speed | OFF, 1/24, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/10000, 1/50000 second (Factory setting: OFF) | A |
| | 2. Variable shutter | | |
| | 3. Mode | OFF, Fixed shutter, One trigger (Factory setting: OFF) | |
| B | 4. Vertical sub sampling | OFF(x1) / x2 Factory setting: OFF | B |
| | 5. Gain | 0dB to 18 dB
Factory setting: 0dB | |
| | 6. Partial scan | Selectable the start position and the width of picture grabbing in 1H step. (Factory setting: OFF) | |
| | 7. Offset level | 0/255 to 127/255
Factory setting: 0/255 | |
| C | 8. Trigger pulse polarity | POS/NEGA
Factory setting: POS | C |
| | 9. Configuration | Base / Medium / Full
Factory setting: Base | |
| | 10. Camera Link clock | 42.4285715MHz / 84.857143MHz
Factory setting: 84.857143MHz | |
| D | 11. Image inversion output (Left / Right / Up / Down) | OFF / Left & Right / Up & Down / Left & Right & Up & Down
Factory setting: OFF | D |
| | 12. Trigger input | Camera Link (CC1) or DCIN/SYNC connector
Factory setting: CC1 | |
| | 13. Output signal | OFF, FLASH OUT, VD OUT
Factory setting: OFF | |
| | 14. Test pattern | OFF / H-LAMP / V-LAMP / HV-LAMP
Factory setting: OFF | |
| E | 15. Gamma | ON/OFF
Factory setting: OFF | E |
| | 16. Knee | ON/OFF
Factory setting: OFF | |
| | 17. Sharpness | ON/OFF
Factory setting: OFF | |
| F | 18. Factory reset | Return to the factory settings. | F |

4. Composition

- (1) Camera (with AR coated Dummy glass)
- (2) Warranty card

5. Optional accessories

- (1) AC adaptor JC-100 (Junction box integrated)
In case the power is supplied via DCIN / SYNC connector.
UD-240A, UD-M1 (with 12-pin connector)

- (2) Junction box JU-F30
- (3) 12pin plug HR10A-10P-12S(01)
- (4) Dummy glass (AR coated) ARC1214
- (5) IR cut filter IRC650
- (6) Tripod adaptor TA-FM200

(7) Camera cable (12-pin cable)

	Molded type	Shield type
2 m	C-201KSM	C-201KSS
5 m	C-501KSM	C-501KSS
10 m	C-102KSM	C-102KSS

In the CE Marking region, use the shield type and install clamp filter (ZCAT2035-0930A: TDK) at both ends of the cable.

(8) Digital out cable (Camera Link cable)

Cable length	Model name	
	SDR-SDR type	SDR-MDR type
1m	C-101PCL (SS)	C-101PCL (SM)
2m	C-201PCL (SS)	C-201PCL (SM)
3m	C-301PCL (SS)	C-301PCL (SM)
5m	C-501PCL (SS)	C-501PCL (SM)

SDR: Shrunk Delta Ribbon

MDR: Miniature Delta Ribbon

(Note) In case of Full configuration, please use Full configuration compatible cable.

6. Signal connection to connector

A

(1) Signal connection of DCIN/SYNC connector

PIN No.	Signal	PIN No.	Signal
1	GND	7	Trigger IN
2	N.U. (PoCL)	8	GND
	+12V (non PoCL)		
3	GND	9	N.U.
4	N.U.	10	FLASH OUT / VD OUT
5	GND	11	N.U.
6	N.U.	12	GND

N.U.: Not Used

Plug (matching cable plug) Hirose HR10A-10P-12S(01) or equivalent

(Note) Please do not unplug and insert cable (camera cable) with a power supplied to a camera.

In the CE marking region, please install clamp filter (ZCAT 2035-0930A: TDK) at both ends (camera and video processor ends).

B

C

D

E

F

A

B

C

D

E

F

(2) Signal connection of DIGITAL OUT connector

D.OUT 1

Pin No.	Signal	Pin No.	Signal
1	+12V(PoCL)	14	GND
	GND(non-PoCL)		
2	TXOUT 0 (-)	15	TXOUT 0 (+)
3	TXOUT 1 (-)	16	TXOUT 1 (+)
4	TXOUT 2 (-)	17	TXOUT 2 (+)
5	TXCLKOUT (-)	18	TXCLKOUT (+)
6	TXOUT 3 (-)	19	TXOUT 3 (+)
7	RX (+) [SERTC (+)]	20	RX (-) [SERTC (-)]
8	TX (-) [SERTFG (-)]	21	TX (+) [SERTFG (+)]
9	TRIG (-) [CC1 (-)]	22	TRIG (+) [CC1 (+)]
10	N.U. [CC2 (+)]	23	N.U. [CC2 (-)]
11	N.U. [CC3 (-)]	24	N.U. [CC3 (+)]
12	N.U. [CC4 (+)]	25	N.U. [CC4 (-)]
13	GND	26	+12V(PoCL)
			GND(non-PoCL)

