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SONY

CCD VISION CAMERA MODULE

# XC-75 series
# XC-73 series

## Component/OEM



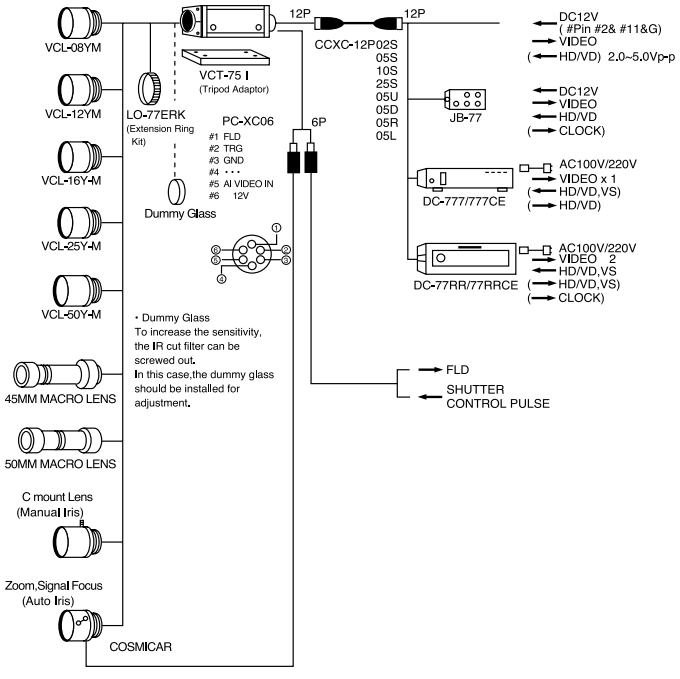

## OUTLINE

**The XC-75/73 series of monochrome camera module has been designed to be a more compact and versatile version of the widely used XC-77 for machine vision application. The XC-75/73 has an asynchronous trigger shutter function (S-DONPISHA)that allows fast moving objects to be captured upon the application of an external signal. The XC-75/73 series has been made even more versatile by the introduction of the L-type frame. This enables installation systems where space is a premiun without using a mirror.**

## FEATURES

- **XC-75/75L/75CE : 1/2" IT Hyper HAD CCD**
- **XC-73/73L/73CE : 1/3" IT Hyper HAD CCD**
- **High resolution**
  **Horizontal resolution 570TV lines/560TV lines**
- **Compact and lightweight**
- **2 : 1 Interlaced/Non-Interlaced**
- **Frame/Field exposure**
- **High sensitivity 400 lx, F4**
- **High S/N ratio 56dB/54dB**
- **Electronic shutter function (8steps 1/125~1/10,000sec.)**
- **External trigger shutter (S-DONPISHA) function**
- **HD/VD, VS external sync.**
- **Restart • Reset function**
- **Compatible with XC-77/77CE**

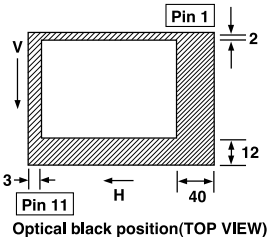
## CONNECTIONS




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# CCD OUTPUT WAVE TIMING CHART

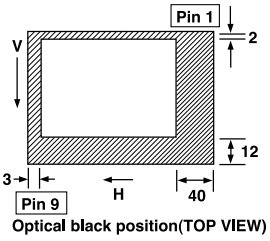
## XC-75/75L/75CE



Optical black position(TOP VIEW)

| | XC-75/75L | XC-75CE |
|---|---|---|
| Optical size | 1/2-inch format | |
| Effective picture elements | 768(H) x 494(V) | 752(H) x 582(V) |
| Total number of pixels | 811(H) x 508(V) | 795(H) x 596(V) |
| Chip size | 7.95mm(H) x 6.45mm(V) | |
| Unit cell size | 8.4µm(H) x 9.8µm(V) | 8.6µm(H) x 8.3µm(V) |

