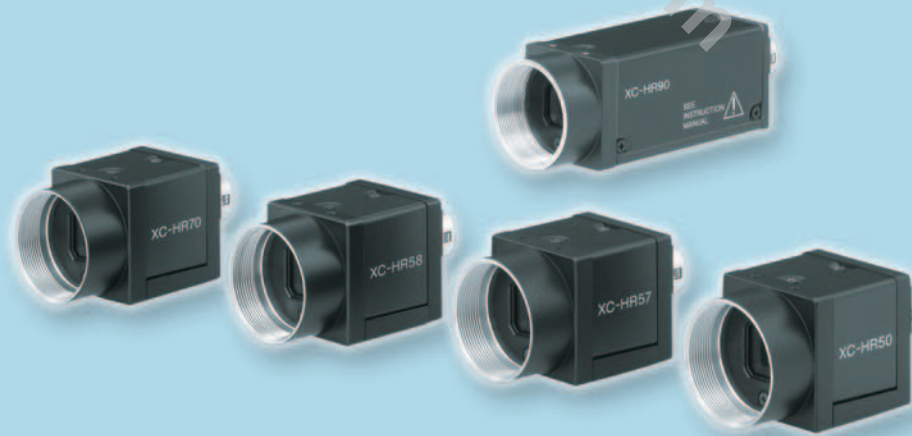


# XC-HR Series

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B/W Progressive Scan Cameras

**SONY**®



## For Demanding Applications That Require High Frame Rates and High Resolution, Choose Sony's XC-HR Series of Progressive Scan Cameras

Joining Sony's popular XC-HR Camera Series is the new high-speed/high-resolution XC-HR90. This new camera incorporates a 1/3" Progressive Scan IT CCD with SXGA resolution of 1280 x 960 pixels at a selectable frame rate of 30 or 15 full frames per second (fps). The XC-HR90 achieves high-rate scanning up to 204.8 fps with 60 effective lines, selectable from 16 vertical divisions. Camera settings can be made via the camera's RS-232C interface (12-pin connector).

Sony's complete line-up of high speed cameras include the XC-HR50, XC-HR57, XC-HR58, and XC-HR70. All of these cameras feature the same compact body enabling them to be easily interchanged to meet your various application requirements and are ideal for space restricted areas. The XC-HR57 and XC-HR58 cameras both incorporate a 1/2" Progressive Scan IT CCD. The XC-HR57 features VGA resolution of 648 x 494 pixels at 60 full fps, and the XC-HR58 features SVGA resolution of 767 x 580 pixels at 50 full fps. Both the XC-HR50 and XC-HR70 cameras incorporate a 1/3" Progressive Scan IT CCD. The XC-HR50 features VGA resolution of 648 x 494 pixels at 60 full fps, and the XC-HR70 provides XGA resolution of 1024 x 768 pixels at 30 full fps.

In addition, the XC-HR camera series has a high-rate scanning function that increases their vertical scanning frequency so that images can be captured from 120 to 240 fps depending on the camera model.

Combining high-resolution and high-speed image capture capabilities in a compact, robust body, Sony's XC-HR Camera Series are ideal for demanding applications such as semiconductor production and high-speed assembly lines.

## COMMON FEATURES

High-Resolution Image Capturing

High-Rate Scanning

Synchronization: Internal/External (HD/VD)

### Vertical Binning Function

By combining the image data of every two lines vertically, these cameras can increase the frame rate, which minimizes image processing time.

### External Trigger Shutter

Allows accurate image capture of fast-moving objects through shutter speeds of 1/4 to 1/100,000 sec.

