



C9016 series

OVER VIEW

Connecting a C9016 series image intensifier unit to the front of a CCD camera or CMOS camera makes it easy to capture images of low-light-level phenomena occurring at high speeds.

The image intensifier can operate from a remote controller or PC via the USB interface. The C9016 series includes an excessive light protection function so users do not have to worry about damage from an increase in incident light level.

FEATURES

- **High performance image intensifier**
Quantum efficiency: 50 % Typ. at 530 nm
(GaAsP photocathode model: C9016-01, -02)
High resolution (C9016-01, -03, -05)
High gain (C9016-02, -04, -06)
- **Easy handling**
Fully controllable from a PC via the USB interface
Easy-to-use remote controller
- **Gate operation: 10 μ s to 100 ms**
- **Built-in protective circuit prevents damage from excessive light**

APPLICATIONS

- **Biological observation under microscope**
- **Imaging of low-light-level emission and fluorescence**
- **Analysis of explosion and combustion**
- **Imaging of invisible light**

SPECIFICATIONS

Parameter		C9016-01	C9016-02	C9016-03	C9016-04	C9016-05	C9016-06	Unit
Photocathode sensitivity	Luminous sensitivity (Typ.)	700		280	170	1500		μA/lm
	Radiant sensitivity [Ⓐ] (Typ.)	214		62	60	170		mA/W
	Quantum efficiency [Ⓐ] (Typ.)	50		18	17	30		%
Photocathode	Effective diameter [Ⓑ]	17		17		17		mm
	Window material	Borosilicate glass		Synthetic silica		Borosilicate glass		—
	Photocathode material	GaAsP		Multialkali		GaAs		—
	Spectral response range	280 to 720		185 to 900		370 to 920		nm
	Wavelength of peak sensitivity	530		430		800		nm
Phosphor screen	Window material	FOP						—
	Phosphor material [Ⓒ]	P43						—
	Decay time	See Figure 4						—
Luminous gain (Typ.)		2.2 × 10 ⁴	5.0 × 10 ⁶	1.2 × 10 ⁴	5.0 × 10 ⁶	4.0 × 10 ⁴	9.6 × 10 ⁶	(lm/m ²)/lx
Radiant emittance gain [Ⓐ] (Typ.)		1.4 × 10 ⁴	3.4 × 10 ⁶	8.7 × 10 ³	4.0 × 10 ⁶	1.2 × 10 ⁴	2.7 × 10 ⁶	(W/m ²)/(W/m ²)
Equivalent back-ground Input (EBI)	Luminous (Typ.)	3 × 10 ⁻¹²		1 × 10 ⁻¹¹		2 × 10 ⁻¹¹		lm/cm ²
	Radiant (Typ.)	8 × 10 ⁻¹⁵		3 × 10 ⁻¹⁴		4 × 10 ⁻¹⁴		W/cm ²
Limiting resolution (Typ.)		64	57	64	57	64	57	Lp/mm
Image magnification		1						—
Maximum input light level ^{ⒶⒹ}		1.4 × 10 ⁻³	6.3 × 10 ⁻⁶	2.6 × 10 ⁻³	6.3 × 10 ⁻⁶	7.9 × 10 ⁻⁴	3.3 × 10 ⁻⁶	lx
		3.4 × 10 ⁻¹⁰	1.4 × 10 ⁻¹²	5.4 × 10 ⁻¹⁰	1.2 × 10 ⁻¹²	3.9 × 10 ⁻¹⁰	1.7 × 10 ⁻¹²	W/cm ²
Power requirement		AC 100 V to AC 240 V (when AC adapter is used) / Supplied from PC (when USB is used)						—
Power consumption (Max.)		3.5						W
Operating ambient temperature		0 to +40						°C
Storage temperature		-20 to +50						°C
Operating and storage humidity [Ⓔ]		Below 70						%

NOTE: [Ⓐ]At wavelength of peak sensitivity

[Ⓑ]Effective output area is 12.8 mm × 9.6 mm. Take the effective area of the camera and reduction rate of the relay lens to be used into account.

[Ⓒ]P-24 and P-46 phosphor screens are also available.

