

# XC-56BB

|                     |   |  |  |               |               |                             |
|---------------------|---|--|--|---------------|---------------|-----------------------------|
| Progressive Scan    | 1/3 Type CCD                              | Square Pixels                                    | NF Lens Mount                                    | VS Output     | VGA Output    | 1/30 Sec 1/30 Non-Interface |
| 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 | Remote Head                 |
| Lead-Free Solder    | * When the image input board is connected |  |  |               |               |                             |

PS Connection Diagram P31



## Outline

The XC-56BB is a small-sized head-detachable monochrome camera module that incorporates a 1/3 type progressive scan CCD. The XC-56BB has the same camera function as those of XC56. The XC-56BB has VGA-class resolution output at 30 frames/sec. The XC-56BB is a compact model succeeding to the XC-55BB with the dimensions of 22 (W) x 22 (H) x 30 (D) for the camera head and 29(W) x 29 (W) x 67(D) for the control part.

## Features

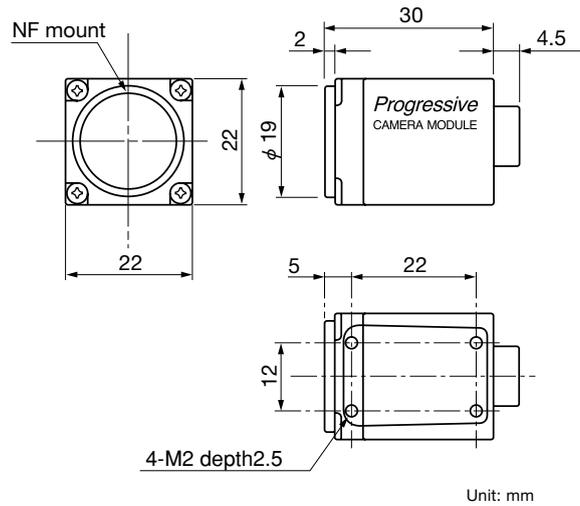
- Incorporating a 1/3 type progressive scan CCD
- Non-TV format
- Square pixel/ Full pixel read-out
- VGA-class resolution image output, 30 frames/sec.
- High rate scanning function
- External trigger shutter
  - Restart/Reset
  - Mode 1 (Non-reset mode)
  - Mode 2 (Reset mode)
- Various settings are available on the rear panel
- Cable Length: 2 m
- Lead-free soldering

## Accessories

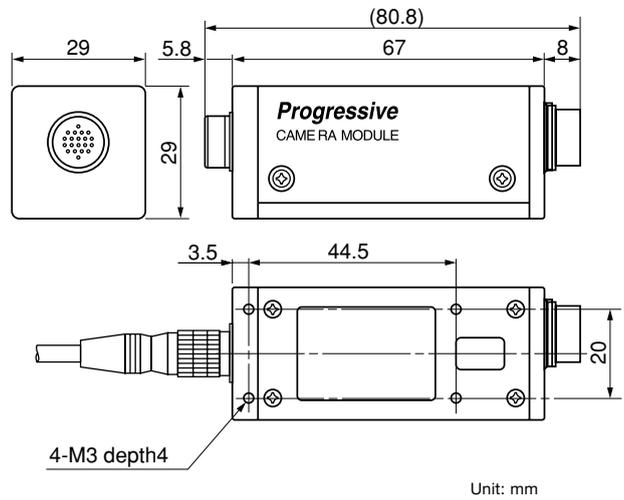
- Compact camera adaptor
  - DC-700/700CE
- 12-pin camera cable (CE standard)
  - CCXC-12P02N (2 m)
  - CCXC-12P10N (10 m)
  - CCXC-12P05N (5 m)
  - CCXC-12P25N (25 m)
- C-mount adaptor
  - LO-999CMT
- C-mount LENS
  - VCL-12YM
  - VCL-50YM
- NF-mount LENS
  - VCL-03S12XM
  - VCL-06S12XM
  - VCL-12S12XM
- Tripod adaptor
  - VCT-333I (for CHU)
  - VCT-55I (for CCU)

