XC-ES50/ES50CE
XC-ES51/ES51CE
XC-ES30/ES30CE

*1 | 1/3 Type CCD | *2 | 1/2 Type CCD | C Lens Mount | VS Output | HD VD External Sync | Normal Shutter | Mode 1 (Non-Reset Mode) External Trigger Shutter

Mode 2 (Non-Reset Mode) External Trigger Shutter | Restart Reset | Long Exposure | Lead-Free Solder

*1 :XC-ES30/ES30CE
*2 :XC-ES50/ES50CE/ES51/ES51CE

Connection Diagram P58

Outline

The XC-ES series is a small-sized lightweight monochrome camera module designed as an input device for image processing, realized through the newest high-density packaging.
The downsized the main body allows to set the XC-ES series easily at the places where is difficult to set the existing devices

Features

■ XC-ES30/ES30CE :1/3 type IT CCD
■ XC-ES50/ES50CE :1/2 type IT CCD
■ XC-ES51/ES51CE :1/2 type IT CCD High sensitivity
■ External trigger shutter function
　XC-ES50/ES51/ES30 : 1/4 to 1/10,000 sec.
　XC-ES50CE/ES51CE/ES30CE : 1/4 to 1/8,000 sec.
■ Electronic shutter function
　XC-ES50/ES51/ES30 : 1/100 to 1/10.000 sec.
　XC-ES50CE/ES51CE/ES30CE : 1/120 to 1/10.000 sec.
■ High S/N ratio: 60 dB
■ 2:1 Interlaced/non-interlaced
■ Frame/field accumulation
■ Restart/reset function
■ Sync system: Internal/external (HD/VD)
■ High shock and vibration resistance

Accessories

■ Compact camera adaptor
　●DC-700/700CE
■ 12-pin camera cable (CE standard)
　●CCXC-12P02N (2 m)　　　●CCXC-12P05N (5 m)
　●CCXC-12P10N (10 m)　　　●CCXC-12P25N (25 m)
■ Tripod adaptor
　●VCT-333I
■ C-mount LENS
　●VCL-08YM　　　　　　　●VCL-12YM
　●VCL-16Y-M　　　　　　　●VCL-25Y-M
　●VCL-50Y-M

