

## HIGH-SPEED GATED IMAGE INTENSIFIER UNITS C9548 SERIES



### OVERVIEW

Image intensifiers (I. I.) are devices capable of intensifying an image at high gain and high-speed gating (electronic shutter operation). This allows them to capture "instantaneous images" of ultra-fast phenomena that occur in extremely short periods of time.

The C9548 series is an I.I. unit which is suitable for PIV application. It has a built-in pulse generator to allow multi-exposure (burst) operation.

By using a relay lens, the C9548 series can be easily connected to various cameras or high-speed cameras. The I.I. gain, gate width and delay time can be controlled and set from a PC through the RS-232C interface. (The I.I. gain can also be controlled and set from the remote controller.)

### FEATURES

- **Maximum repetition frequency: 200 kHz**
- **High-speed gating: 10 ns minimum**
- **Built-in pulse generator**
- **Multi-exposure**
- **High performance image intensifier**
  - High quantum efficiency in visible range:  
GaAsP photocathode
  - Wide spectral response range from UV to near IR:  
Multialkali photocathode
  - High sensitivity from visible range to near IR:  
GaAs photocathode
- **Be equipped with over light protection**

### APPLICATIONS

- **Analysis of high-speed phenomenon**  
PIV / Engine combustion state  
Plasma emission / Discharge / Flow / Spray and so on.
- **Observation of high speed maneuvering-vehicle**  
Flow observation of microparticle, gas, liquid, etc.

# SPECIFICATIONS

Parameter		C9548-01	C9548-02	C9548-03	C9548-04	C9548-05	C9548-06	Unit
Photocathode sensitivity	Luminous sensitivity (Typ.)	650		230	150		1100	μA/lm
	Radiant sensitivity <sup>(A)</sup> (Typ.)	192		53	47		147	mA/W
	Quantum efficiency <sup>(A)</sup> (Typ.)	45		15	14		22	%
Photocathode	Effective diameter	25 <sup>(B)</sup>						mm
	Window material	Borosilicate glass		Synthetic silica		Borosilicate glass		—
	Photocathode material	GaAsP		Multialkali		GaAs		—
	Spectral response	280 to 720		185 to 900		370 to 920		nm
	Peak wavelength	530		430		800		
Input mount (Lens mount)		F-mount (C-mount selectable)						—
Phosphor screen	Window material	FOP						—
	Phosphor material	P46 (P24 or P43 selectable)						—
	Decay time	See [Phosphor screen decay characteristics]						—
Gain	Luminous gain (Typ.)	6.0 × 10 <sup>3</sup>	1.5 × 10 <sup>6</sup>	3.3 × 10 <sup>3</sup>	1.0 × 10 <sup>6</sup>	9.9 × 10 <sup>3</sup>	2.6 × 10 <sup>6</sup>	(lm/m <sup>2</sup> )/lx
	Radiant emittance gain <sup>(A)</sup> (Typ.)	1.3 × 10 <sup>4</sup>	1.0 × 10 <sup>6</sup>	2.0 × 10 <sup>3</sup>	7.0 × 10 <sup>5</sup>	2.7 × 10 <sup>3</sup>	6.6 × 10 <sup>5</sup>	(W/m <sup>2</sup> )/(W/m <sup>2</sup> )
Equivalent back-ground Input (EBI) <sup>(C)</sup>	Luminous (Typ.)	3 × 10 <sup>-12</sup>		1 × 10 <sup>-11</sup>		2 × 10 <sup>-11</sup>		lm/cm <sup>2</sup>
	Radiant <sup>(A)</sup> (Typ.)	8 × 10 <sup>-15</sup>		3 × 10 <sup>-14</sup>		4 × 10 <sup>-14</sup>		W/cm <sup>2</sup>
Limiting resolution (Typ.)		51	45	57	51	51	45	Lp/mm
Image magnification		1						—
Maximum input light level <sup>(D)</sup>	Luminous (Typ.)	2.1 × 10 <sup>-2</sup>	8.4 × 10 <sup>-5</sup>	3.8 × 10 <sup>-2</sup>	1.3 × 10 <sup>-4</sup>	1.3 × 10 <sup>-2</sup>	4.8 × 10 <sup>-5</sup>	lx
	Radiant <sup>(A)</sup> (Typ.)	1.6 × 10 <sup>-9</sup>	1.9 × 10 <sup>-11</sup>	9.5 × 10 <sup>-9</sup>	2.7 × 10 <sup>-11</sup>	7.0 × 10 <sup>-9</sup>	2.9 × 10 <sup>-11</sup>	W/cm <sup>2</sup>
Average of Max. phosphor screen brightness		10						cd/m <sup>2</sup>
Power requirement		100 to 240						V
Power consumption (Max.)		12	14.4	12	14.4	12	14.4	W
Operating ambient temperature		0 to +40						°C
Storage temperature		-20 to +50						
Operating and storage humidity <sup>(E)</sup>		Below 70						%

**NOTE:** <sup>(A)</sup>At wavelength of peak sensitivity

<sup>(B)</sup>Effective output area is 16 mm × 16 mm. Take the effective area of the camera and reduction rate of the relay lens to be used into account.

