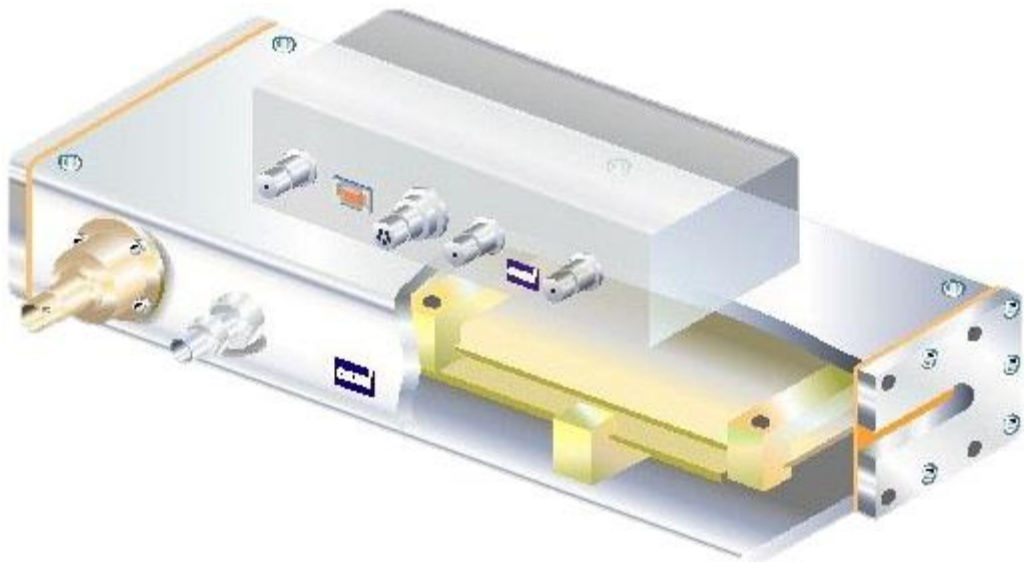


Digital Ion Chamber Controller

DIGITALIZATION ACHIEVES NOISE-FREE REMOTE MEASUREMENT

Digital Ion Chamber



Ion chamber



Digitizer



Controller



Characteristics of Digital Ion Chamber

What Is Digital Ion Chamber?

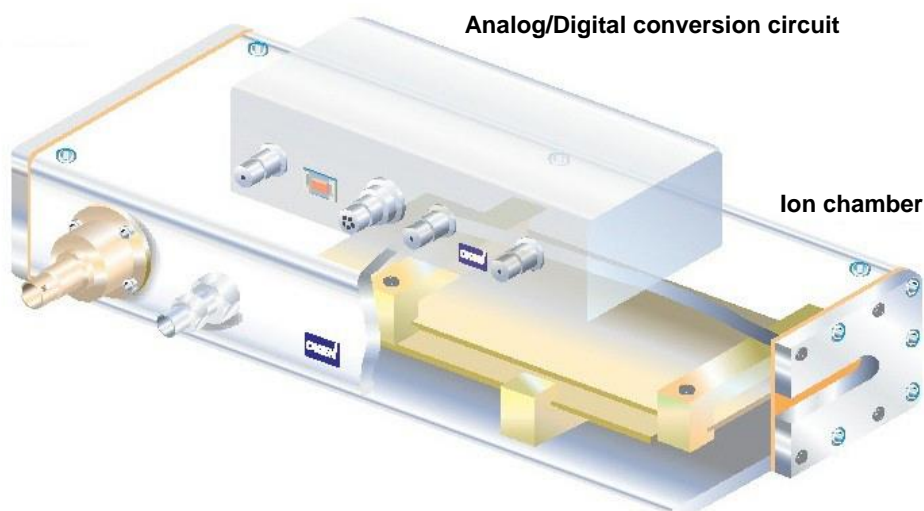
An ion chamber is a typical analog detector for measuring radiation intensity from the ionization current of gas. With its simple structure and high linearity and dynamic range, ion chambers have been used for a long time as radiation intensity monitors.