[Ⓓ]During normal (continuous) mode at maximum gain

[Ⓔ]No condensation

Controllable functions

Parameter	Remote controller	USB
Gain setting	Yes	Yes
Operation mode switching	Yes	Yes
Gate time fine setting	No	Yes
Excessive light protection reset	Yes	Yes
Excessive light protection display	Yes	Yes

Operation mode

Normal mode		Continuous mode
Gain mode	Trigger input level	C-MOS positive logic
	Setting method	Set from PC via USB interface
	Gate time *	10 μs to 100 ms (3 μs steps)
	Delay time *	10 μs to 100 ms (3 μs steps)
	Jitter (Max.)	1.5 μs

NOTE: * When using the USB interface, the following conditions must be met.

$$D \text{ (ms)} + W \text{ (ms)} + 2 \text{ (ms)} \leq T \text{ (ms)}$$

where D is the delay time, W is the gate time and the T is the trigger input interval.

Protective functions

Excessive light protection		Shuts off operation during excessive light warning.
Excessive light protection display*	During excessive light warning	Red LED flashes (on rear of head and remote controller operation panel)
	During shut off operation	Red LED is lit continuously (on rear of head and remote controller operation panel)
Repetition rate (Max.)*		500 Hz: Red LED is lit during shut off operation. (200 Hz Max. during communication)
Protection circuit reset		Reset switch on remote controller or command via USB interface

NOTE: * The LED on the rear side of the head can be turned on / off by control from a PC.