## Dimensions

### ●CHU



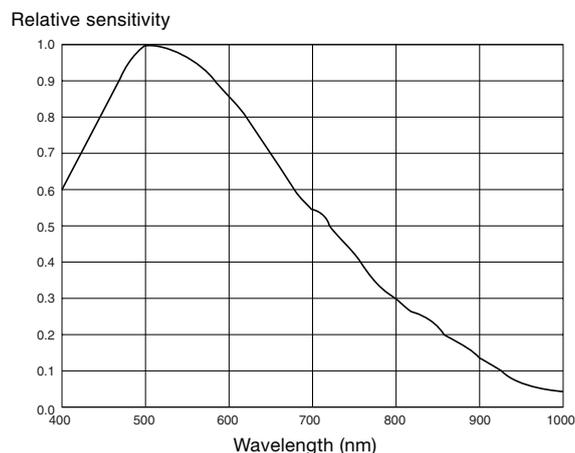
### ●CCU



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

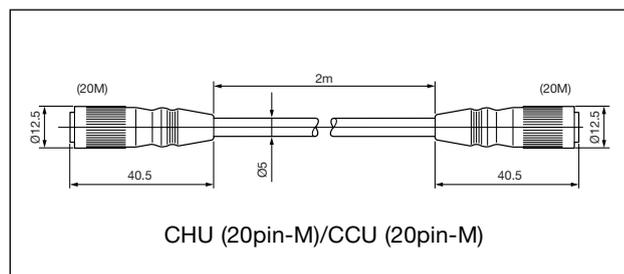
## Spectral Sensitivity Characteristics

### ●XC-56BB



## Supplied Accessories

### Dedicated cable CCU and CHU

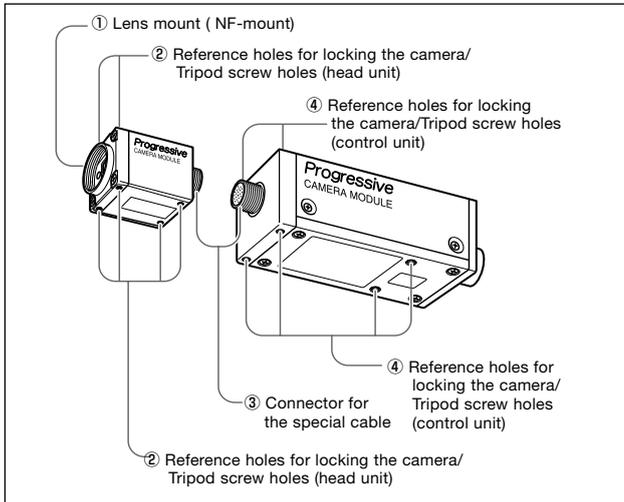


## Specifications

| <b>XC-56BB</b>  |  |
|---|--|
| Image device  | 1/3 type Progressive Scan IT CCD   |
| Effective picture elements (HxV)                          | 659 (H) x 494 (V)  |
| Effective lines (HxV)                                     | 647 (H) x 493 (V)  |
| Output image size   | VGA class ( 647 (H) x 494 (V) )  |
| Cell size   | 7.4 μm (H) x 7.4 μm (V)  |
| Lens mount  | NF-mount   |
| Flange focal length                                       | 12.0 mm  |
| Sync system   | Internal / External (automatically switched according to input signal)   |
| External synchronization input/output**1                  | HD/VD (HD/VD level: 2 to 5 Vp-p, 75Ω)  |
| Allowable frequency deviation of external synchronization | ±1 % (in horizontal synchronous frequency)   |
| H jitter  | Less than 20 ns  |
| Scan lines  | 525-line/236-line (Normal mode/ Binning mode)  |
| Video output mode   | Normal: 1-line sequential output 29.97 fps / Binning: F2-line sequential output 59.94 fps  |
| Video output  | 1.0Vp-p, sync negative, 75Ω unbalanced   |
| Horizontal frequency                                      | 15.734 KHz   |
| Output signal frequency                                   | 29.97 Hz (Normal mode)/59.94 Hz (Binning mode)   |
| Horizontal resolution                                     | 500TV lines  |
| Sensitivity   | 400 lx F8 (γ= OFF, FIX GAIN (0 dB))  |
| Minimum illumination                                      | 0.5 lx ( F1.4, γ= OFF, GAIN +18 dB )   |
| Video S/N ratio   | 58 dB  |
| Gain  | Fixed/Manually adjustable  |
| Gamma   | OFF (γ=1) (fixed)  |
| White clip  | 820 mV ± 70mV  |
| Shutter mode  | Normal shutter, Restart/Reset, External trigger shutter (Mode1/Mode2)  |
| Normal shutter speed                                      | 1/100, 1/125, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/8,000, 1/15,000 s   |
| External trigger shutter                                  | 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 μs to 250 ms, Input impedance: 10kΩ or more (H: +2 to 5.0V, L: 0 to +0.6V)   |
