

**INFRARED-CCD VIDEO CAMERA
C2400-79H
OPERATION MANUAL**

HAMAMATSU

55310-218

Thank you for purchasing the C2400-79H.

Before using your equipment, please read this manual carefully, to make sure you use your unit properly.

If you have any questions concerning the contents, please contact your nearest HAMAMATSU sales representative.

OVER VIEW

The C2400-79H is a compact, lightweight black and white CCD camera module with built-in 2/3-inch infrared CCD chip.

It has many functions like electrical shutter, gain control, external synchronization, variable integration as standard.

And it is suitable for image-sensor not only for industrial applications.

But also for surveillance thanks to high near infrared sensitivity of the camera.

Main features are no distortion, long life, no after image and as follows.

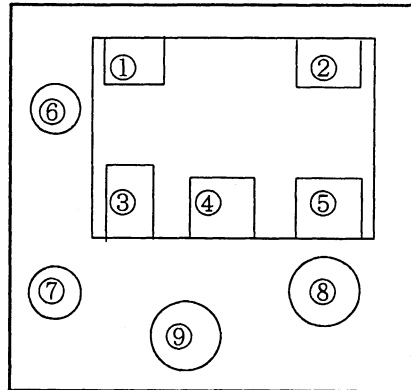
FEATURES

- High resolution 780(H) × 488(V)pixel.
- High sensitivity with 100% window ratio by frame-transfer CCD.
- Wide wavelength range, over 800nm near infrared high sensitivity.
- Non-interlace operation.
- Watch guard use AGC circuit.
- +18dB maximum gain adjustment.
- Electric shutter.
- Variable integration mode.

OPERATION PROCEDURE

When the above operations have been completed, use the following procedure to operate the equipment.

REAR PANEL



① Shutter speed control switch (SW1)

| SW No. | Shutter speed | SW No. | Shutter speed |
|--------|---------------|--------|---------------|
| 0 | 1/500 | 5 | 1/3000 |
| 1 | 1/750 | 6 | 1/4000 |
| 2 | 1/1000 | 7 | 1/8000 |
| 3 | 1/1500 | 8 | no use |
| 4 | 1/2000 | 9 | no use |

② External synchronization termination resistor select switch (SW4)

| | |
|--------|---------------|
| Left | 75 Ω |
| Center | 100K Ω |
| Right | 150 Ω |



L C R

③ Mode select switch (SW3)

| SW No. | Function | Operate |
|--------|---------------------------|-----------------------------|
| 1 | Shutter1 | Fig.1 |
| 2 | Shutter2 | Fig.2 |
| 3 | External synchronization | ON=External synchronization |
| 4 | External synchronization | ON=External synchronization |
| 5 | Interlace / Non-interlace | ON=Interlace |
| 6 | No use | |

Fig.1

| Shutter1 | Shutter2 | Mode |
|----------|----------|----------------------------------|
| OFF | OFF | Shutter OFF |
| ON | OFF | Continue shutter ※ 1 |
| ON | ON | Continue shutter ※ 2 |
| OFF | ON | V.I. (Variable Integration) mode |

※ 1 : V reset (External trigger input)

※ 2 : V non-reset (External trigger input)

④ Gain mode select switch (SW2)

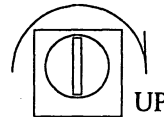
| | |
|--------|--------|
| Left | AGC |
| Center | FIX |
| Right | MANUAL |



L C R

⑤ GAIN VOLUME (VR1)

Gain mode select switch (SW2) is
" MANUAL " set only active.



⑥ DC IN Terminal

DC power supply from AC adaptor.

Connector spec : EIAJ RC-5320A (voltage level 4)

⑦ LENS Terminal

When plug of auto iris lens is connected, it is possible to adjust automatically iris of lens.

And also it is input terminal of shutter trigger.

| Pin No. | Input-output signal | Signal level |
|---------|---|----------------------------|
| 1 | Field index output | HC125 Level |
| 2 | Shutter trigger input V.I. command input | C-MOS Level C-MOS Level |
| 3 | GND | |
| 4 | SMOD Output | HC125 Level |
| 5 | Video output (for auto iris) | |
| 6 | DC+12V Output | |

Cable side connector : HR10A-7P-6P (HIROSE)

Caution : Pin5 is only for auto iris lens so don't use it for the other purpose.

⑧ DC IN / SYNC Terminal

This terminal is for power supply of DC+12V, for video output from camera module and for input / output of synchronization signal.