CHARACTERISTICS

Figure 1: Typical spectral response characteristics

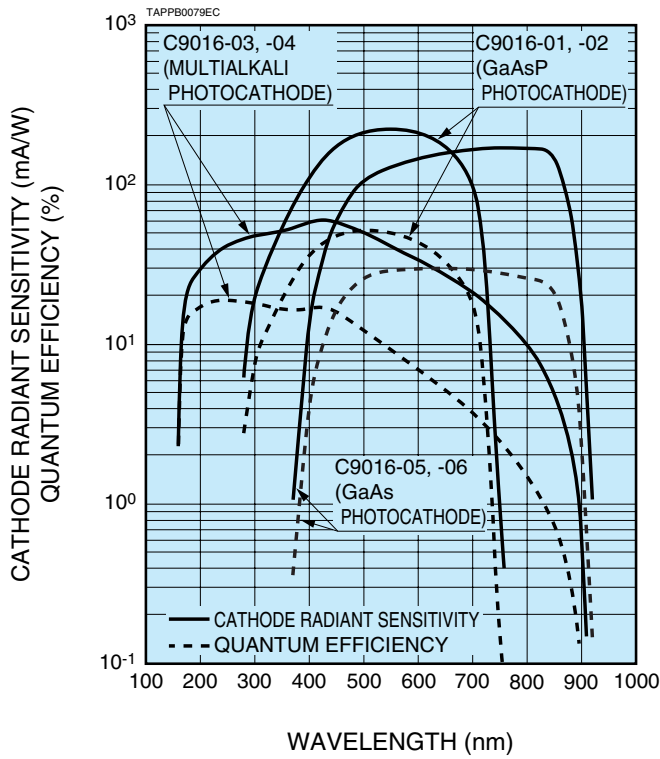


Figure 2: Typical luminous gain

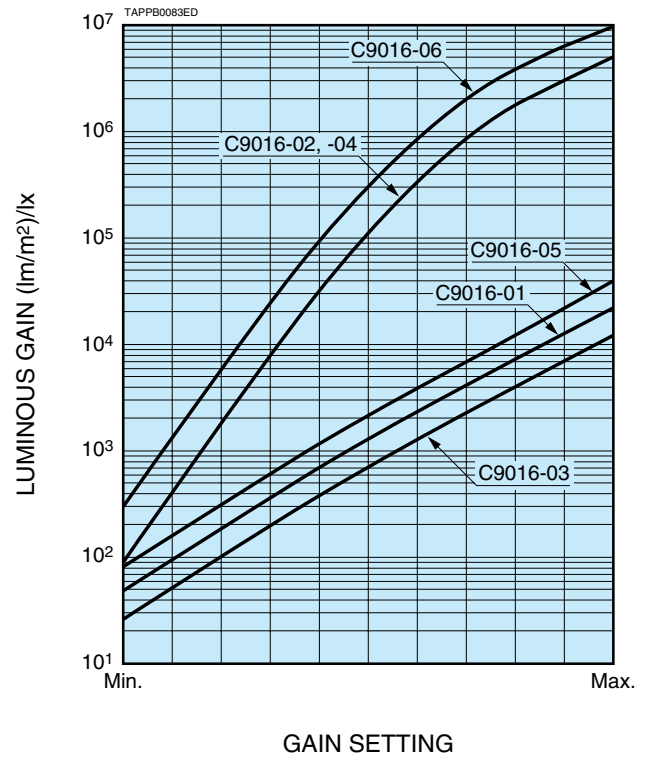


Figure 3: Typical phosphor screen spectral emission

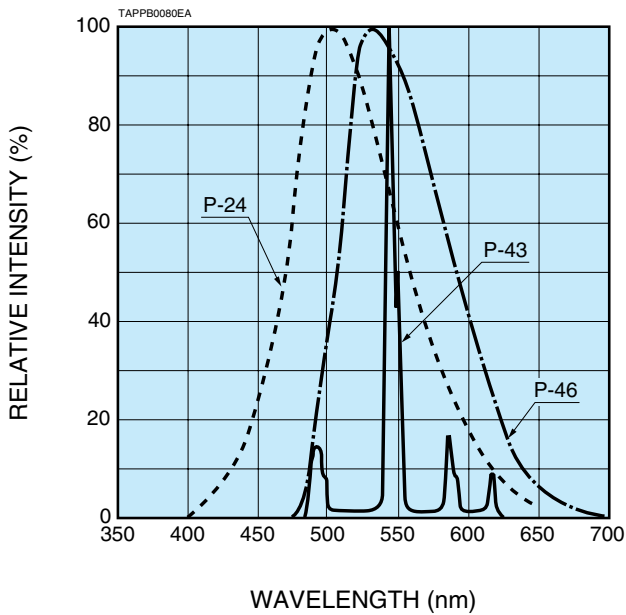
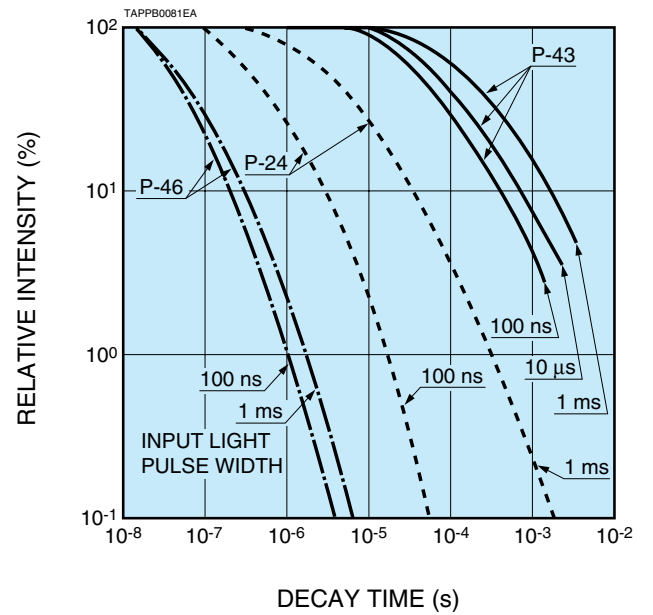
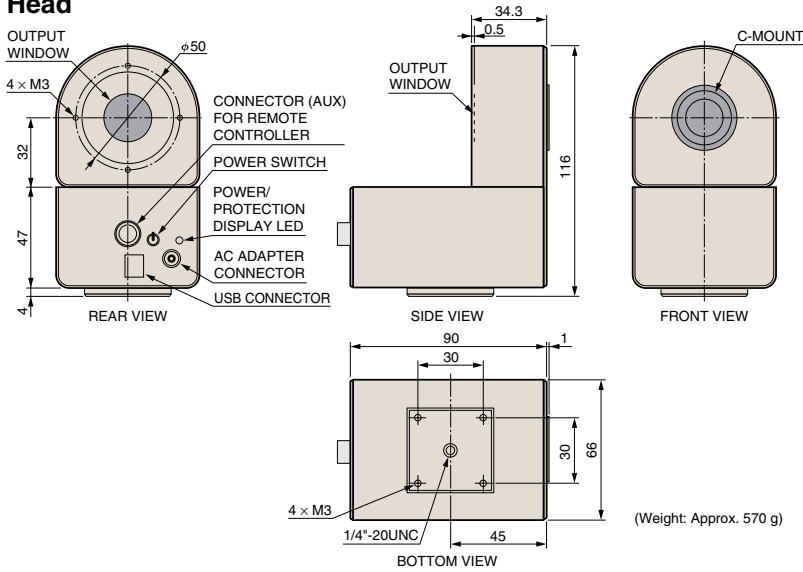