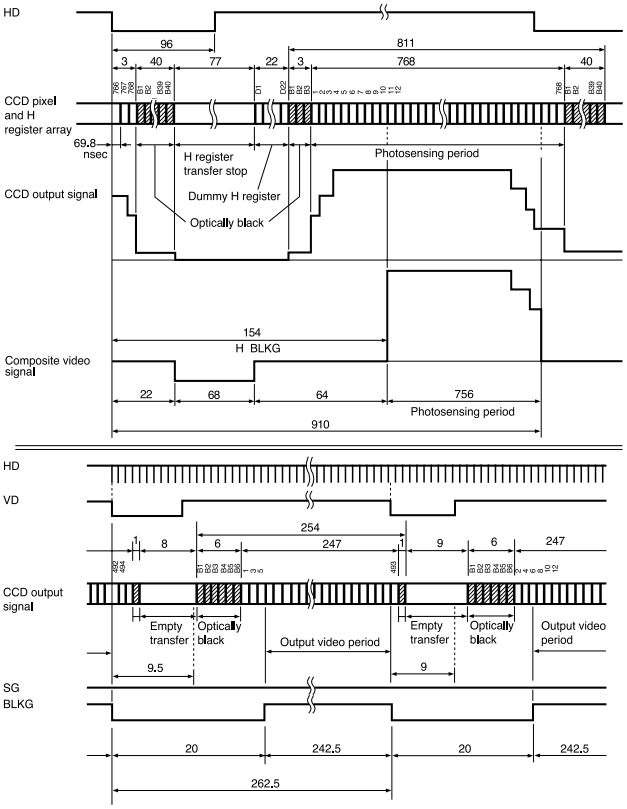
## XC-73/73L/73CE



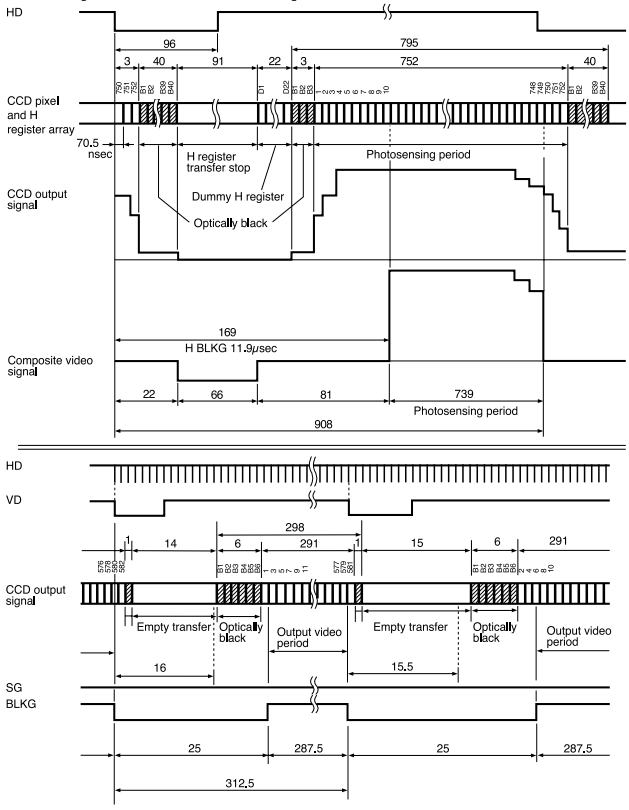
Optical black position(TOP VIEW)

| | XC-73/73L | XC-73CE |
|---|---|---|
| Optical size | 1/3-inch format | |
| Effective picture elements | 768(H) x 494(V) | 752(H) x 582(V) |
| Total number of pixels | 811(H) x 508(V) | 795(H) x 596(V) |
| Chip size | 6.00mm(H) x 4.96mm(V) | |
| Unit cell size | 6.35µm(H) x 7.4µm(V) | 6.5µm(H) x 6.25µm(V) |

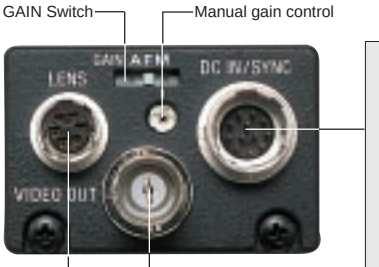
## EIA(XC-75/75L/73/73L)