<sup>(C)</sup>Input illuminance (or irradiance) required to produce a luminous emittance from the phosphor screen, which is equal to that obtained when no light is incident on the photocathode. This indicates the lower limit of detectable illuminance (or irradiance) level of an image intensifier.

<sup>(D)</sup>During normal (continuous) mode at maximum gain <sup>(E)</sup>No condensation

## Protective Functions

Parameter	C9548 series	
Repetition rate	Max.	200 kHz
	Display	Red LED is lit continuously *
Excessive light protection	Shuts off operation during excessive light	
	Warning	Red LED flashes * (on rear of head and remote controller operation panel)
	Shut off	Red LED is lit continuously * (on rear of head and remote controller operation panel)
Protection circuit reset	Reset switch on the remote controller or sending command via RS-232C interface	

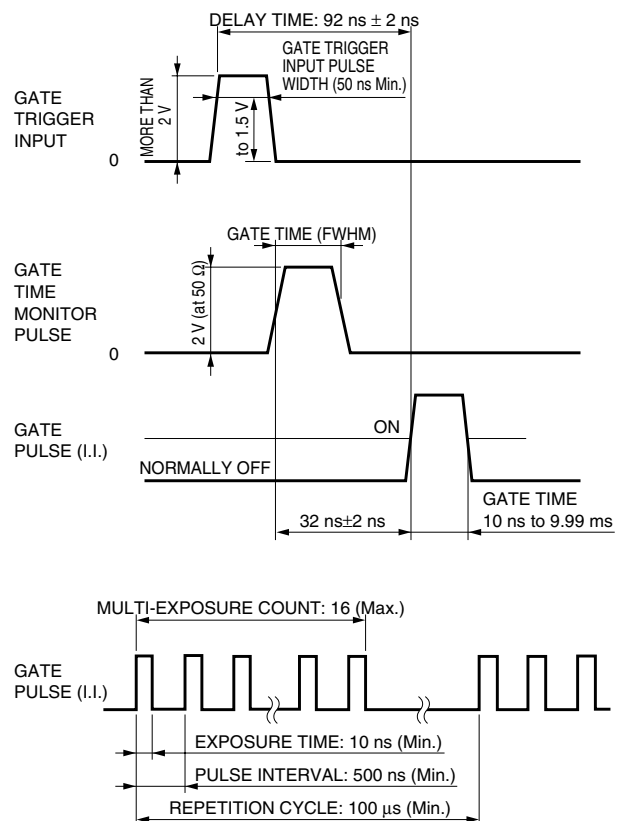
**NOTE:** \*The LED on near of head can be turned out by control software.

## Gate Specifications (Built-in pulse generator)

Parameter	C9548 series	
Operation Mode	Normal (continuous) mode / Single gate mode / Burst gate mode	
Single Gate Mode	Gate time *	10 ns to 9.99 ms
	Repetition Frequency (Max.)	200 kHz (protection circuit incorporated)
	Delay Time *	10 ns to 9.99 ms
Burst Gate Mode	Pulse Interval * (Min.)	500 ns
	Number of Exposures (Max.)	16
	Exposure Time * (Min.)	10 ns
	Repetition Cycle (Min.)	100 μs
Gate Trigger Input	Level	TTL positive logic
	Input Impedance	1 kΩ
Gate Output	Basic Delay Time	92 ns ± 2 ns
	Gate Jitter (Max.)	2 ns (10 ns maximum when gate time is set to 10 μs or more)
Gate Time Monitor	Output Level	2 V positive logic
	Pulse Width	Gate time width (FWHM)
Monitor	Output Impedance	200 Ω

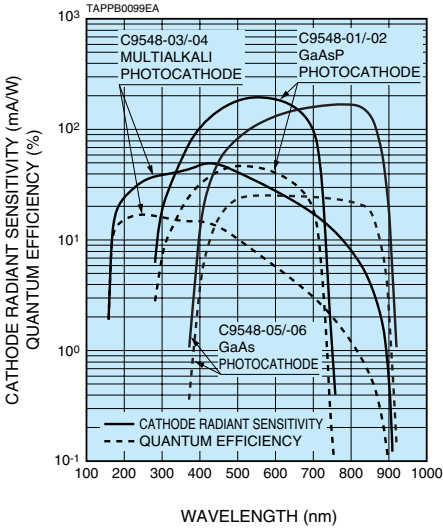
**NOTE:** \* Settable at figure of 3 digits.