### High Shock and Vibration Tolerance

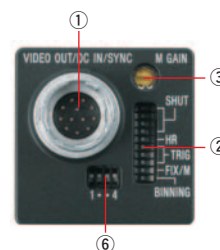
### RoHS Compliance

### Compact, Lightweight Body

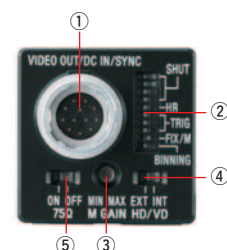
### C-mount

## REAR PANELS

XC-HR90



XC-HR50/HR57/HR58/HR70



- ① 12-pin connector
- ② Shutter speed/Mode setting DIP switch
- ③ Manual Gain adjustment
- ④ HD/VD signal I/O switch
- ⑤ 75<sup>Ω</sup> termination switch
- ⑥ Mode setting DIP switch  
(75<sup>Ω</sup> termination, HD/VD signal I/O, 30 fps/15 fps, RS-232C ON/OFF)

## SPECIFIC CAMERA KEY FEATURES

### XC-HR90

- 1/3-type progressive scan CCD
- SXGA resolution (1,280 x 960 pixels) image capturing at a speed of 30 or 15 full fps.
- High-rate scanning
  - Readout of center 240 lines at 95.8 fps (set using dip switches)
  - Readout of 60 effective lines selectable from 16 vertical divisions at up to 204.8 fps.
- Horizontal resolution: 960 TV lines
- Partial scan controlled by VD pulse length
- Minimum illumination: 1.0 lx at F1.4
- High S/N ratio: 56 dB
- Electronic shutter: 1/100 to 1/100,000 sec.

### XC-HR50

- 1/3-type progressive scan CCD
- VGA resolution (648 x 494 pixels) image capturing at a speed of 60 full fps.
- High-rate scanning of up to 240 partial fps. (100 effective lines at restart/reset ON, binning OFF)
- Horizontal resolution: 500 TV lines
- Partial scan controlled by VD pulse length
- Minimum illumination: 1.0 lx at F1.4
- High S/N ratio: 58 dB
- Electronic shutter: 1/100 to 1/30,000 sec.

### XC-HR57

- 1/2-type progressive scan CCD
- VGA resolution (648 x 494 pixels) image capturing at a speed of 60 full fps.
- High-rate scanning of up to 240 partial fps. (100 effective lines at restart/reset ON, binning OFF)
- Horizontal resolution: 500 TV lines
- Partial scan controlled by VD pulse length
- Minimum illumination: 1.0 lx at F1.4
- High S/N ratio: 58 dB
- Electronic shutter: 1/100 to 1/30,000 sec.

### XC-HR58

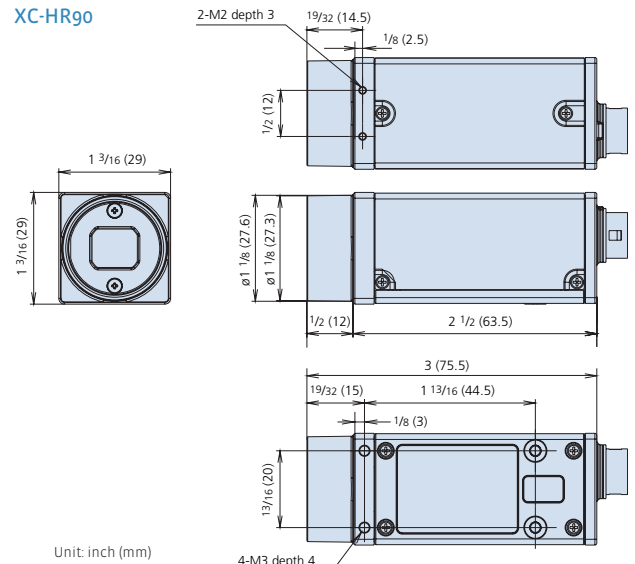
- 1/2-type progressive scan CCD
- High SVGA resolution (767 x 580 pixels) image capturing at a speed of 50 full fps.
- High-rate scanning of up to 200 partial fps. (90 effective lines at restart/reset ON, binning OFF)
- Horizontal resolution: 600 TV lines
- Partial scan controlled by VD pulse length
- Minimum illumination: 1.0 lx at F1.4
- High S/N ratio: 56 dB
- Electronic shutter: 1/100 to 1/30,000 sec.