## CCIR(XC-75CE/73CE)

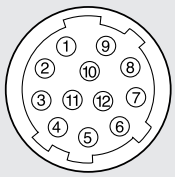



# REAR SWITCHES & CONNCTORS



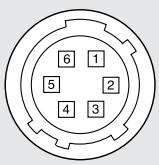
*VIDEO OUT connector

12Pin Multiconnector
(External view)




| Pin No. | EXTERNAL SYNC MODE | | | CAMERA SYNCRONOUS OUTPUT |
|---|---|---|---|---|
| | HD/VD | VS | RESTART RESET | |
| 1 | GND | GND | GND | GND |
| 2 | DC+12V | DC+12V | DC+12V | DC+12V |
| 3 | VIDEO OUTPUT(GND) | VIDEO OUTPUT(GND) | VIDEO OUTPUT(GND) | VIDEO OUTPUT(GND) |
| 4 | VIDEO OUTPUT(SIGNAL) | VIDEO OUTPUT(SIGNAL) | VIDEO OUTPUT(SIGNAL) | VIDEO OUTPUT(SIGNAL) |
| 5 | HD INPUT(GND) | —— | HD INPUT(GND) | HD OUTPUT(GND) |
| 6 | HD INPUT(SIGNAL) | —— | HD INPUT(SIGNAL) | HD OUTPUT(SIGNAL) |
| 7 | VD INPUT(SIGNAL) | VS INPUT(SIGNAL) | RESET PULSE(SIGNAL) | VD OUTPUT(SIGNAL) |
| 8 | —— | —— | —— | CLOCK OUTPUT(GND) |
| 9 | —— | —— | —— | CLOCK OUTPUT(SIGNAL) |
| 10 | GND | GND | GND | GND |
| 11 | DC+12V | DC+12V | DC+12V | DC+12V |
| 12 | VD INPUT(GND) | VS INPUT(GND) | RESET PULSE(GND) | VD OUTPUT(GND) |

6Pin Lens connector(External view)




| Pin No. | SIGNAL | SPECIFICATION |
|---|---|---|
| 1 | FLD OUT | FLD OUT |
| 2 | TRIGGER | TTL level |
| 3 | GND | GND |
| 4 | NC | NC |
| 5 | VS OUT | VIDEO SIGNAL OUTPUT |
| 6 | +12 OUT | DC+12 OUT |

* When the pin No.4 of the 12Pin connector is not terminated with 75 Ω impedance, you can only use this connector for video signal output.

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# OPERATION MODE SETTING

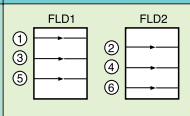
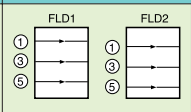
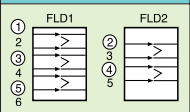
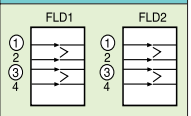
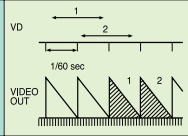
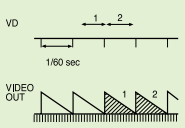
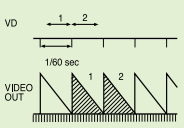
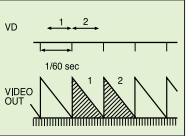
## ●REAR PANEL