## TIME SEQUENCE

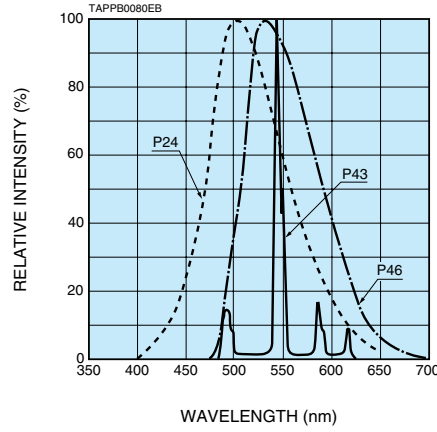


# CHARACTERISTICS

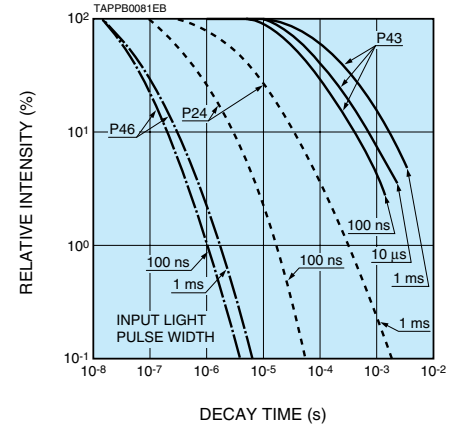
## ● Typical Spectral Response (Typ.)