Analog type ion chambers are weak in noise and not suitable for remote measurement with use of a micro current amplifier, and requires a high-cost micro current measurement system. Analog ion chambers are widely used as beam monitors in radiation light facilities. However, needs for remote operations, including range switching, have increased in recent years.

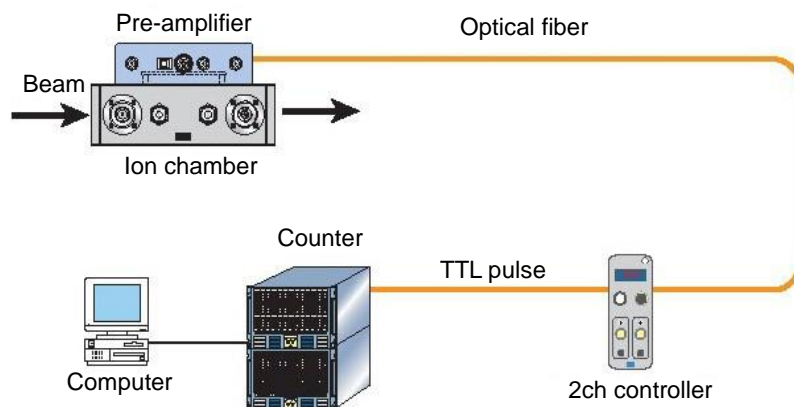
Mechanism of Digital Ion Chamber

The mechanism of the ion chamber is same as that of analog types, but the digital ion chamber is characterized by the detector itself with a digital frequency output in proportion to the current. This output being converted to an optical pulse and led by the optical fiber, enables long- distance (30m in standard) remote measurements and is also strong in noise. Range switching is easily achieved with the controller at hand. An optical pulse is outputted after being converted to a TTL pulse, and can be directly inputted into your scaling circuit. Also, in the range of or above $10^{-8}A$, the micro current amplifier offers a measurement system with performance equivalent to or exceeding that of high class amplifiers, achieving excellent cost performance. The power supply for the ion chamber is not required.

Structure of Digital Ion Chamber



Composition of Digital Ion Chamber



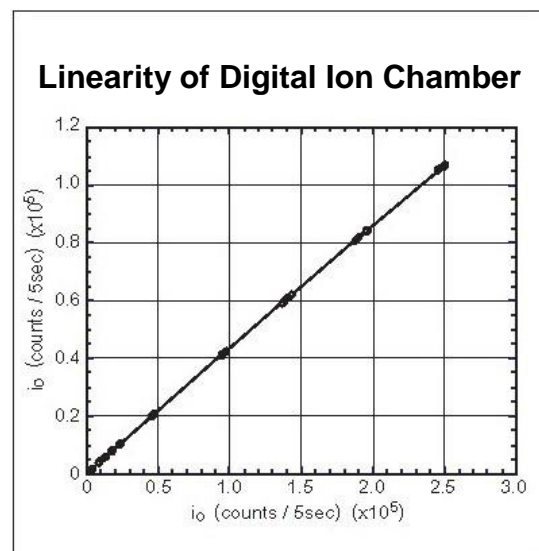
Composition of Digital Ion Chamber

(1) Number of pre-amplifier connections	- Max. of 2 sets	(7) Bias voltage for chamber	
(2) Input signal	- Optical frequency signal	Output voltage output	- 0 – +3000V (Dial value x3)
(3) Output signal	- Frequency signal output +5V, 0.5µsec (TTL level)	Voltage setting accuracy	- ±0.5%FS or less
	10 ⁻¹³ – 10 ⁻⁹ (A): 1MHz/10 ⁻⁹ (A)	Ripple noise	- 30mVp-p or less
	10 ⁻¹² – 10 ⁻⁸ (A): 1MHz/10 ⁻⁸ (A)	(8) Indicator indication	- ± 0.5% FS or 2 dig or less accuracy
	10 ⁻¹¹ – 10 ⁻⁷ (A): 1MHz/10 ⁻⁷ (A)		Indicator switch/ output frequency and bias voltage
	10 ⁻¹⁰ – 10 ⁻⁶ (A): 1MHz/10 ⁻⁶ (A)	(9) Over level indication	- Lights up when the output frequency is equal to or above 1.03 MHz.
(4) Accuracy	- ±2%FS or less (For each range of 10 ⁻⁶ 10 ⁻⁷ 10 ⁻⁸ A)	(10) Pre-amplifier gain switch	- 4 position switching
	- ±3%FS or less (Range 10 ⁻⁹ A)	(11) Connection with the pre-amplifier	- Signal (frequency) output: Optical connector
(5) Integral linearity	- ±0.1%FS or less		High voltage input: Coaxial connector Low voltage and gain control: Multipole connector
(6) Analog output	- 0–10VFS	(12) Dimensions	- NIM standard 2 width module
		(13) Required power supply	
			- +24V:160mA, +12V:85mA,-24V:35mA,-12V:35mA