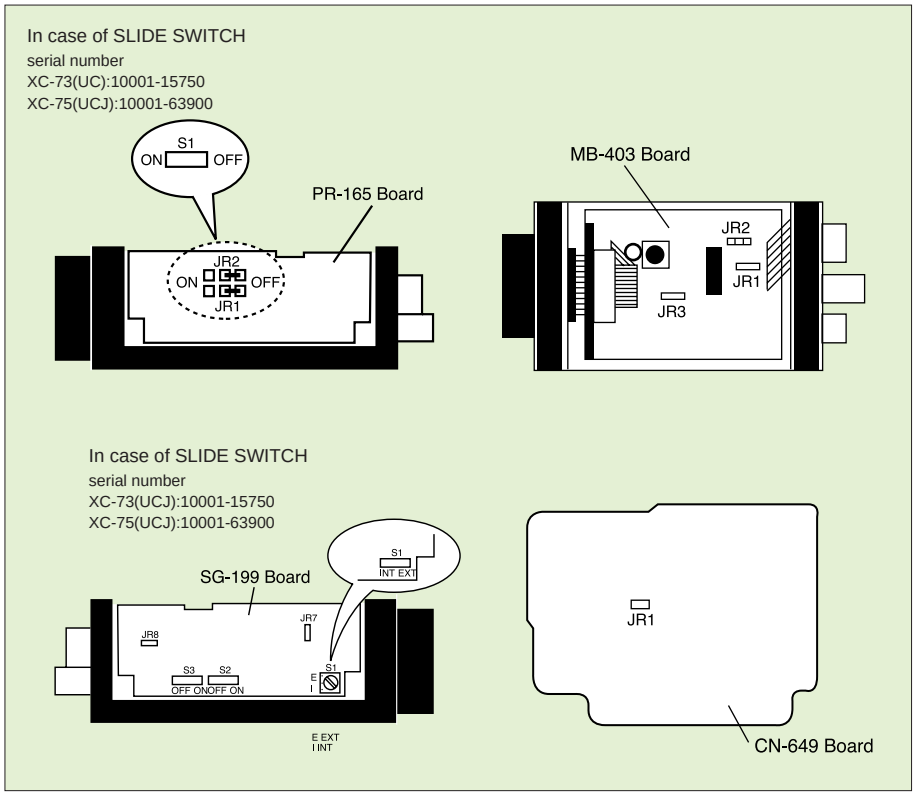
| Item | Location | Setting | Factory-setting mode |
|---|---|---|---|
| GAIN mode(*1) | Rear Panel | SLIDE SW | F(0dB) |
| MAN.gain control | Rear Panel | VOLUME | 0dB |

## ●INTERNAL of CAMERA

| Item | Location | Setting | Factory-setting mode |
|---|---|---|---|
| γ correction mod(*2) | PR-165 board | JR1,JR2 | OFF |
| Normal shutter | MB-403 board | SW S1 | 0(OFF) |
| S-DONPISHA | MB-403 board | JR1 | OPEN(OFF) |
| Trigger setting | MB-403 board | JR2 | OPEN(OFF) |
| Charge accumulation mode(*3) | MB-403 board | JR3 | OPEN(FRAME) |
| Sync signal input/output(*4)<br>EXT/INT-HD/VD | SG-199 board | SW S1 | E(INPUT) |
| EXTHD75 Ω termination(*5) | SG-199 board | SW S2 | ON |
| EXTVD75 Ω termination | SG-199 board | SW S3 | ON |
| RESTART • RESET mode | SG-199 board | JR7,JR8 | SHORT(OFF) |
| Clock signal output(*6) | CN-649 board | JR1 | OPEN |

## ●Comparison with FRAME and FIELD accumlation

| Read out mode setting | | Frame integration mode | | Field integration mode | |
|---|---|---|---|---|---|
| Scanning mode | | Interlace | Non-Interlace | Interlace | Non-Interlace |
| Scanning | NORMAL MODE |  |  |  |  |
| | INVERSE MODE | FLD 1 and FLD 2 are inverted. | FLD 1 and FLD 2 become ② ④ ⑥... | FLD 1 and FLD 2 are inverted. | FLD 1 and FLD 2 become ② ④ ⑥... |
| Storage time and VIDEO OUT correlation | |  |  |  |  |
| Vertical effective lines(TV lines) | EIA | 492 | 242 | 350 | 242 |
| | CCIR | 582 | 291 | 410 | 291 |




(*1)● GAIN mode: "A"(AGC) is automatically adjusted to the proper level between 0 and 18 dB according to the brightness of a subject. "F" (fixed) is fixed to 0 dB. "M"(manual) can be adjusted between 0 and 18 dB when no proper illuminance can be obtained. Recommend the use of "F" or "M" for image processing.

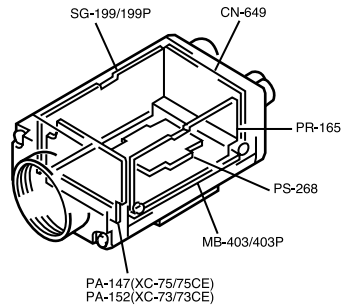
(*2)● γ correction mode: Set this mode to OFF if accurate video information for image processing is required. If the γ correction mode is set to ON, the display on the monitor screen is correct. The γ correction value at that time is approximately 0.45.

