SPECIFICATIONS

Pulse Height Analyzer

KH-03

RION CO., LTD.

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Outline

The Pulse Height Analyzer KH-03 accepts an analog input signal from a particle counter and analyzes pulses comprised in this signal in real time. Signals are ranked by pulse height. The unit has a PHA mode for creating a pulse height based histogram, and an MCS mode for observing time-based fluctuations of pulse count.

In PHA mode, the histogram can be used to detect the pulse count between selected channels, and to determine the voltage and channel where the cumulative count reaches 50% of the total count.

The system consists of a supplied probe for connection of the analog signal from the particle counter, the main unit which performs analysis of the signal from the probe, and the Pulse Height Analyzer control software which controls the hardware and serves for data management. The user must provide a generic computer on which the control software is installed. An adapter for connection between the main unit and the computer is supplied.

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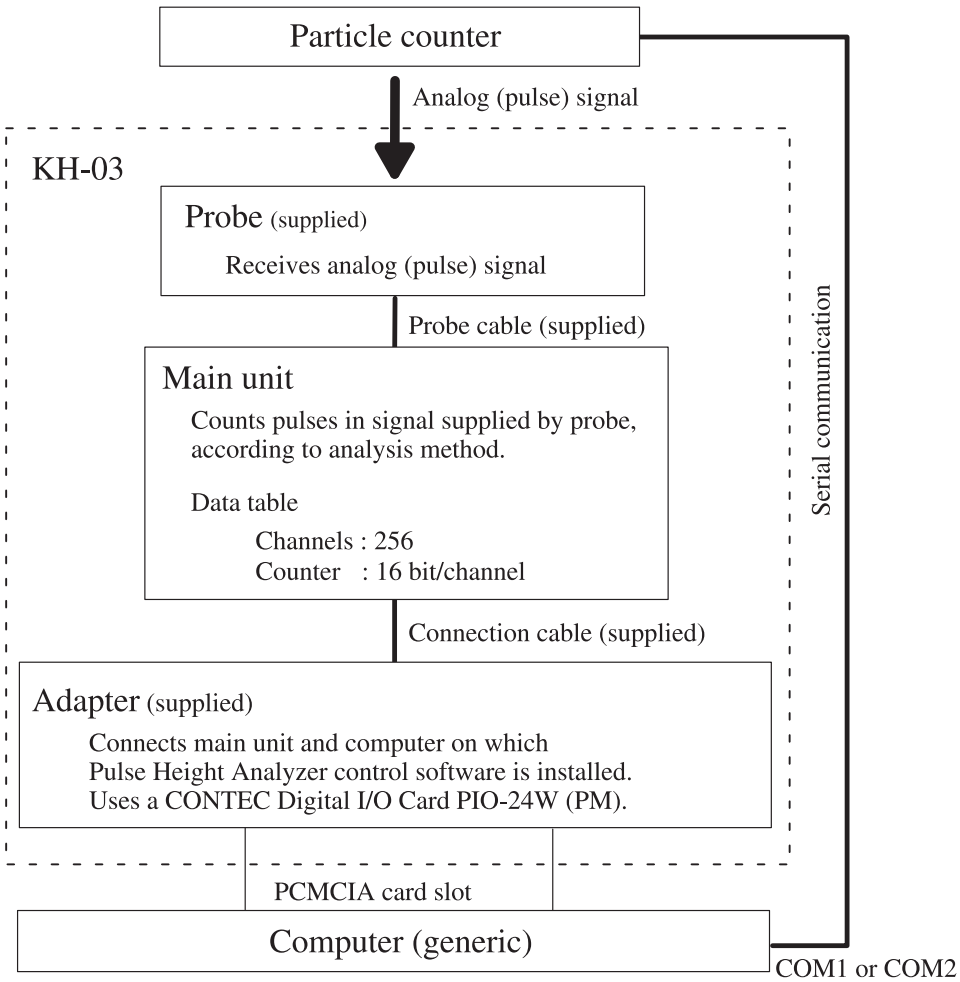