| Pinassignment   | Correspondence to EIAJ compliant 12PIN connector pin assignment Unavailable (No.8 pin: Trigger input (G), No.9 pin: Trigger input, No.10 pin: GRD, No.11pin: +12V) Pins No.10 and 11 are not connected inside the camera |
| Power requirements  | DC 12 V (+10.5 V to +15.0 V)   |
| Power consumption   | 2.2 W  |
| Dimensions  | CHU: 22 (W) x 22 (H) x 30 (D) mm CCU: 29 (W) x 29 (H) x 67 (D) mm  |
| Mass  | CHU: 40 g CCU: 100 g   |
| Operating temperature                                     | -5 to 45 °C  |
| Storage temperature                                       | -30 to 60 °C   |
| Performance guarantee temperature                         | 0 to 40 °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   |
| MTBF  | 73,800 hrs. (approx. 8.4 years)  |
| Regulation  | UL 6500, FCC Class A Digital Device, CE (EN61326/97+A1/98), Australia EMC (AS4251.1+A4252.1)   |
| Supplied accessories                                      | Lens mount cap (1), Operating instructions (1), Dedicated cable (1), Ferrite core (1)  |

\*\*1 Automatic switching in response to the presence of an input signal when the switch on the rear panel is set to EXT.

## Location and Function of Parts and Controls



### ① Lens mount (NF-mount)

Install an NF mounted lens or optical device, e.g., the standard lens VCL-12S12XM. If you install a C-mount lens on the XC-56BB, you will need the C-mount adaptor LO-999CMT.

### ② Reference holes for locking the camera/Tripod screw holes (head unit)

You can attach a tripod to the reference holes (4) on the bottom. You will need a tripod adapter VCT-3331 to install the tripod. There are two more reference holes on the front of the top surface.

#### Note

- The XC-56BB head unit (CHU) must have the same serial number as the control unit (CCU).
- Do not connect or disconnect the supplied cable while the power is turned on, otherwise the camera may be damaged.

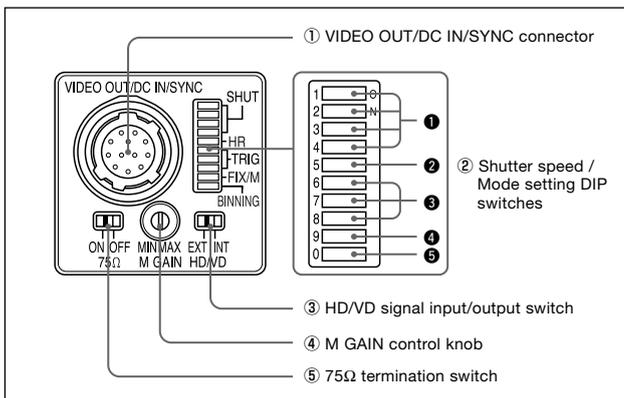
### ③ Connector for the special cable

Connect the head unit and the control unit with the supplied cable.

### ④ Reference holes for locking the camera/Tripod screw holes (control unit)

High-precision screw holes for locking the camera onto the lens mounted surface. Locking the camera minimizes optical axis deviation. For details, see the Application Guide. You can attach a tripod to the reference holes on the bottom of the head unit. You will need a tripod adapter VCT-551 to install the tripod. There are two more reference holes on the front of the top surface.

## Rear Panel



#### Note

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.