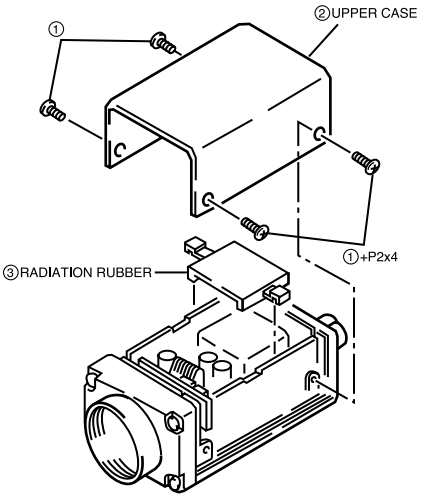
(*3)● Charge storage mode: For frame storage, a still subject can be shot by high resolution (H/V).For field storage, an image can be shot in units of fields.
The field storage is thus suitable for a moving subject.

(*4)● Sync signal input/output: The camera is automatically detects when an external sync signal is input to the camera during factory setting.
To output a sync signal from the camera, set to "1" (output).

(*5)● 75 Ω termination: This switch is set to ON at the factory. Notice that some user systems may not be able to be connected unless this switch is set to high impedance. This switch is set to high impedance when the factory setting is changed from ON to OFF.

(*6)● Clock output mode: A horizontal drive frequency of the CCD can be output in the clock output mode. Short-circuit JR1 when an accurate data exchange is required between an image processing system and this mode.

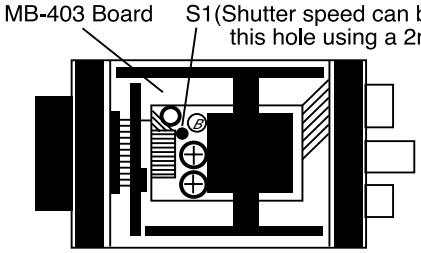


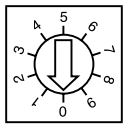




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## SHUTTER FUNCTIONS (NORMAL SHUTTER)

**The electronic shutter mode continuously capture clear images of fast moving objects. The shutter speed is set using a rotary switch (S1) on the MB-403 board. It is recommended to use of field accumulation mode to improve sensitivity.**




Switch S1
MB-403 board
Factory setting

| Position | Shutter speed |
|---|---|
| 0 | OFF |
| 1 | 1/125 |
| 2 | 1/250 |
| 3 | 1/500 |
| 4 | 1/1000 |
| 5 | 1/2000 |
| 6 | 1/4000 |
| 7 | 1/10000 |
| 8 | Flicker-less mode* |
| 9 | Flicker-less mode* |

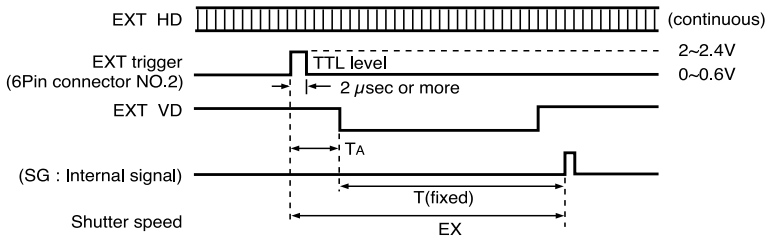
* The flicker-less mode can be set when the rotary code switch is set to position 8 or 9. In positions 8 and 9, the shutter speed is 1/100sec for EIA, and 1/120 sec for CCIR.

Confirmation of Electronic Shutter OFF Position while Monitoring
Å@Condition:Fix the lens iris.
Turn the rotary switch S1 on the MB-403 board clockwise and stop it when the image is brightest on the monitor. This detect position is the Shutter OFF position.