Block Diagram

Specifications

Common Specifications for Main Unit and Probe

Input pulse detection frequency response

1 kHz to 500 kHz

Analysis voltage range: 0.25 to 64 mV, 0.5 to 128 mV, 1 to 256 mV, 2 to 512 mV, 4 to 1024 mV, 8 to 2048 mV, 16 to 4096 mV, 32 to 8192 mV, 64 to 16384 mV; depending on probe gain setting

Pulse height analysis resolution

0.25 mV, 0.5 mV, 1 mV, 2 mV, 4 mV, 8 mV, 16 mV, 32 mV, 64 mV; depending on selected analysis voltage range (in order of setting items)

Pulse height analysis resolution accuracy

Input pulse height vs. output tolerance

Using a sine wave input signal conforming to the bandwidth stated in "Input pulse detection frequency response", with a pulse height of 1/4 or more of full-scale value for the respective analysis voltage ranges, tolerance is within ±5%.

Input pulse height vs. output differential linearity

Using a sine wave input signal conforming to the bandwidth stated in "Input pulse detection frequency response" for the respective analysis voltage ranges, tolerance is within ±0.2 mV, ±0.4 mV, ±0.8 mV, ±1 mV, ±2 mV, ±4 mV, ±8 mV, ±16 mV, ±32 mV.

Main Unit Specifications

Sample time: 2, 10, 20, 50, 100, 250, 500, 1000 µs; selectable
Tolerance within ±5%

Non-detection interval: 1/10 of sample time

Analysis modes: PHA mode (pulse height analysis)
MCS mode (multi channel scaling)

Interval time (MCS mode): 0.1 to 600 s, 0.1-s steps
Tolerance within ±(1 ms + 0.1% of setting)

Pulse count memory

Size: 256 channels

Capacity (pulse count): 16 bits (65,535 counts) per channel

Trigger level settings	0.25 to 64 mV, 0.5 to 128 mV, 1 to 256 mV, 2 to 512 mV, 4 to 1024 mV, 8 to 2048 mV, 16 to 4096 mV, 32 to 8192 mV, 64 to 16384 mV; depending on selected analysis voltage range (in order of probe analysis voltage range items) Setting steps: 0.25 mV, 0.5 mV, 1 mV, 2 mV, 4 mV, 8 mV, 16 mV, 32 mV, 64 mV; depending on selected analysis voltage range (in order of probe analysis voltage range items) Using a sine wave input signal conforming to the bandwidth stated in "Input pulse detection frequency response", tolerance within ±5%
Power requirements	Source for powering probe, main unit, and adapter Rated voltage: 100 to 240 V AC (±10%), 50/60 Hz Rated power consumption 40 VA
Dimensions	300 mm (W) × 35 mm (H) × 240 mm (D) (without protruding parts)
Weight	Approx. 1.9 kg

Probe Specifications

Absolute maximum input voltage range	±18 V
Input impedance	1 MΩ
Input capacitance	35 pF
Input connector	BNC
Main unit connection cable	Length 2 m
Dimensions	53 mm (W) × 28 mm (H) × 75 mm (D) (without protruding parts and cable)

Adapter Specifications

Card type	CONTEC Digital I/O Card PIO-24W (PM)
Slot requirements	Type II size PC Card slot supporting PCMCIA Rel. 2.0 or JEIDA Ver. 4.1 or later (including PC Card Standard)
Main unit connection cable	Length 400 mm

Software Specifications

Controls function settings, PHA mode and MCS mode measurement operation, and pulse count memory readout.
Displays graphics (histogram) and numeric list on computer, performs arithmetic processing, and allows data storage, read-in, and printout.

Operating system: Microsoft Windows 98, Windows 2000 or Windows XP

Basic operation and functions

PHA mode

Measurement: Automatic measurement
- Automatic repeated measurement
  - Hold interval 2 to 6000 s, 1-s steps
  - Repeat count 2 to 10000 times, infinite
- Manual stop

Setting items:
- Probe gain
- Trigger level
- Sample time
- Measurement end conditions
  - Using measurement time: 1 to 6000 s, 1-s steps
  - Using total count: 1 to 100000, 1-count steps

Graph functions: Pulse height (channel) based pulse count histogram
- Vertical axis full-scale switching (automatic, manual)
- Vertical axis switching (linear, logarithmic)
- Horizontal axis compression: 16, 32, 64, 128 channels