### ① VIDEO OUT/DC IN/SYNC (video output/DC power/sync input signal) connector (12-pin connector)

Connect a CCXC-12P05N camera cable to this connector to obtain power from the +12 V DC power supply and also to enable video signal output from the camera module. When a sync signal generator is connected to this connector, the camera module is synchronized with the external sync signals (HD/VD signals).

### ② Shutter speed/Mode setting DIP switch

#### ① Shutter speed (bits 1-4)

Set an appropriate shutter speed (factory setting: OFF).

#### ② High-rate scan mode switch (bit 5)

The factory setting of this switch is high-rate scan OFF. If you turn this switch ON to use high-rate scan mode, you also need to make pulse rate settings.

#### ③ Restart reset/External trigger shutter mode switch (bits 6 to 8)

By inputting an external restart/reset signal, you can capture the information of single screens at arbitrary timing. By inputting an external trigger signal, you can capture fast-moving objects at precise locations. The factory settings for these switches are for normal operation.

#### ④ Gain switch (bit 9)

This switch selects FIX (fixed) or MANUAL (manual adjustment) (factory setting: FIX (left side)).

#### ⑤ Binning mode switch (bit 0)

Switches the video signal output mode between binning OFF and binning ON (factory setting: OFF).

### ③ HD/VD signal input/output switch

Set the switch to INT to output HD/VD signals from the camera module. Set the switch to EXT to input HD/VD signals from an external unit (factory setting: EXT).

#### Note

Even when the switch is set to EXT, the camera module operates in internal synchronization mode unless an external HD signal is input. In this case, however, the camera module will not output internal sync signals.

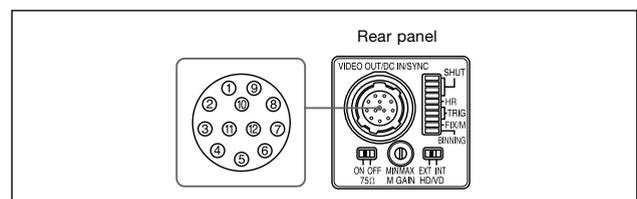
### ④ M GAIN (Manual Gain) control knob

If you have selected MANUAL (manual adjustment) with DIP switch 4, this knob adjusts the gain. The dimensions of the groove on the knob are 0.5 (W) X 1.9 (L) X 0.45 (D)mm. Use a screwdriver that is appropriate for these dimensions. The knob can be rotated 260 degrees. Do not rotate the knob over the stopper on the limit point.

### ⑤ 75Ω termination switch

Turn this to OFF when not terminating the external sync signal (factory setting: ON).

## Connector Pin Assignments



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

\* Common ground for pins 7, 10, and 11

## About the Electronic Shutter

There are two shutter types: normal shutter and external trigger shutter. Select them with the DIP switches on the rear panel.

\*1The electronic shutter cannot be used in restart/reset mode.

\*2High-rate scan can be used in restart/reset mode and in external trigger shutter mode 1.

## Normal Shutter

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

|                            |                            |
|----------------------------|----------------------------|
| Normal Shutter             | Other modes*               |
| 8 <input type="checkbox"/> | 8 <input type="checkbox"/> |

\* "Other modes" refers to restart/reset mode and external trigger shutter mode.

### Normal shutter speed settings

|                            |                            |                            |                            |
|----------------------------|----------------------------|----------------------------|----------------------------|
| 1/125                      | 1/250                      | 1/500                      | 1/1000                     |
| 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> |
| 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> |
| 4 <input type="checkbox"/> | 4 <input type="checkbox"/> | 4 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 1/2000                     | 1/4000                     | 1/8000                     | 1/15000                    |
| 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> |
| 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> |
| 4 <input type="checkbox"/> | 4 <input type="checkbox"/> | 4 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 1/100                      |                            |                            |                            |
| 1 <input type="checkbox"/> |                            |                            |                            |
| 2 <input type="checkbox"/> |                            |                            |                            |
| 3 <input type="checkbox"/> |                            |                            |                            |
| 4 <input type="checkbox"/> |                            |                            |                            |

(Unit: seconds)

## External Trigger Shutter

Inputting an external trigger pulse enables the camera to capture first-moving objects clearly. Set DIP switches 6, 7, and 8 on the rear panel to Mode 1 or Mode 2. When you set the trigger pulse width to 1/3 of a second or more, the output signal changes to the normal VIDEO signal.