Dimensions

Camera body of all XC-E models
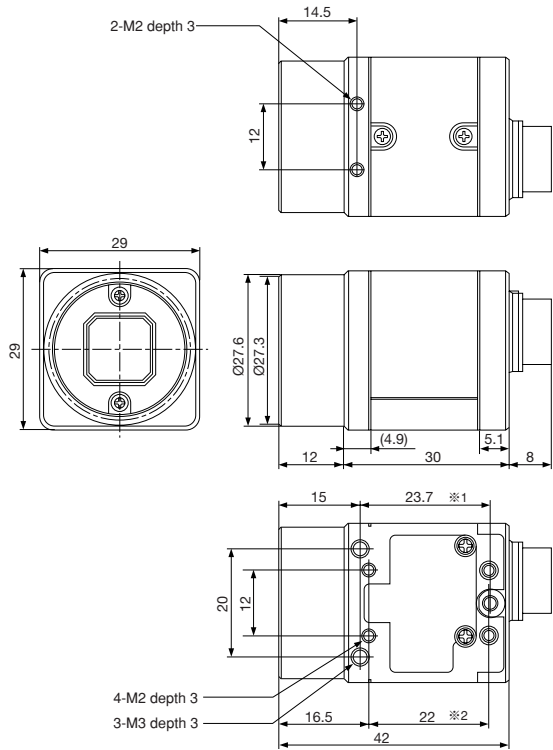
Unit: mm

*1: M3 screw size
*2: M2 screw size

Notice

From January 2005, the outside dimensions of XC-E series consoles will be changed to the same dimensions of XC-HR series consoles.
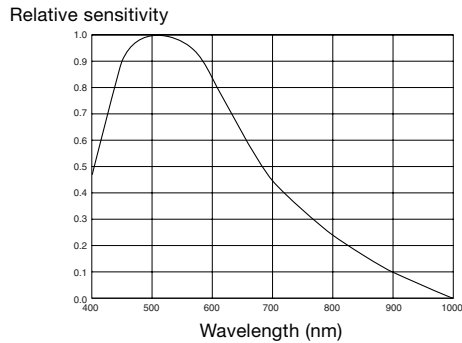For the new outside dimensions, see page 48.
The outside dimensions will be changed from the following serial numbers.
XC-ES50/XC-ES30: 250001〜
XC-ES50CE/ES30CE: 550001〜
XC-ES51:150001〜
XC-ES51CE:450001〜
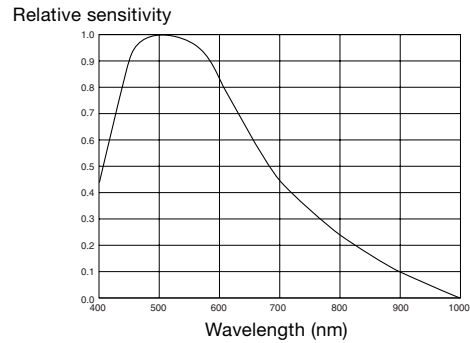
Spectral Sensitivity Characteristics
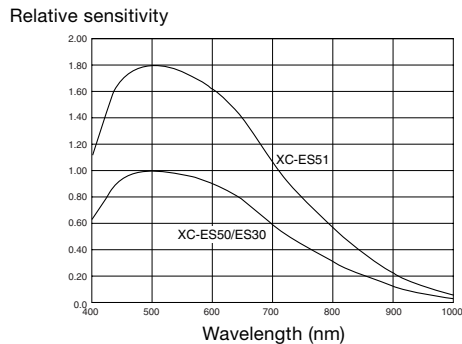
●XC-ES50/XC-ES51/XC-ES30

(Typical Values)

Relative sensitivity

Wavelength (nm)

●XC-ES50CE/XC-ES51CE/XC-ES30CE

(Typical Values)

Relative sensitivity

Wavelength (nm)

●XC-ES50, XC-ES51/XC-ES30

(Comparison sensitivity)

Relative sensitivity

XC-ES51

XC-ES50/ES30

Wavelength (nm)

●XC-ES50CE, XC-ES51CE/XC-ES30CE

(Comparison sensitivity)

Relative sensitivity

XC-ES51CE

XC-ES50CE/ES30CE

Wavelength (nm)
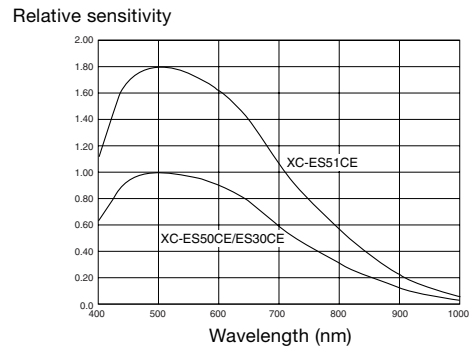
(Lens characteristics included, and light source characteristics excluded.)

Specifications

	XC-ES50	XC-ES51	XC-ES30	XC-ES50CE	XC-ES51CE	XC-ES30CE
Image device	1/2 type IT CCD		1/3 type IT CCD	1/2 type IT CCD		1/3 type IT CCD
Signal system	EIA			CCIR		
Effective picture elements	768 (H) x 494 (V)			752 (H) x 582 (V)		
Effective lines	752 (H) x 485 (V)			736 (H) x 575 (V)		
Horizontal frequency	15.734 kHz			15.625 kHz		
Vertical frequency	59.94 Hz			50 Hz		
Lens mount	C mount					
Sync system	Internal/External (auto)					
External sync system input/output[*1]	HD/VD (HD/VD level: 2 to 5 Vp-p)					
External sync frequency	±1 % (in horizontal sync frequency)					
Jitter	less than ±20 nsec					
Scanning system	525 lines 2:1 Interlaced (Automatic switching according to input signal)					
Video output	1.0 Vp-p, negative, 75 Ω unbalanced					
Horizontal resolution	570 TV lines			560 TV lines		
Sensitivity	400 lx F5.6	400 lx F8	400 lx F4	400 lx F5.6	400 lx F8	400 lx F4
	(γ=ON, MIN GAIN, No IR cut filter)					
Minimum illumination[*2]	0.3 lx	0.2 lx	0.3 lx	0.3 lx	0.2 lx	0.3 lx
S/N ratio	60 dB					
Gain	AGC/Manual (Adjustable on the rear panel)					
Gamma	ON/OFF (Adjustable on the rear panel)					
Normal shutter	1/100 to 1/10,000 s			1/120 to 1/10,000 s		
External trigger shutter[*3]	1/4 to 1/10,000 s			1/4 to 1/8,000 s		
Power requirements	DC 12 V (+9 to16 V)					
Power consumption	1.6 W		1.4 W	1.6 W		1.4 W
Dimension (W) x (H) x (D)	29 x 29 x 32mm					
Mass	50 g					
Operation temp. / humidity	-5 ℃ to +45 ℃ / 20 to 80 % (no condensation)					
Storage temp. / humidity	-20 ℃ to +60 ℃ / 20 to 95 % (no condensation)					
Vibration resistance	10 G (20 to 200 Hz in X,Y,Z directions)					
Shock resistance	70 G					
MTBF	126,469 hrs.					
Regulatory compliance	UL1492, FCC Class B Digital Device, CE (EN61326/97 + A1/98), Australia EMC (AS4251.1+A4252.1)		UL1492, FCC Class B Digital Device, CE (EN61326/97 + A1/98), Australia EMC (AS3548)	UL1492, FCC Class B Digital Device, CE (EN61326/97 + A1/98), Australia EMC (AS4251.1+A4252.1)		UL1492, FCC Class B Digital Device, CE (EN61326/97 + A1/98), Australia EMC (AS3548)
Supplied accessories	Lens mount cap (1), Operating instructions (1)					