Display:
- Cumulative percentage curve
- Marker
- 16 CH relative frequency distribution
- Numeric list
- Measurement time and total count

Functions:
- Peak pulse count and channel search
- Cumulative count 50% voltage and standard deviation display
- Smoothing
- Use particle size for graph horizontal axis
- Particle counter sync
  - For synchronized measurement by controlling particle counter via serial interface (not available for some models)

MCS mode

Measurement	Automatic measurement
	Manual measurement
Setting items	Probe gain
	Trigger level
	Sample time
	Interval time
	0.1 to 600 s, 0.1-s steps
Graph functions	Time (channel) based pulse count histogram
	Vertical axis full-scale switching (automatic, manual)
	Vertical axis switching (linear, logarithmic)
Display	Marker
	Numeric list
	Measurement time and total count
Functions	Peak pulse count and channel search
	Smoothing
Common functions	Graph and numeric list printing
	Graph color setting
	Comment text input
	Measurement data, measurement parameter store/read
	Copy graph/list to clipboard
	Message display
	On-line help

Common Specifications for Entire System

Measurement time accuracy (PHA mode)

1 to 6 s within ±10%
7 to 60 s within ±1%
61 to 6000 s within ±0.1%

Interval time accuracy (MCS mode)

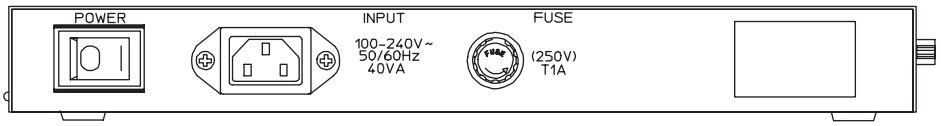
within ±(1 ms + 0.1% of setting)

Ambient condition for use +5 to +35ºC, 20 to 80% RH (no condensation)