Figure 4: Typical phosphor screen decay characteristics

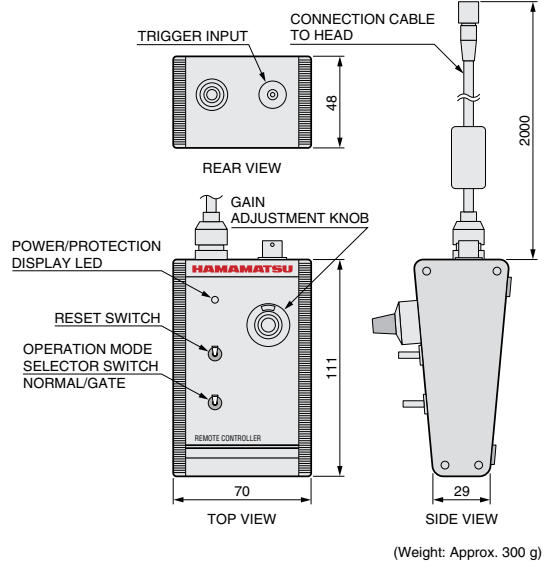


DIMENSIONAL OUTLINES (Unit: mm)

Head



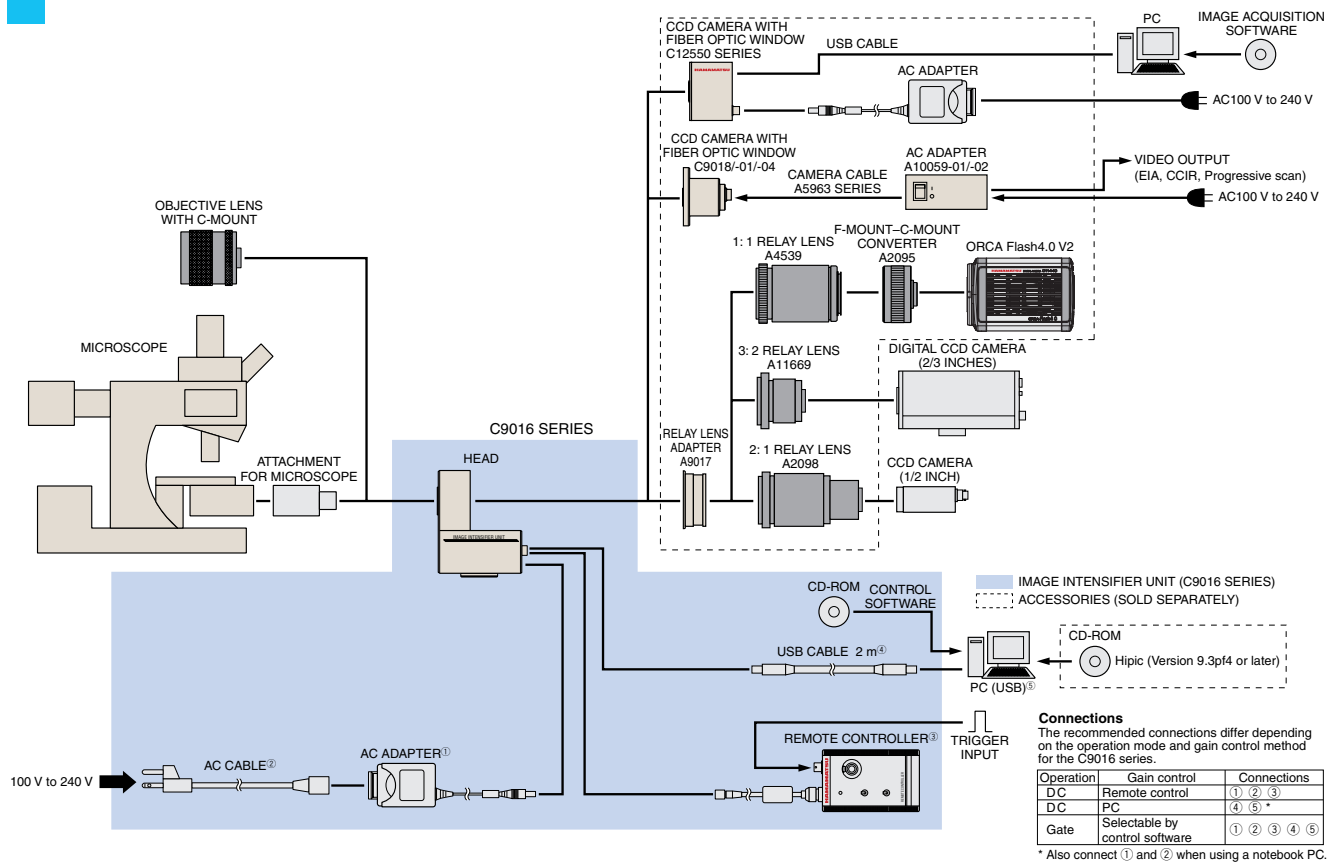
Remote Controller



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SETUP EXAMPLE WITH OPTICAL ACCESSORIES



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