[*1] Automatic switching in response to the presence of an input signal when the switch on the rear panel is set to EXT.
[*2] (F1.4, AGC ON, without IR cut filter)   [*3] Using Dip switch on the rear panel or Using trigger pulse width

Non-TV Format

B/W Model   TV Format

Color Model

Intelligent

Digital Interface
IEEE1394

Camera Link compatible

Accessories

Color PTZ Model

Color Camara Block

Location and Function of Parts and Controls

① Lens mount (C-mount)
② Guide holes
(at the bottom)
③ Tripod screw holes
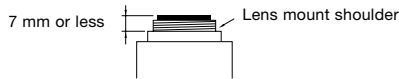(at the bottom)
④ Reference holes
(at the bottom)
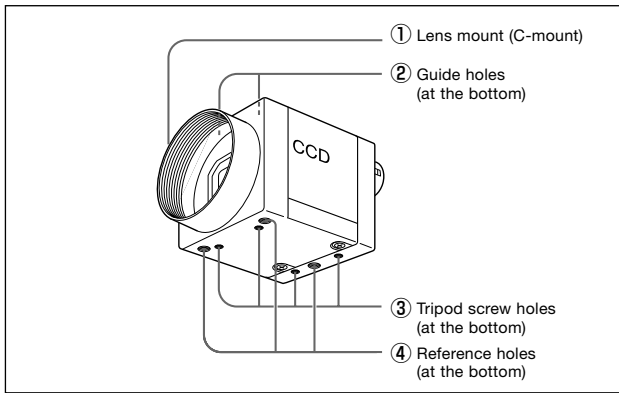
① **Lens mount section (C mount)**
A commercial C-mount lens as well as a Sony standard lens can be used.

Note

Be sure that the lens does not project more than 7mm from the lens mount.

7 mm or less — Lens mount shoulder

② **Guide holes (at the top)**
These screw holes help to lock the camera module.

③ **Tripod screw holes (at the bottom)**
These four screw holes on the bottom are for installing the camera module on a tripod. To install on a tripod, you will need to install the VCT-333I tripod adaptor using these holes on the bottom of the camera.

④ **Reference holes (at the bottom)**
These precision screw holes are for locking the camera module. Locking the camera module using these holes secures the optical axis alignment.

Rear Panel

Rear panel

DIP switch

Switches 1 to 4:
Select the shutter speed.
Switch 5: Selects the frame or field integration.
Switches 6 to 8:
Select the trigger shutter mode.
Switch 9: Selects g correction on/off.
Switch 0: Selects the gain.

VIDEO OUT/DC IN/SYNC
SHUT
FR/FL
TRIG
M/AGC
ON OFF   EXT INT   MIN   MAX
75Ω   HD/VD   M GAIN

*

* The rear panel is different for the serial numbers shown below.
XC-ES50/ES30   :200001~
XC-ES50CE/ES30CE :500001~

① **12-pin multi-connector**
DC IN/HD/VD (DC power/sync signal input) VIDEO OUT terminal.