## SHUTTER FUNCTIONS (TRIGGER SHUTTER S-DONPISHA)

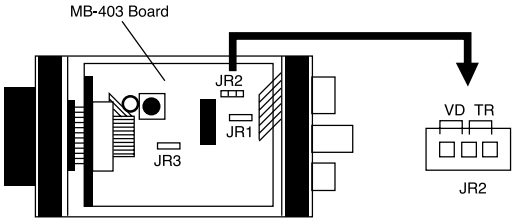
**A fast moving object can be captured precisely by an external trigger input. In addition to the trigger input, a continuous EXT HD signal and one VD pulse are required when this mode is set. It is necessary to change the mode internal setting of camera.**

**Internal setting of camera SG-199 board JR7, JR8 → open(same as Restart • Reset mode)**
**MB-403 board JR1 → short, JR2 → short (TR), JR3 → short**




T : XC-75,75L,73,73L(9H/8.5H 42.2μ
XC-75CE,73CE(14.5H/14H 43.3μsec)

**An accurate shutter speed with high repeatability can be obtained by synchronizing trigger and HD pulses.**



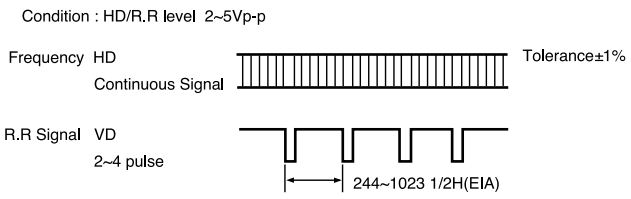

EX:The shutter speed can be controlled by trigger and VD pulses.
The exposure time: EX=TA(variable)+T(fixed)

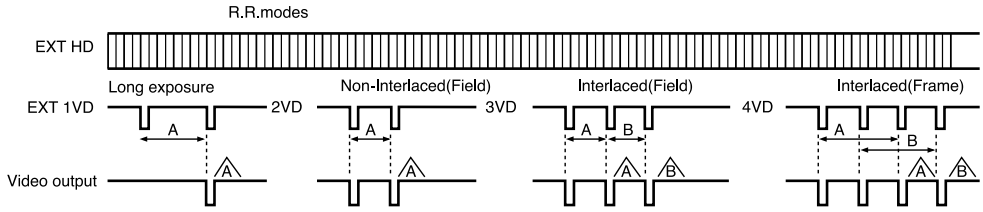
shutter speed XC-75, 73, 75L, 73L 1/100~1/1,600 sec.
XC-75CE, 73CE 1/80~1/1,500 sec.

## RESTART•ERESET

In the external sync mode, the information corresponding to one screen can be captured randomly.

Internal setting of camera JR7 and J8 on SG-199 board → open
An external sync signal is required when this mode is set. The external sync signal can be output when a continuous HD signal is added to pin 6 (HD signal) of a 12-pin connector and when an RR signal is added to pin 7 (VD signal).




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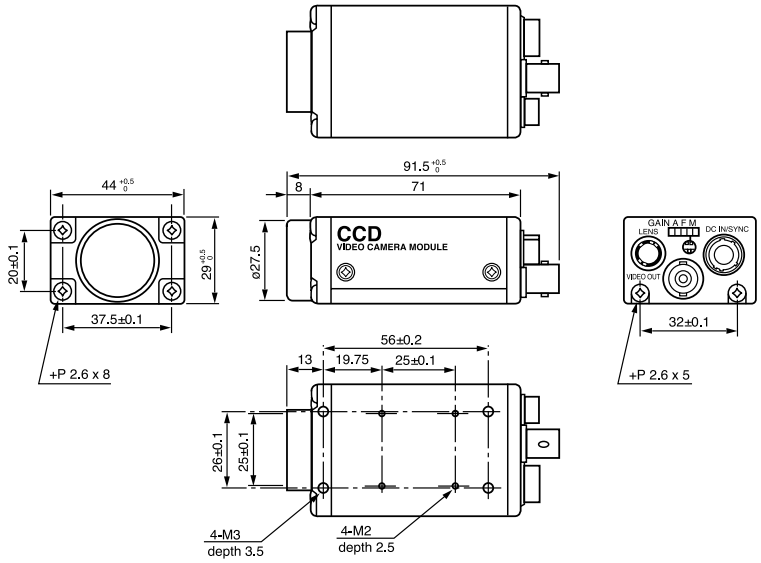
## DIMENSIONS