### XC-HR70

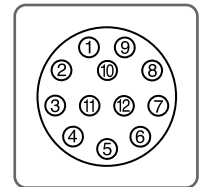
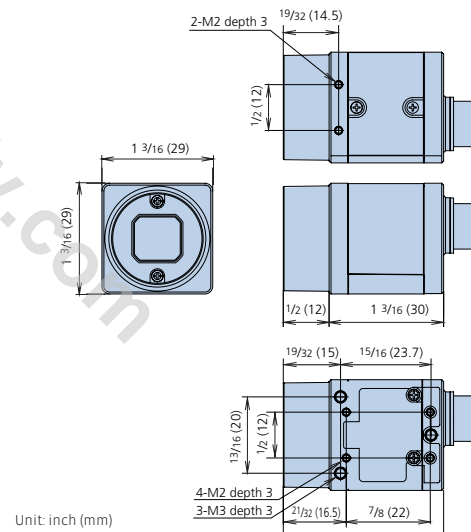
- 1/3-type progressive scan CCD
- XGA resolution (1,024 x 768 pixels) image capturing at a speed of 29 full fps.
- High-rate scanning of up to 120 partial fps. (152 effective lines at restart/reset ON, binning OFF)
- Horizontal resolution: 800 TV lines
- Partial scan controlled by VD pulse length
- Minimum illumination: 1.0 lx at F1.8
- High S/N ratio: 56 dB
- Electronic shutter: 1/100 to 1/20,000 sec.

## DIMENSIONS

### XC-HR90



### XC-HR50/HR57/HR58/HR70



## PIN ASSIGNMENT

### XC-HR90

| Pin No. | Camera sync output                | External sync mode | Restart/Reset mode | External trigger shutter mode |
|---------|-----------------------------------|--------------------|--------------------|-------------------------------|
| 1       | Ground                            |                    |                    |                               |
| 2       | +12 V DC                          |                    |                    |                               |
| 3       | Video output (Ground)             |                    |                    |                               |
| 4       | Video output (Signal)             |                    |                    |                               |
| 5       | HD output (Ground)                | HD input (Ground)  |                    |                               |
| 6       | HD output (Signal)                | HD input (Signal)  |                    |                               |
| 7       | VD output (Signal)                | VD input (Signal)  | Reset (Signal)     | VD input (Signal)             |
| 8       | Rx (RS-232C serial communication) |                    |                    |                               |
| 9       | Tx (RS-232C serial communication) |                    |                    |                               |
| 10      | —                                 | —                  | —                  | WEN output (Signal)           |
| 11      | —                                 | —                  | —                  | Trigger pulse input (Signal)  |
| 12      | VD output (Ground)                | VD input (Ground)  | Reset (Ground)     | Reset (Ground)                |

### XC-HR50/HR57/HR58/HR70

| Pin No. | Camera sync output    | External sync mode | Restart/Reset mode | External trigger shutter mode |
|---------|-----------------------|--------------------|--------------------|-------------------------------|
| 1       | Ground                |                    |                    |                               |
| 2       | +12 V DC              |                    |                    |                               |
| 3       | Video output (Ground) |                    |                    |                               |
| 4       | Video output (Signal) |                    |                    |                               |
| 5       | HD output (Ground)    | HD input (Ground)  |                    |                               |
| 6       | HD output (Signal)    | HD input (Signal)  |                    |                               |
| 7       | VD output (Signal)    | VD input (Signal)  | Reset (Signal)     | VD input (Signal)             |
| 8       | —                     | —                  | —                  | —                             |
| 9       | —                     | —                  | —                  | —                             |
| 10      | —                     | —                  | —                  | WEN output (Signal)           |
| 11      | —                     | —                  | —                  | Trigger pulse input (Signal)  |
| 12      | VD output (Ground)    | VD input (Ground)  | Reset (Ground)     | Reset (Ground)                |