## ● Typical Phosphor Screen Spectral Emission (Typ.)

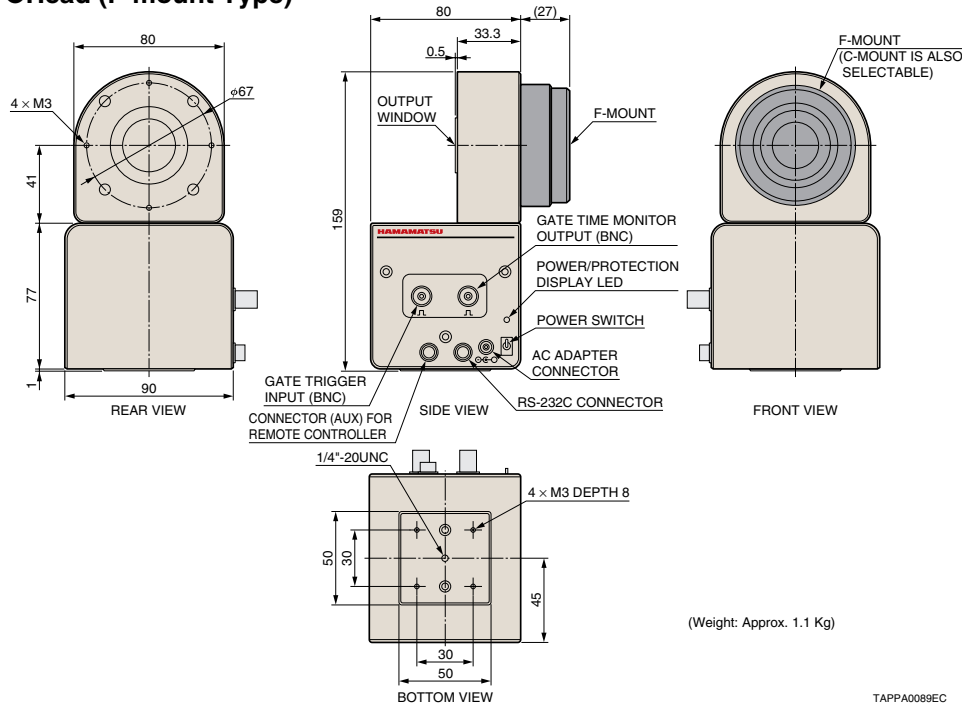


## ● Typical Phosphor Screen Decay Characteristics (Typ.)

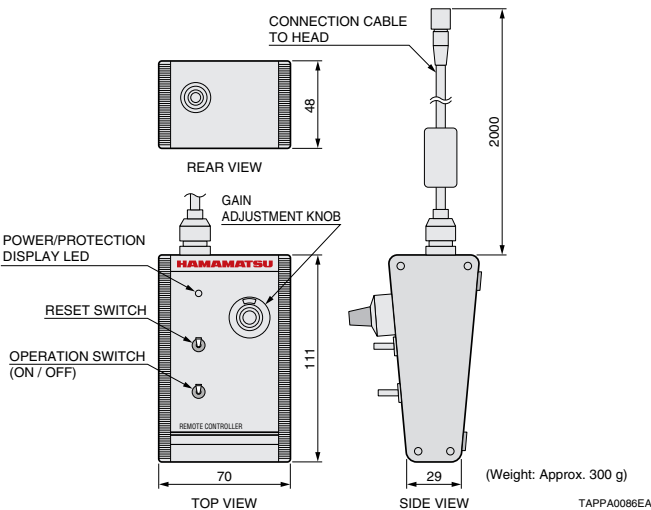


# DIMENSIONAL OUTLINES (Unit: mm)

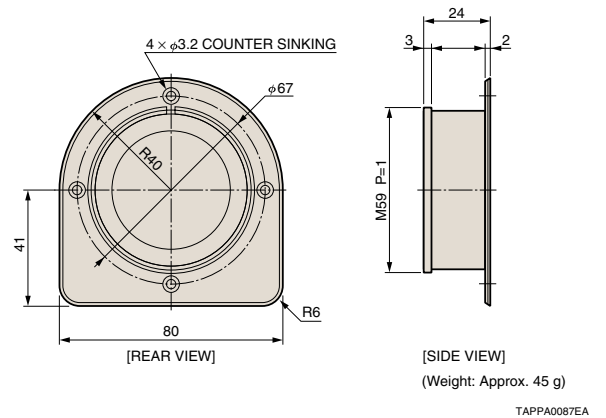
## ● Head (F-mount Type)



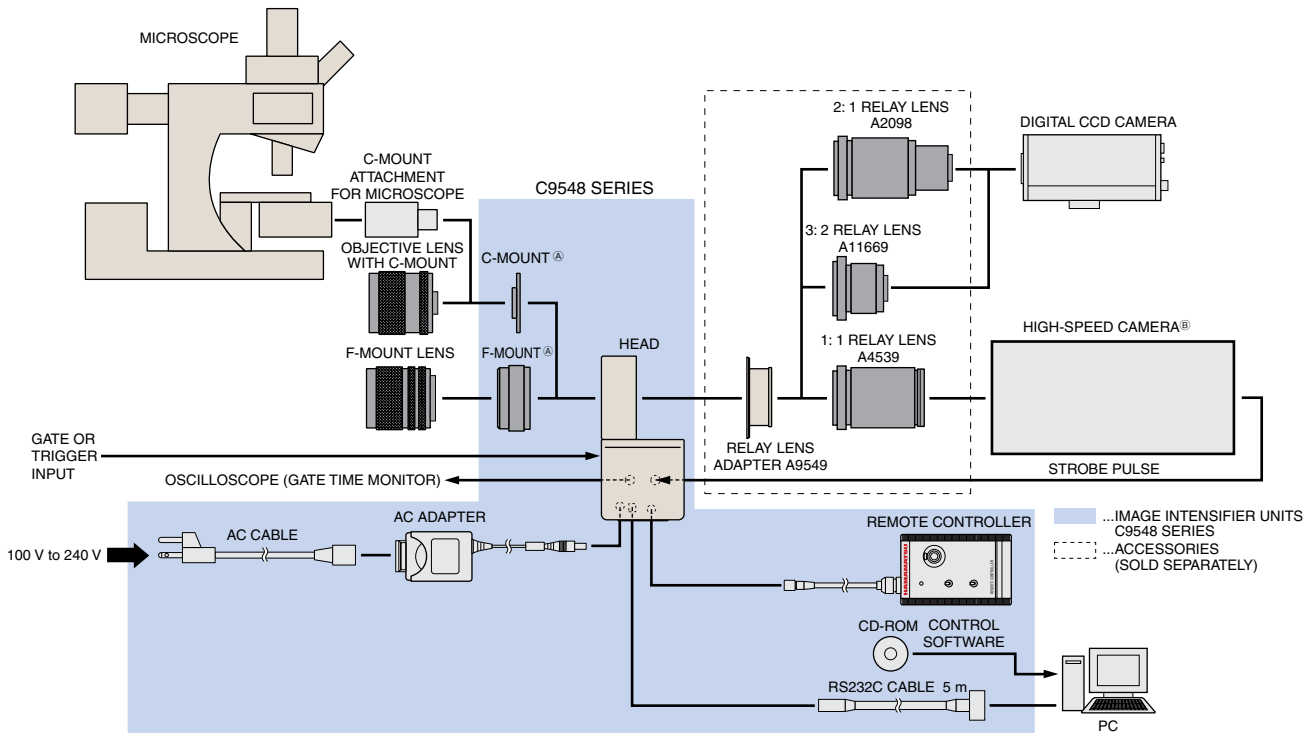
## ● Remote Controller



## ● Relay Lens Adapter A9549 (Sold Separately)



# SETUP EXAMPLE WITH OPTICAL ACCESSORIES



**NOTE:** Ⓐ Select C-mount or F-mount at ordering.  
 Ⓑ Supported high-speed cameras depend on the readout frame rate. Please be sure to consult us. Check the input mount of the high-speed camera. The A2095 is needed in front of the high-speed camera when the camera has a C-mount input port.

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