

NEWS RELEASE

Hamamatsu Photonics has developed a cubic, compact, lightweight image intensifier unit connectable to most camera types.

We start accepting product orders from March 2nd, 2020.

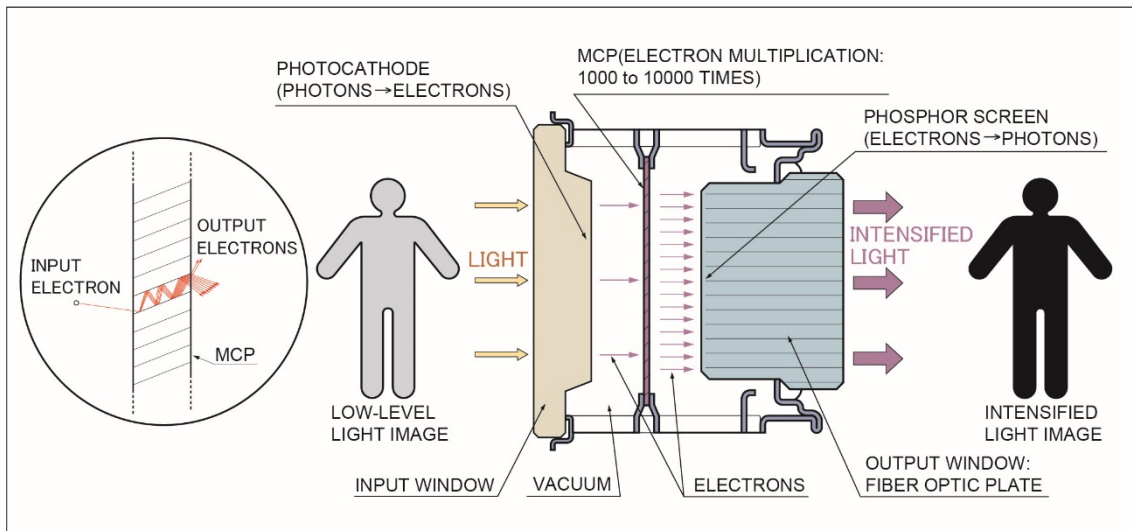
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President and CEO: Akira Hiruma

By applying unique circuit and structural design technology, here at Hamamatsu Photonics we have developed cube-shaped compact, lightweight image intensifier (or I.I.) units “C14245 series” that easily connect to most types of cameras. Mounting the camera connected to this I.I. unit into inspection equipment allows low-light-level imaging such as for capturing images of micro electrical discharges from printed circuit boards caused by poor insulation and images of combustion inside engines. We start accepting orders for the C14245 series I.I. units from March 2nd (Mon), 2020. Sales are primarily targeted toward manufacturers of printed circuit board inspection equipment, electrical devices, and transport equipment.

The C14245 series I.I. units will be on exhibit at the “International Technical Exhibition on Image Technology and Equipment 2019” held in Pacifico Yokohama (Nishi-ku, Yokohama, Japan) for 3 days from December 4th (Wed) to 6th (Fri), where many domestic and overseas manufacturers and experts in the most advanced machine vision technology companies gather to exhibit their products.

<Closer look at image intensifiers>

I.I. is an image intensifying tube primarily developed for night vision under starlight. A typical I.I. has a vacuum envelope made of ceramic in which a photocathode for converting light into electrons, a microchannel plate (MCP) for multiplying electrons, and a phosphor screen for reconvertng electrons into light are arranged in close proximity. Optically connecting an I.I. to an industrial camera allows imaging low-light-level phenomena including not only visible light but also invisible light in the near infrared and UV regions. A gate function can also be added as an electronic shutter to perform high-speed imaging.



Structure and operation of I.I.

<Overview of this product>

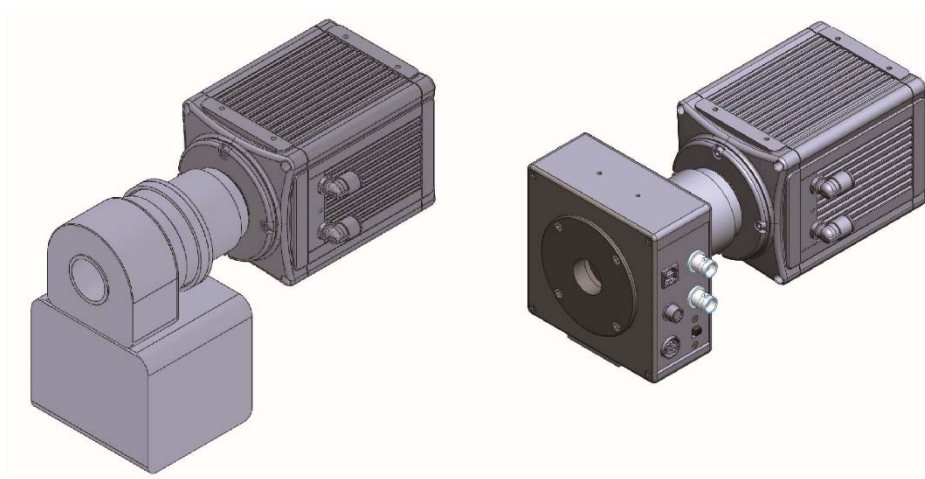
The C14245 series is a family of cubic, compact, lightweight I.I. units designed to easily connect to most types of cameras.