② **75Ω termination selector switch**

③ **HD/VD input-output selector switch**

④ **Shutter speed/mode setting DIP switch**

⑤ **Volume control switch**
This switch can be changed in the range of Switch 0 to 18 dB when the GAIN switch is set to "M".
*During factory setting, this switch is adjusted to the mechanical center.
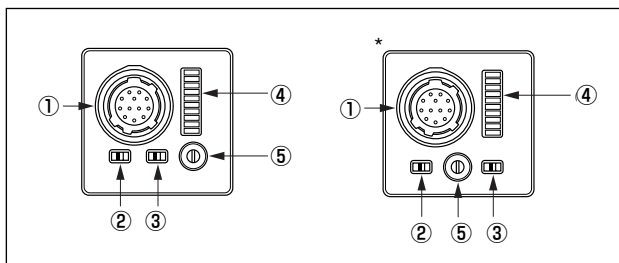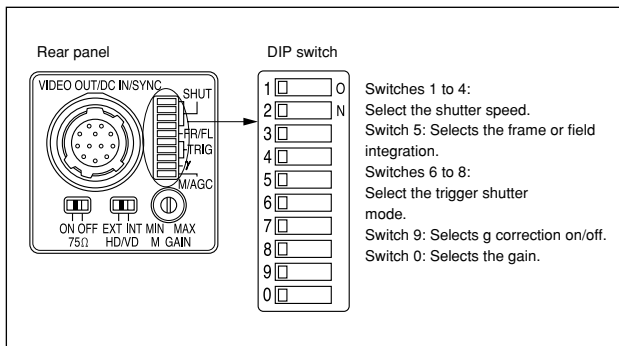
Note

When setting DIP switch 5 to the frame integration, set the volume control switch 8 to the MAX side from the mechanical center (because of CCD characteristics).

Be sure to turn the power off before making switch settings. As the variable controller for manual adjustment is a small precise component, do not apply force more than required when adjusting. Doing so will break the component. The controller is not a 360-degree rotation type. Do not turn the controller beyond the stopper of the component. The range of rotation is about 260 degrees. For the adjustment of the variable controller, use a flathead screwdriver. The sizes of a recommended flathead screwdrivers are 1.9mm width, 0.5mm thickness and more than 0.45mm length.

Factory Mode Settings of Rear Panel

| No.	Switch	Factory-setting mode
②	75 Ω termination selector switch	ON
③	HD/VD input-output selector switch	EXT
④	Shutter speed/mode setting DIP switch	
	Switches 1 to 4: Select the shutter speed.	OFF
	Switch 5: Selects the frame or field integration.	FRAME
	Switches 6 to 8: Select the trigger shutter mode.	Normal
	Switch 9: Selects correction on/off.	OFF
	Switch 0: Selects the gain.	Manual
⑤	Volume control switch	Mechanical center

Connector Pin Assignments

12-pin multi-connector
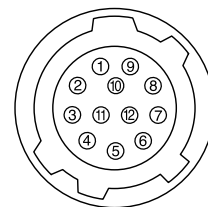
Pin No.	External HD/VD synchronization	Internal HD/VD synchronization
1	GND	GND
2	+12 V	+12 V
3	GND	GND
4	VIDEO output	VIDEO output
5	GND	GND
6	External HD input	Internal HD output
7	*1 External VD input	Internal VD output
8	GND	GND
9	–	–
10	*2 WEN output	*2 WEN output
11	TRIG input	TRIG input
12	GND	GND

*1: An input VD signal is required when the restart/reset mode is used.
*2: A WEN output signal is valid only in the external trigger shutter mode.

Non-TV Format
B/W Model
TV Format
Color Model
Intelligent
Digital Interface IEEE1394
Camera Link compatible
Accessories
Color PTZ Model
Color Camara Block

Normal Shutter

This mode provides continuous video output with the electronic shutter selected by switches to clearly capture a high-speed moving object.

■ Setting of normal shutter speed

Switch	Shutter Off	1/125	1/250	1/500	1/1000	1/2000	1/4000	1/8000 (CCIR) 1/10000(EIA)	*Flickerless
1	0	1	0	1	0	1	0	1	—
2	0	0	1	1	0	0	1	1	—
3	0	0	0	0	1	1	1	1	—
4	0	0	0	0	0	0	0	0	1
5	Frame: 0 / Field: 1								
6	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—
8	0	0	0	0	0	0	0	0	0

* In the flickerless mode, the normal shutter speed is 1/100 sec for XC-ES50/ES30 and XC-EI50/EI30 (EIA) and 1/120 sec for XC-ES50CE/ES30 CE and XC-EI50CE/EI30CE (CCIR).