unit : mm

- **XC-75/75CE**
- **XC-73/73CE**



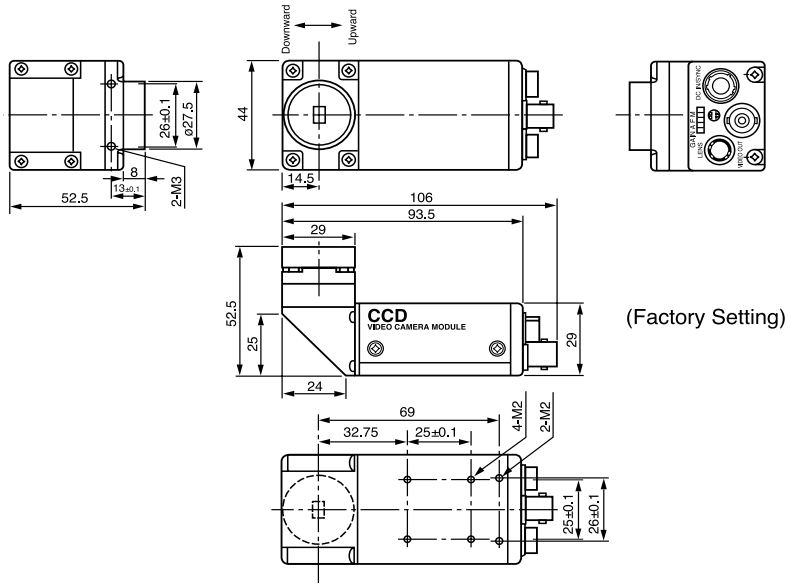
44(W) x 29(H) x 71(D)mm
140g




- **XC-75L**
- **XC-73L**



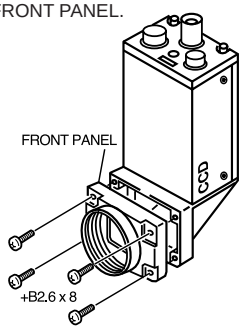
44(W) x 29(H) x 93.5(D)mm
180g



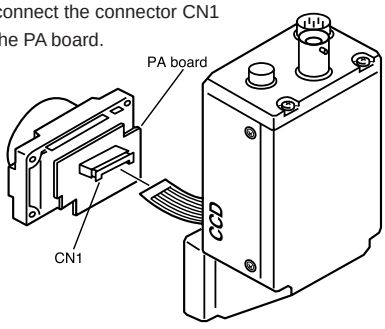

(Factory Setting)

## PROCEDURE TO CHANGE THE DIRECTION OF THE OPTICAL LENS PART(only XC-75L/73L)

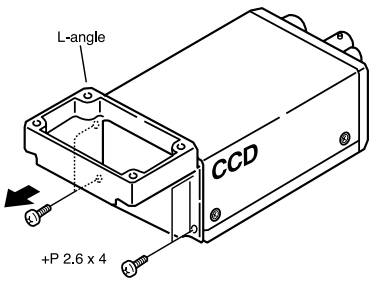
1.Remove the FRONT PANEL.



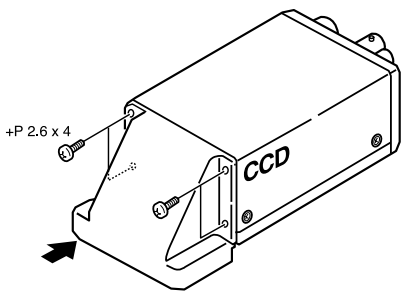

2.Disconnect the connector CN1 on the PA board.



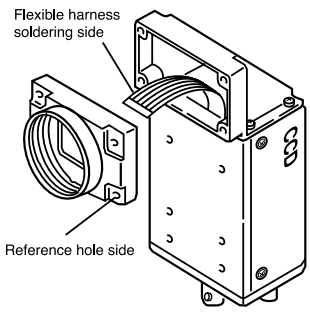

3.Remove the L-angle.



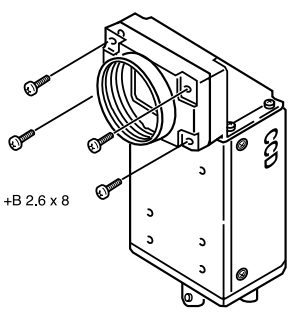

4.Turn the L-angle upside down,and assemble.