## SPECIFICATIONS

|                                | XC-HR50   | XC-HR57  | XC-HR58  | XC-HR70  | XC-HR90   |
|--------------------------------|---|--|--|--|---|
| Image device                   | 1/3-type progressive scan IT CCD  | 1/2-type progressive scan IT CCD   |  | 1/3-type progressive scan IT CCD   |   |
| Effective picture elements     | 659 (H) x 494 (V)   |  | 782 (H) x 582 (V)  | 1,034 (H) x 779 (V)  | 1296 (H) x 966 (V)  |
| Effective lines                | 648 (H) x 494 (V) - VGA   |  | 767 (H) x 580 (V) - SVGA   | 1,024 (H) x 768 (V) - XGA  | 1280 (H) x 960 (V) - SXGA   |
| Cell size                      | 7.4 μm (H) x 7.4 μm (V)   | 9.9 μm (H) x 9.9 μm (V)  | 8.3 μm (H) x 8.3 μm (V)  | 4.65 μm (H) x 4.65 μm (V)  | 3.75 μm (H) x 3.75 μm (V)   |
| Scanning system                | Progressive scan  |  |  |  |   |
| Output signal frequency        | 59.94 Hz (normal mode),<br>119.88 Hz (binning mode)   |  | 50.0 Hz (normal mode),<br>99.8 Hz (binning mode)   | 29.2 Hz (normal mode),<br>58.4 Hz (binning mode)   | 30.0 Hz (normal, 30 fps mode)<br>15.0 Hz (normal, 15 fps mode)<br>54.1 Hz (binning, 30 fps mode)<br>30.0Hz (binning, 15 fps mode) |
| Lens mount                     | C mount   |  |  |  |   |
| Flange back                    | 17.526 mm   |  |  |  |   |
| Sync system                    | Internal/External (auto)  |  |  |  |   |
| External sync signal           | HD/VD (2 to 5 Vp-p 75 $\Omega$ )  |  |  | HD/VD (2.5 to 5 Vp-p 75 $\Omega$ )   |   |
| Jitter                         | Less than 20 ns   |  |  |  |   |
| Video output                   | 1.0 Vp-p, sync negative, 75 $\Omega$ , unbalanced   |  |  |  |   |
| Horizontal resolution          | 500 TV lines  | 600 TV lines   | 800 TV lines   | 960 TV lines   |   |
| Sensitivity                    | 400 lx F 5.6 ( $\gamma$ = OFF, FIX GAIN (0dB))  |  |  |  |   |
| Minimum illumination           | 1lx (F 1.4, $\gamma$ = OFF, GAIN +18dB)   |  |  | 1lx (F 1.8, $\gamma$ = OFF, GAIN +18dB)  | 1lx (F 1.4, $\gamma$ = OFF, GAIN +18dB)   |
| S/N ratio                      | 58 dB (0 dB GAIN)   | 56 dB (0 dB GAIN)  |  |  |   |
| Gain                           | Manual (0 to 18dB)/FIX (0dB) (adjustable on rear panel)   |  |  |  | Manual (0 to +18dB)/FIX (0dB) (adjustable on rear panel or via RS-232C)   |
| Gamma                          | OFF (fixed)   |  |  |  |   |
| White clip                     | 820 mV $\pm$ 70 mV (F1.4, FIX GAIN (0dB))   |  |  | 820 mV $\pm$ 70 mV (F1.8, FIX GAIN (0dB))  |   |
| Shutter                        | Normal shutter, Restart/Reset(R/R), External trigger shutter (Mode 1/Mode 2)  |  |  |  |   |
| Normal shutter speed           | 1/100, 1/125, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/10,000, 1/15,000, 1/30,000 s   |  |  | 1/100, 1/125, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/10,000, 1/20,000 s                                  | 1/100, 1/125, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/10,000, 1/25,000, 1/50,000, 1/100,000 s                                  |
| External trigger shutter speed | DIP switch settings: 1/100, 1/125, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/10,000, 1/25,000, 1/50,000, 1/100,000 s<br>Trigger pulse width settings: 1/4 to 1/100,000 s |  |  |  |   |