D.OUT 1

Pin No.	Signal	Pin No.	Signal
1	+12V(PoCL)	14	GND
	GND(non-PoCL)		
2	TYOUT 0 (-)	15	TYOUT 0 (+)
3	TYOUT 1 (-)	16	TYOUT 1 (+)
4	TYOUT 2 (-)	17	TYOUT 2 (+)
5	TYCLKOUT (-)	18	TYCLKOUT (+)
6	TYOUT 3 (-)	19	TYOUT 3 (+)
7	100Ω (+)	20	100Ω (-)
8	TZOUT 0 (-)	21	TZOUT 0 (+)
9	TZOUT 1 (-)	22	TZOUT 1 (+)
10	TZOUT 2 (-)	23	TZOUT 2 (+)
11	TZCLKOUT (-)	24	TZCLKOUT (+)
12	TZOUT 3 (-)	25	TZOUT 3 (+)
13	GND	26	+12V(PoCL)
			GND(non-PoCL)

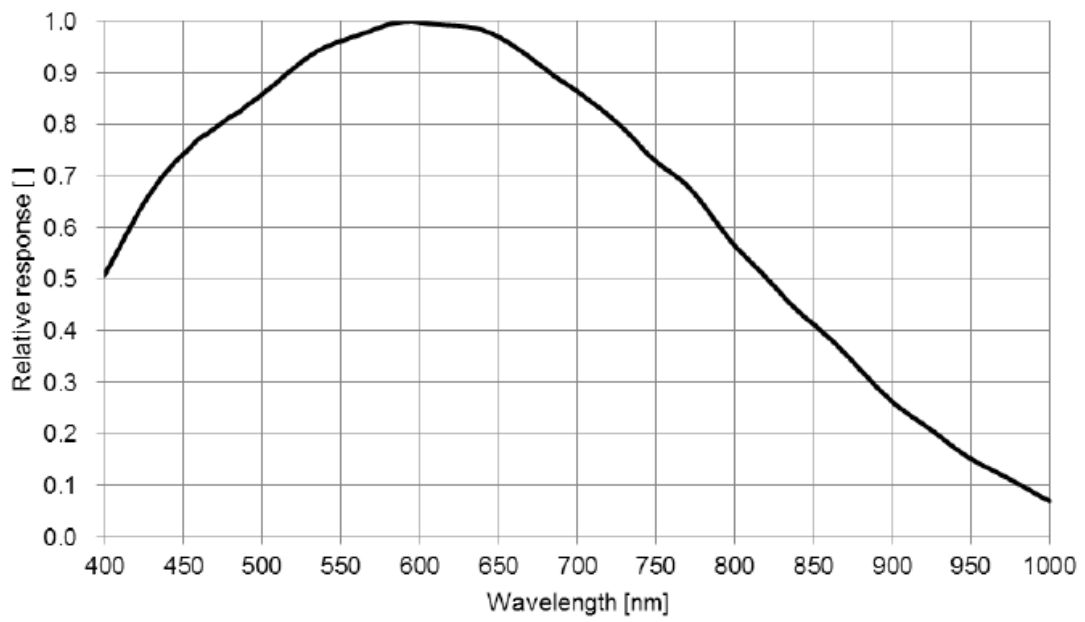
N.U. : Not used

Connector (camera side): SDR connector (Sumitomo 3M) or equivalent

- The digital out cable should be comprised of a twisted pair of wires having 100 ohm characteristic impedance and an outer sheath shield type conductor.
- Connect the shield (ground) of the digital out cable to the ground terminal of the video equipment, frame grabber, etc.
- Install clamp filter (ZCAT2035-0930A: TDK) at both ends (camera and video processor ends) in the CE marking region.
- TX: Transmit data from camera to machine
- RX: Transmit data from machine to camera

(Note) Please do not unplug and insert cable (digital out cable) with a power supplied to the camera.