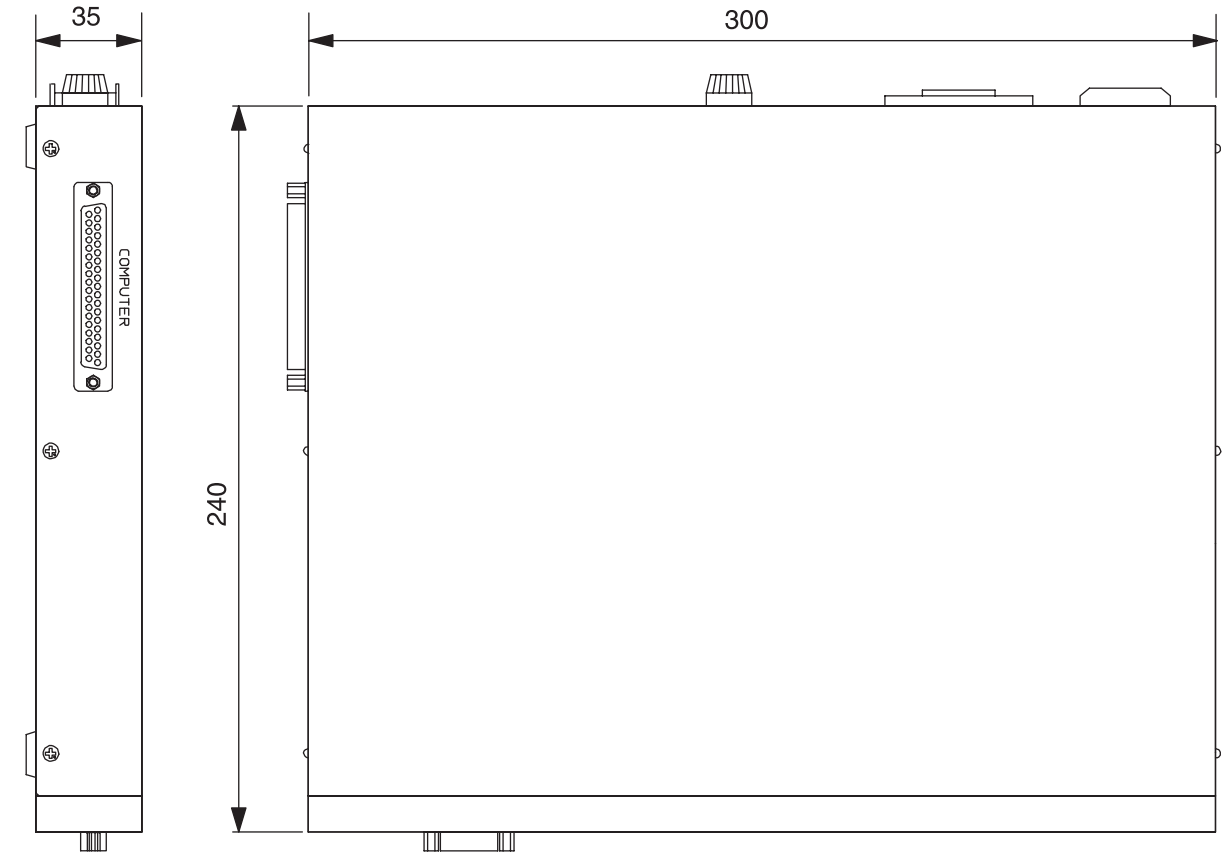
Ambient condition for storage

-10 to +50ºC, max. 90% RH (no condensation)

Supplied Accessories	Probe	1
	Probe cable	1
	BNC-BNC cable, length 90 mm	1
	BNC-alligator clip cable, length 90 mm	1
	Adapter	1 set
	[CONTEC Digital I/O Card PIO-24W (PM)]	
	Power cord, length 2 m	1
	Installation disk (CD-ROM)	1
	Instruction manual	1
	Inspection certificate	1



Rear View



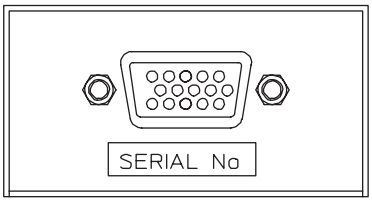
Left Side View

Top View

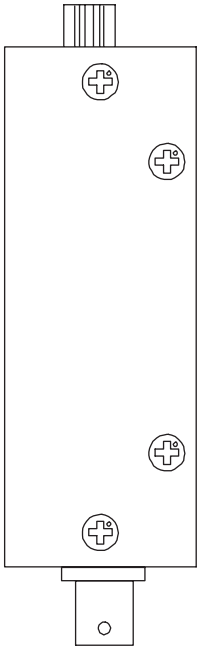
Front View

Unit: mm

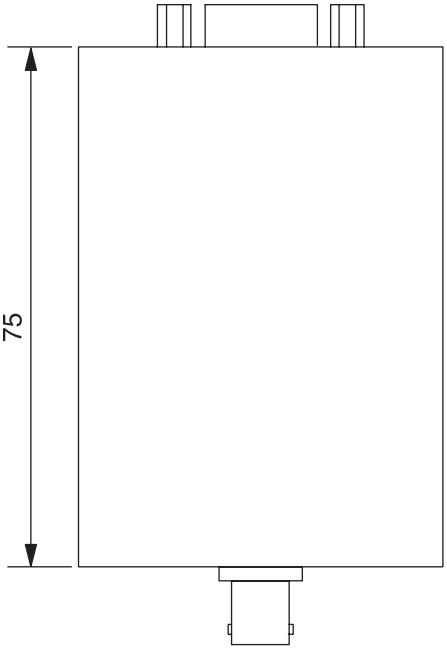
Main Unit Dimensional Drawings



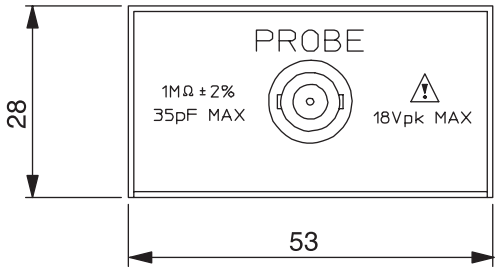
Rear View



Side View



Top View



Front View

Unit: mm

Probe Dimensional Drawings

Specifications subject to change without notice