1: ON
0: OFF
–: Any

Note

It is recommended to set DIP switch 5 for field selection. (The field selection is about two times in sensitivity as high as the frame selection.)

External Trigger Shutter

These modes are used to capture one image (one field) per trigger pulse.
Set DIP switches 6, 7, and 8 on the rear panel to mode 1 or 2. (Refer to the table below.)
When the trigger pulse width is 1/3 sec or more, the output signal is switched to a normal video signal.
There are two modes for timing in which a video signal is obtained.

●Mode 1 (Non-reset mode)

In this mode, a video signal synchronized with a VD signal is output after a trigger pulse is input.
– A video signal is synchronized with the external VD signal when an external HD/VD signal is input.
– A video signal is synchronized with an internal VD signal when no external HD/VD signal is input.

●Mode 2 (Reset mode)

In this mode, an internal video signal is output from a trigger pulse after a certain period of time.

■ Setting of external trigger shutter speed

There are two ways to set the shutter speed.

Mode 1 (Non-reset mode)

Swich	*1/100	1/125	1/250	1/500	1/1000	1/2000	1/4000	**1/10000
1	–	1	0	1	0	1	0	1
2	–	0	1	1	0	0	1	1
3	–	0	0	0	1	1	1	1
4	1	0	0	0	0	0	0	0
5	Frame: 0 / Field: 1							
6	0	0	0	0	0	0	0	0
7	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1
9	–	–	–	–	–	–	–	–
0	–	–	–	–	–	–	–	–

Mode 2 (Reset mode)

Swich	*1/100	1/125	1/250	1/500	1/1000	1/2000	1/4000	**1/10000
1	–	1	0	1	0	1	0	1
2	–	0	1	1	0	0	1	1
3	–	0	0	0	1	1	1	1
4	1	0	0	0	0	0	0	0
5	Frame: 0 / Field: 1							
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	1	1	1	1	1	1	1	1
9	–	–	–	–	–	–	–	–
0	–	–	–	–	–	–	–	–

* The external trigger shutter speed is set to 1/100 sec for XC-ES50/ES30, XC-EI50/EI30 (EIA) and 1/120 sec for XC-ES50CE/ES30CE, XC-EI50CE/EI30CE (CCIR).

1: ON
0: OFF
–: Any

** The external trigger shutter speed is set to 1/10000 sec for XC-ES50/ES30, XC-EI50/EI30 (EIA) and 1/8000 sec for XC-ES50CE/ES30CE, XC-EI50CE/EI30CE (CCIR).

●Using trigger pulse width

– Set DIP switches 1 to 4 on the rear panel to 0.
– An arbitrary shutter speed can be obtained by setting the trigger pulse width to the range of 2 msec to 250 msec.

| Switch	Mode 1 (Non-reset mode)	Mode 2 (Reset mode)
1	0	0
2	0	0
3	0	0
4	0	0
5	Frame: 0 / Field: 1	
6	0	0
7	1	0
8	1	1
9	0	0
0	0	0

1: ON
0: OFF

Exposure time = Trigger pulse width + 97 µsec (EIA)
120 µsec (CCIR)

Note

1. It is recommended to set DIP switch 5 for field selection. (The field selection is about two times in sensitivity as high as the frame selection.)
2. After a trigger pulse is input, a new trigger pulse must not be input before the video signal obtained by the trigger pulse has been output.

■ Specifications of trigger pulse
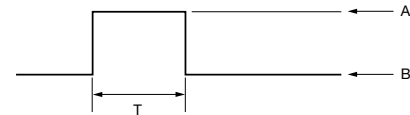
A: 4 to 5.0 V
B: 0 to 1.0 V
T: 2 µs to 1/4 s

T: 2 ms to 1/4 s, 100 µs to 1/4 s when setting the shutter speed using DIP switch
* Input impedance: 10 kW or more
* The voltage and pulse width used are measured at pin 11 of a 12-pin multi-connector on the rear panel.

Restart/Reset

The information on one screen can be extracted at any time by inputting a restart/reset signal (HD/VD) from the outside. To enter this mode, set DIP switches 6, 7, and 8 on the rear panel of a camera as shown in the table below. The setting is especially effective for the following operation.

Switch	Restart Reset (R.R)
1	0
2	0
3	0
4	0
5	0
6	1
7	1
8	1
9	0
0	0

1: ON
0: OFF