7. Spectral response



8. External view

A

B

C

D

E

F

A

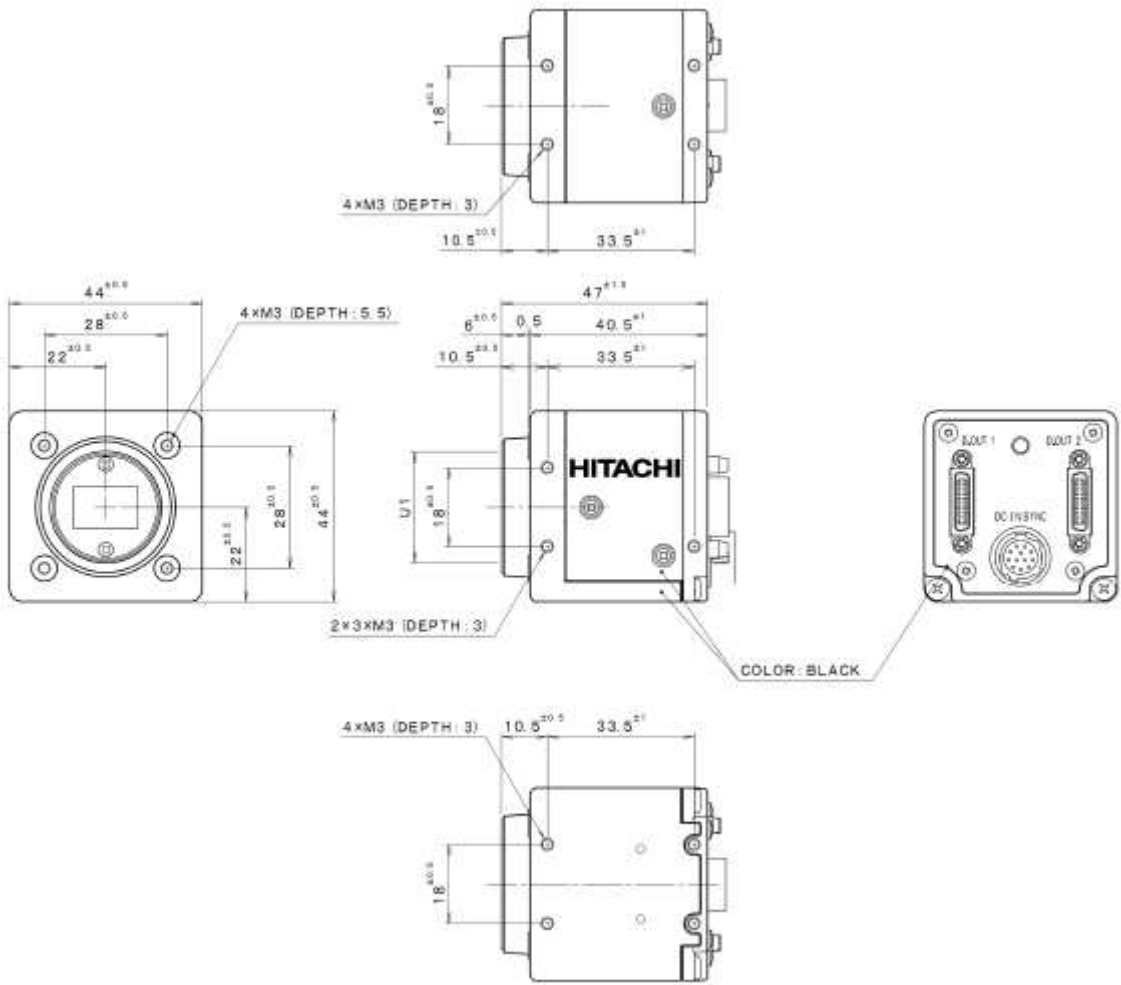
B

C

D

E

F



Notice:

These specifications are subject to change without prior notice due to product improvement.

Confirm the most recent specifications at time of order.

Hitachi Kokusai certifies this product complies with the standard warranty conditions of Hitachi Kokusai, and that quality control is implemented to the extent required to comply with these conditions.

RoHS Compliant

This product complies with the requirement of the RoHS(Restriction of the use of Certain Hazardous Substances in Electrical and Electronic Equipment) Directive 2002/95/EC

Warranty and service:

- (1) The guarantee period is one year after the data purchase.
However, the defects due to erroneous use or intentional act are excluded.
- (2) As the defect after expiration of the guarantee period, where product repair is possible, repair will be performed at charge.
- (3) The present Warranty pertains only to the camera unit. Secondary malfunctions attributable to camera failure as well as expenses incurred by disassembly and reassembly of the related system, are beyond the scope of this Warranty.
- (4) Compensation for loss of business, loss or damage to software, database and other contingent losses are beyond the scope of this Warranty.
- (5) Hitachi Kokusai Electric Inc. is not liable for the losses caused when the equipment is used in a system, use for business trades, production process, medical fields, crime prevention applications, etc.
- (6) In the case of camera trouble by miss wiring of cable, it will be considered as out of warranty.