| External trigger               | Polarity: +, Width: 2 $\mu$ s to 250ms, Input impedance: 10 k $\Omega$ or more (H: +2 to +5.0V, L: 0 to 0.6V) Polarity: +, Width: 2 $\mu$ s to 250ms,                     |  |  |  | Input impedance: 10 k $\Omega$ or more (H: +2.5 to +5.0V, L: 0 to 0.6V)   |
| High-rate scanning             | R/R mode<br>binning off: max 240 fps (effective lines: 102 lines)<br>binning on: max 362 fps (effective lines: 59 lines)  | R/R mode<br>binning off: max 200 fps (effective lines: 111 lines)<br>binning on: max 300 fps (effective lines: 59 lines)                               | R/R mode<br>binning off: max 120 fps (effective lines: 152 lines)<br>binning on: max 180 fps (effective lines: 89 lines)                               | Readout of center 480 lines at 56 fps, Readout of center 240 lines at 95.8 fps (settable using DIP switches) |   |
|                                | External trigger shutter mode (MODE 1)<br>binning off: max 240 fps (effective lines: 100 lines)<br>binning on: max 362 fps (effective lines: 57 lines)                    | External trigger shutter mode (MODE 1)<br>binning off: max 200 fps (effective lines: 109 lines)<br>binning on: max 300 fps (effective lines: 57 lines) | External trigger shutter mode (MODE 1)<br>binning off: max 120 fps (effective lines: 153 lines)<br>binning on: max 180 fps (effective lines: 90 lines) | Readout of 60 effective lines selectable from 16 vertical divisions at max. 204.8 fps (settable via RS-232C) |   |
| Power requirements             | DC 12 V (+10.5 V to +15 V)  |  |  |  |   |
| Power consumption              | 1.8 W   | 2.0 W  |  |  | 2.8 W   |
| Dimensions                     | 1 $\frac{3}{16}$ x 1 $\frac{3}{16}$ x 1 $\frac{3}{16}$ inches (29 (W) x 29 (H) x 30 (D) mm) (excluding protrusions)   |  |  |  | 1 $\frac{3}{16}$ x 1 $\frac{3}{16}$ x 2 $\frac{1}{2}$ inches (29 (W) x 29 (H) x 63.5 (D) mm) (excluding protrusions)              |
| Weight                         | 1.8 oz (50 g)   |  |  |  | 2.8 oz (80 g)   |
| Operating temperature          | 23 to 113 $^{\circ}$ F (-5 to 45 $^{\circ}$ C)  |  |  |  |   |
| Storage temperature            | -22 to 140 $^{\circ}$ F (-30 to 60 $^{\circ}$ C)  |  |  |  |   |
| Operating humidity             | 20 to 80% (no condensation)   |  |  |  |   |
| Storage humidity               | 20 to 95% (no condensation)   |  |  |  |   |
| Vibration resistance           | 10 G (20 Hz to 200 Hz)  |  |  |  |   |
| Shock resistance               | 70 G  |  |  |  |   |
| Supplied accessories           | Lens mount cap (1), Operating instructions (1)  |  |  |  |   |

## ACCESSORIES

|                     | XC-HR50  | XC-HR57 | XC-HR58 | XC-HR70 | XC-HR90 |
|---------------------|--|---------|---------|---------|---------|
| Camera adaptor      | DC-700/700CE   |         |         |         |         |
| 12-pin camera cable | CCXC-12P02N (2 m)/12P05N (5 m)/12P10N (10 m)/12P25N (25 m) |         |         |         |         |
| Tripod adaptor      | VCT-333I   |         |         |         | VCT-55I |

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