The Digital Ion Chamber Installed In Photon Factory



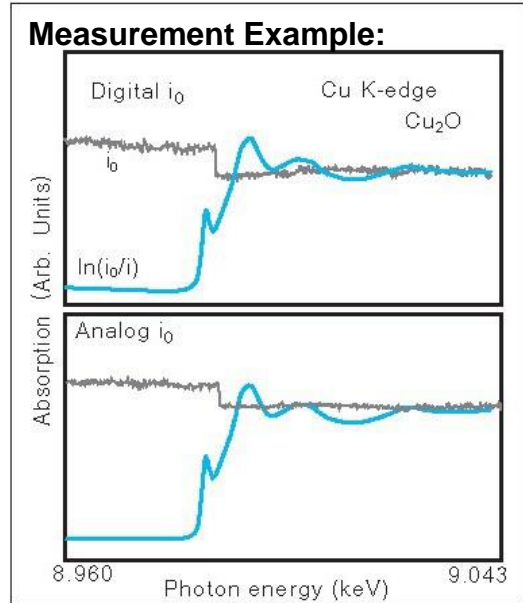
The digital ion chambers (Specific to photon factories) for incident beam and IO (left) and for transmission beam and I (right) are installed, with the sample between them. The output of the ion chamber is led to outside the hatch (laboratory) by the optical fiber, and the number of pulse for a preset time is measured.



The graph showing linearity of the digital ion chamber, shows a high linearity between the incident beam intensity (x-axis) and the digital ion chamber output (y-axis).



Digital ion chambers (Designed specific to SPring-8) for incident beam and IO (left) and for transmission beam and I (right).



A sudden change (jump in the graph) in incident beam intensity caused by gap tuning of SPring-8 undulator is completely standardized. Results of the remote measurement at a distance of 30 meters.

Features

- ◆ Conversion to optical frequency signal/ electric frequency signal (I/F signal)
- ◆ External output of I/F signal
- ◆ Output signal monitor (4-disit LED indicator)
- ◆ Output frequency and high voltage output
- ◆ Over level indication (LED lamp)
- ◆ Bias power supply for the chamber and power supply for the I/F circuit.
- ◆ Pre-amplifier gain switching

[Standard System Composition]

- (1) Pre-amplifier (S -2340A): 2 units
- (2) Controller (S -2341A): 1 unit
- (3) Connection cable
 - Between the chamber and pre-amplifier for high voltage (Low noise) x 2
 - For signal (Low noise) x 2
 - Between the pre-amplifier and controller Composite cable (5 m) x 2
- (4) Operation manual (Test report)

The composite cable between the pre-amplifier and controller can be made up to a length of 5-40 m, in units of meters.

When cables with length other than standard length (5m) are needed, please specify the length when ordering.

A single pre-amplifier can be purchased.



OHYO KOKEN KOGYO CO., LTD

Head office/Factory:	1642-26,Oaza-Kumagawa, Fussa city, TOKYO 197-0003, JAPAN	+81-425-52-4511 (main)
Osaka Business Office:	4-4-63, Miyahara, Yodogawa-ku, OSAKA, JAPAN	+81-6-394-4168 (main)
Higashimatsuyama Factory:	88-77,Oaza-Shingo,Higashimatsuyama city, SAITAMA, JAPAN	+81-493-23-9515 (main)