5.Connect the flexible harness to CN1 on the PA board.
Be sure to confirm the direction of FRONT PANEL.




6.Assemble the FRONT PANEL.



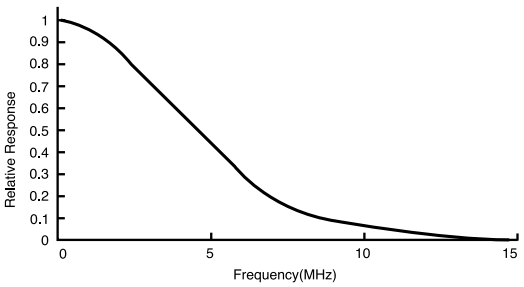

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## SPECIFICATIONS

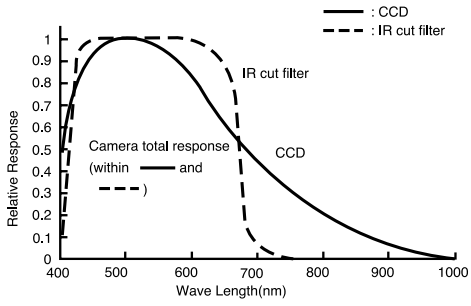
| | XC-75/75L/73/73L | XC-75CE/73CE |
|---|---|---|
| **Pick up device** | Interline transfer Hyper HAD CCD | |
| **Effective picture elements** | 768(H) x 494(V) | 752(H) x 582(V) |
| **CCD horizontal frequency** | 14.318MHz | 14.1875MHz |
| **Signal system** | EIA | CCIR |
| **Lens mount** | C mount | |
| **Flange back** | 17.526mm±0.05 | |
| **Horizontal frequency** | 15.734KHz | 15.625KHz |
| **Vertical frequency** | 59.94Hz | 50Hz |
| **Sync System** | Internal/External(auto) | |
| **External sync system** | HD/VD(2~5Vp-p), S, VS(SYNC: $0.3^{+0.3}_{-0.15}$Vp-p) | |
| **External sync frequency** | Horizontal sync frequency±1% | |
| **Jitter** | less than±50n sec. | |
| **Scanning system** | 525 lines 2:1Interlaced/Non-Interlaced | 625 lines 2:1Interlaced/Non-Interlaced |
| **Video output** | 1.0Vp-p, negative, 75Ω unbalanced | |
| **Horizontal resolution** | 570 TV lines | 560 TV lines |
| **Sensitivity** | 400 lx F4(γ compensation ON, 0dB) | |
| **Minimum illumination** | 3.0 lx(AGC, F1.4, γ compensation ON)(with IR cut filter)/approx. 0.5 lx(without IR cut filter) | |
| **S/N ratio** | 56dB | 54dB |
| **Gain** | AGC(O~18dB)/ FIX(0dB)/Manual(0~18dB) | |
| **Gamma** | γ : ON(γ =0.45)/OFF(γ =1) (Internal switch selection) | |
| **Normal shutter** | FL, 1/125, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/10,000 sec. | |
| **Trigger shutter (S-DONPISHA)** | 1/100~1/1,600 sec. | 1/80~1/1,500 sec. |
| **Power requirements** | DC+12V(+10.5~15V) | |
| **Power consumptions** | XC-75, 75L, 75CE:1.6W /XC-73, 73L, 73CE:1.4W | |
| **Weight** | XC-75, 75CE, 73, 73CE:140g /XC-75L, 73L:180g | |
| **Operating temp./mois.** | -5~+45˚C/20~80% | |
| **Storage temp./mois.** | -25~+60˚C/20~95% | |
| **Vibration resistance** | 7G(11~200Hz XYZ directions) | |
| **Shock resistance** | 70G | |
| **MTBF** | 123,900Hrs | |
| **Regulations** | UL1409, FCC Class A Digital Device,CE(EN50081-1+EN50082-1(excluding XC-75L/73L)) | |
| **Supplied accessories** | Lens mount cap(1), Operating instructions(1) | |

## CHARACTERISTICS

### ●Total MTF Response(typical value)




### ●Spectral Response(typical value)





| | | | |
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