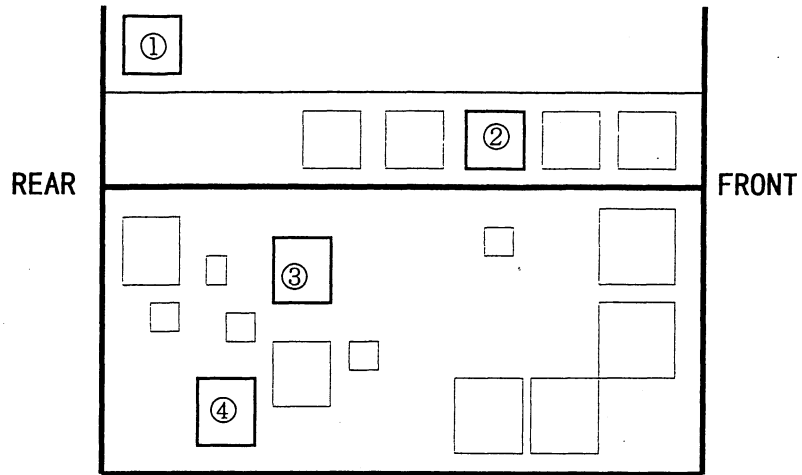
| Pin No. | Input-output signal | Signal level |
|---------|---|----------------------------|
| 1 | GND | |
| 2 | DC+12V | |
| 3 | Video output (Return) | |
| 4 | Video output (Signal) | |
| 5 | HD Input-output (Return) | |
| 6 | HD Input (Signal) HD Output (Signal) | HCT14 Level HC125 Level |
| 7 | VD Input (Signal) VD Output (Signal) | HCT14 Level HC125 Level |
| 8 | Option output (Return) | |
| 9 | Option output (Signal) | HC126 Level |
| 10 | GND | |
| 11 | DC+12V Output | |
| 12 | VD Input-output (Return) | |

Cable side connector : HR10A-10P-12S (HIROSE)

Caution : Last resistor (SW4) must be C (100K Ω) when output synchronization (HD / VD).

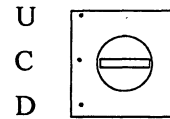
INTERNAL SWITCH

Remove the cover setup the switch.



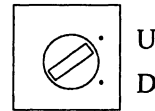
① Synchronization (HD / VD) input or output select switch. (SW1)

| | |
|--------|----------------|
| UP | HD / VD input |
| CENTER | no use |
| DOWN | HD / VD output |



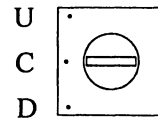
② Option output select switch. (S1)

| | |
|------|------------------------|
| UP | Shutter monitor output |
| DOWN | Pixel clock output |



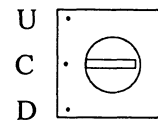
③ GAMMA select switch. (SW1)

| | |
|--------|----------------------|
| UP | $\gamma = 1$ (OFF) |
| CENTER | no use |
| DOWN | $\gamma = 0.45$ (ON) |



④ Output coupling type select switch. (SW4)

| | |
|--------|-------------|
| UP | DC coupling |
| CENTER | no use |
| DOWN | AC coupling |



SPECIFICATIONS

IMAGER

| | |
|-------------------|-------------------------------------|
| imaging device | : frame transfer CCD |
| effective pixel | : 754 × 484 (Horizontal / Vertical) |
| image area | : 2/3 inch |
| signal | : NTSC B / W |
| spectral response | : 400 to 1300 nm |