|                            |                            |
|----------------------------|----------------------------|
| Mode 1                     | Mode 2                     |
| 6 <input type="checkbox"/> | 6 <input type="checkbox"/> |
| 7 <input type="checkbox"/> | 7 <input type="checkbox"/> |
| 8 <input type="checkbox"/> | 8 <input type="checkbox"/> |

High-rate scannig

|                            |                            |
|----------------------------|----------------------------|
| OFF                        | ON                         |
| 5 <input type="checkbox"/> | 5 <input type="checkbox"/> |

(High-rate mode is compatible with Mode 1 only.)

### Note

High-rate scan mode cannot be used while in external trigger shutter mode 2.

There are two modes for the timing in which video signals are 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.

– The video signal is synchronized with the external VD signal when an external HD\*/VD signal is input.

– The video signal is synchronized with an internal VD signal when no external HD\*/VD signal is input.

\* External or internal synchronization is selected automatically depending on the presence or absence of external HD input.

#### Mode 2 (Reset mode)

In this mode, an internal VD is reset, then a video signal is output a certain period of time after trigger pulse input.

## To Set the External Trigger Shutter

There are two ways to set the shutter speed.

#### Using trigger pulse width

Set all DIP switches (1 to 4 on the rear panel) to OFF.

You can obtain an arbitrary shutter speed by setting the trigger pulse width to the range of 2 μsec to 250 msec.

Exposure time = Trigger pulse width + 8 μsec

Mode 1  
(Non-reset mode)

|                            |
|----------------------------|
| 1 <input type="checkbox"/> |
| 2 <input type="checkbox"/> |
| 3 <input type="checkbox"/> |
| 4 <input type="checkbox"/> |

Mode 2  
(Reset mode)

|                            |
|----------------------------|
| 1 <input type="checkbox"/> |
| 2 <input type="checkbox"/> |
| 3 <input type="checkbox"/> |
| 4 <input type="checkbox"/> |

### Note

An incorrect video signal will be output if you input a new trigger pulse before the video signal output for the previous trigger pulse is output completely.

#### Using the DIP switches on the rear panel

For shutter speeds, see the following table.

Mode 1 (Non-reset mode)/Mode 2 (Reset mode)

|                            |                            |                            |                            |
|----------------------------|----------------------------|----------------------------|----------------------------|
| 1/125                      | 1/250                      | 1/500                      | 1/1000                     |
| 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> |
| 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> |
| 4 <input type="checkbox"/> | 4 <input type="checkbox"/> | 4 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 1/2000                     | 1/4000                     | 1/10000                    | 1/25000                    |
| 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> |
| 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> |
| 4 <input type="checkbox"/> | 4 <input type="checkbox"/> | 4 <input type="checkbox"/> | 4 <input type="checkbox"/> |
| 1/50000                    | 1/100000                   | 1/100                      |                            |
| 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> |                            |
| 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> |                            |
| 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> |                            |
| 4 <input type="checkbox"/> | 4 <input type="checkbox"/> | 4 <input type="checkbox"/> |                            |

(Unit: seconds)

## Restart/Reset

### To Set Restart/Reset Mode

This mode allows you to capture the information on single screens at any time by externally inputting restart/reset signals (HD/VD). To enter this mode, set the trigger shutter switches (6 to 8) on the rear panel of the camera as shown in the figure below.

To use restart/reset mode and high-rate scan mode simultaneously, set the high-rate scan mode switch (5) to ON (right side).

|                            |                            |
|----------------------------|----------------------------|
| R/R                        | High-rate scan             |
| 6 <input type="checkbox"/> | OFF                        |
| 7 <input type="checkbox"/> | ON                         |
| 8 <input type="checkbox"/> | 5 <input type="checkbox"/> |

## Long Exposure

The Restart/Reset function extends the CCD accumulation time, resulting in highly sensitive image capture. This function is effective when you cannot gain satisfactory sensitivity under normal operating conditions, or when you want to observe the trail of a moving object. Extend the VD interval (T) between external VD pulses.