Operating an I.I. requires a high-voltage power supply circuit providing about 8000 volts and a control circuit. To make I.I. easier to handle and use, Hamamatsu Photonics has produced I.I. units assembled in conjunction with the necessary peripheral circuits. Those I.I. units have been used mainly with a compact CCD camera for low-light-level imaging in industry, biology, astronomy, and academic research fields, etc. Meanwhile, cameras have been greatly improved with higher performance and more diverse shapes and sizes. This increases the need for I.I. units that connect to various types of cameras even more easily than the conventional I.I. units that usually have a relatively large L shape configuration.

By rethinking the circuit layout and overall structural design to arrange the necessary circuits together around an I.I., we successfully fabricated a cube-shaped unit that easily connects to the body of various cameras and power cables. At the same time, we redesigned the electronic components and changed the circuit design to reduce the cubic volume and overall weight down to two-thirds that of conventional I.I. units. The cube-shaped design has a good weight balance that helps relieve mechanical stress on the connected camera. The C14245 series I.I. units in this way eliminate restrictions on the shape and size of camera to connect to and so will extend applications of low-light-level imaging and observation even to the invisible range, such as for imaging faint electrical discharges from poor insulation points on printed circuit boards, combustion status in engines, and cell fluorescence.

We will currently release 3 models of C14245 series I.I. units having sensitivity in different spectral ranges from UV to near infrared. We also provide higher sensitivity models that use a two-stage MCP for electron multiplication.

We will continue developing still more compact units that allow observing even more fast-changing phenomena.



Conventional I.I. unit (left) and newly developed I.I. unit (right),
both optically connected to a video camera

<Features of this product>

1. Easily connectable to various types of cameras

We redesigned the circuit layout and structure of the entire unit to relocate the required components around the I.I. periphery. This enabled us to fabricate a cube-shaped unit that easily connects to the body of most cameras and power cables. The cube-shaped design has a good weight balance that relieves the mechanical stress on the connected camera or microscope.

2. Compact and lightweight

Besides taking a close look at previously used electronic components and then employing smaller components, we devised the peripheral circuit design with dimensions slashed to 100mm×100mm×45mm (W×H×D) and a weight of only about 600 grams, so the cubic volume and weight are reduced to about two-thirds that of conventional I.I. units.

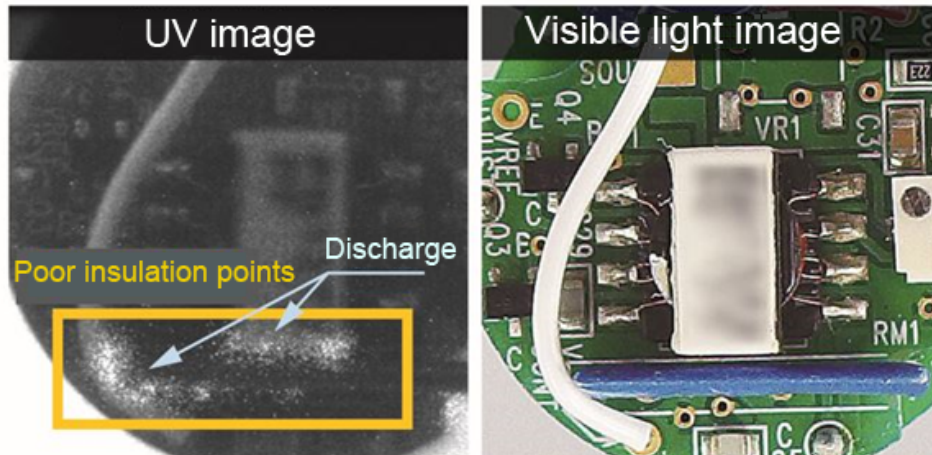


Image captured with camera connected to I.I. unit

Image captured with ordinary digital camera only

Imaging of discharge phenomena occurring due to poor insulation

● Main specifications

Item		C14245 series			Unit
Photocathode material		Multialkali	GaAsP	GaAs	-
Spectral response range		185 to 900	280 to 720	370 to 920	nm
Input and output faceplate size		18 dia. (*1)			mm
Luminous gain (Typ.)	1-stage MCP	1.1×10^4	2.2×10^4	4.0×10^4	(lm/m ²)/lx
	2-stage MCP	4.0×10^6	5.0×10^6	9.6×10^6	
Limiting resolution (Typ.)	1-stage MCP	64	64	64	Lp/mm
	2-stage MCP	57	57	57	
Operation mode		Continuous operation or gated operation			-
Gate operation (*2)		Gate time: 3 ns to DC Maximum gate repetition range: 30 kHz			-
Dimensions (W×H×D)		100 × 100 × 45			mm

*1: Effective area is 12.8 mm x 9.6 mm.

*2: Applies only to types with gate function.



I.I. unit C14245 series