OPTICAL

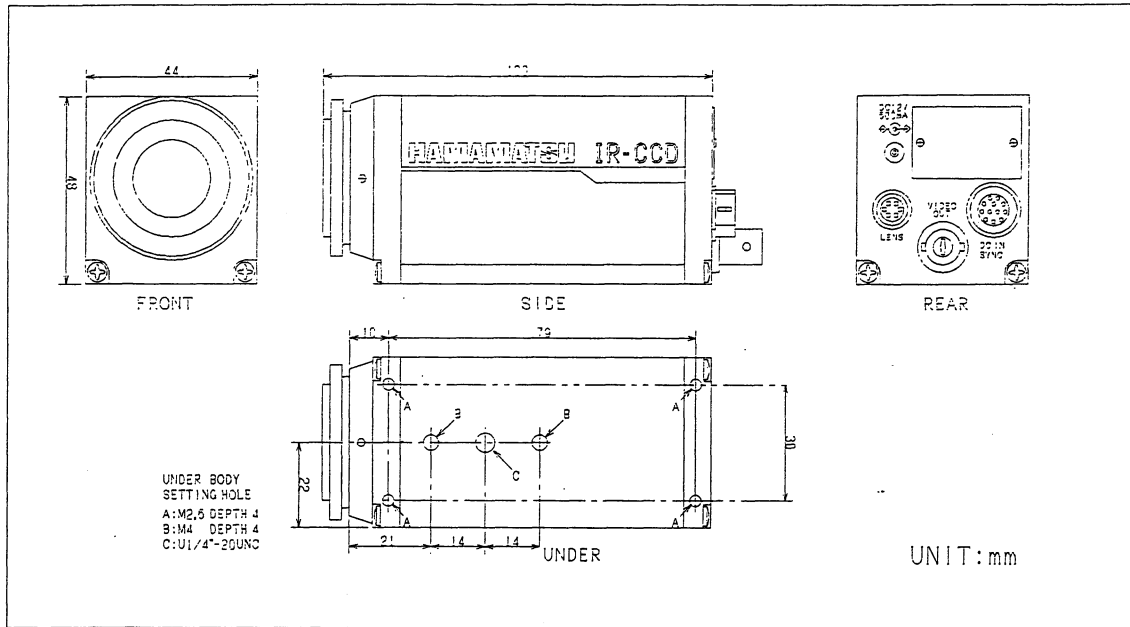
| | |
|-------------|----------------------|
| lens mount | : C-mount |
| flange back | : 19 mm (adjustable) |

OTHER

| | |
|---------------------------|--|
| method of synchronization | : internal / external |
| external synchronization | : HD / VD (input level = TTL) |
| jitter | : within ± 1 nsec. |
| scan method | : 2 : 1 interlace / non-interlace |
| horizontal resolution | : 570TV line |
| sensitivity | : 0.8 Lux (FIX gain) |
| minimum luminous | : 0.1 Lux (MANUAL gain) |
| S/N ratio | : 57dB minimum |
| GAMMA | : ON = 0.45 OFF = 1.0 |
| gain | : AGC (0 ~ 18dB) FIX (0dB) MANUAL (0 ~ 18dB) |
| shutter function | : shutter 1 (continue shutter) shutter 2 (random shutter) |
| shutter speed | : 1/500, 1/750, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/8000 |
| V.I.mode | : variable integration function (with external trigger) |
| power supply | : DC+12V (+10.5 ~ 15V) |
| power consumption | : 4.2W |
| operation temperature | : 0 ~ +40 °C |
| storage temperature | : -25 ~ +60 °C |
| operation humidity | : 20 ~ 80% (no condensation) |
| storage humidity | : 20 ~ 95% (no condensation) |
| shock & vibration | : 4.4G (11 ~ 100Hz) |
| outline dimension | : 44 (W) × 48 (H) × 112 (D) mm |
| weight | : 215 g |
| accessories | : focus ring cap (1) instruction manual (1) |

Sensitivity is measured by "OPT LINER K-1500V" supplied by Optical Instruments Corp (USA).

DIMENSIONAL OUTLINE



Adjustable focus ring ($\pm 2.0\text{mm}$)

OPTION

C-mount lens : A3591 (Infrared lens F1.8 f=25mm)

Infrared filter : A3592 (800 nm)
A3592-01 (700 nm)

Signal cable : A3581 (2 m BNC type)

TV monitor : PVM-96J (9inch NTSC resolution=900TVline)
PVM-96E (9inch CCIR resolution=900TVline)
PVM-146J (14inch NTSC resolution=1000TVline)
PVM-146E (14inch CCIR resolution=1000TVline)

Handgrip : A3594

Infrared illuminator : L5777 (LED type short distance illuminator)

WARRANTY

1. Warranty period

One year from the date of delivery.

However, this warranty is limited to repair or replacement of the pertinent parts.

2. Exceptions

The following shall be repaired for a charge even if they occur within the warranty period.

- Damage due to earthquake, lightning, typhoon, tidal wave, fire, and other disasters.
- If the user has made any modifications that affect the functions of the equipment.
- When the equipment was handled in a manner contrary to that described in the instruction manual.
- Accidents due to use in an adverse environment.
(high temperature and humidity, very low temperature, corrosive gas, vibration, shock, etc.)

3. Repair and inspection after expiration of warranty period.

Repairs and inspection shall be performed for a charge.

Please contact the Hamamatsu Sales Division or your Hamamatsu dealer.

When requesting repair or inspection, please provide the following information along with the equipment:

Your address

Your name

Your telephone number

Product name

Serial No.

Name of store where purchased

Date purchased

Description of problem (in as much detail as possible)