

# SPECIFICATIONS

## PCD-300A

Measurement objects	Strain gage, and strain gage type transducers
No. of measurement channels	4/unit (max. 16/4 units including PCD-320A) (Note 1)
Gage resistance	One- and two- gage systems 120 Ω Four-gage system 120 Ω to 1 kΩ
Bridge voltage	AC 2 Vrms: carrier wave, 1 kHz: sine wave
Balance adjustment range	Resistance: not less than ±2% (±10000 x 10 <sup>-6</sup> strain) Capacity: not less than 5000 pF
Balance adjustment system	Resistance: totally electronic auto balancing system Capacity: CST system (auto follow-up)
Nonlinearity	Within (±0.1%FS + 1 digit) (Note 2)
Gage factor	Fixed at 2.00
Range	7 steps: (200, 500, 1000, 2000, 5000, 10000) x 10 <sup>-6</sup> strain and OFF
Response frequency range	Accuracy: within ±(0.5% of range value) x 10 <sup>-6</sup> strain DC to 200 Hz, Deviation: ±10%
Stability	Zero point—time: within ±1 x 10 <sup>-6</sup> strain/8 h Zero point—temperature: within ±0.2 x 10 <sup>-6</sup> strain/°C Sensitivity—time: within ±0.3%/8 h Sensitivity—temperature: within ±0.05%/°C
A-D type transducers	Resolution: 12 bits System: successive approximation Sampling type: simultaneous sampling
Sampling frequency	Output: complement on 2 (-2048 to 2047) 1, 2, 5, 10, 20, 50, 100, 200, 500 Hz, 1, 2, 5 kHz Simultaneous sampling of four channels (At 5 kHz, simultaneous sampling of four units (16 channels) is possible.)
External trigger signal	System: no-volt contact, open collector, one at 5 V CMOS level CH:1
Saving of set values	Range values and balance adjustment values are saved in the internal nonvolatile memory.
Interface	USB
Operating temperature & humidity range	0 to 40°C, 20 to 85%RH (no condensation)
Power supply	AC 100 to 240 V (Use the AC adapter SA-10A supplied as a standard accessory.) (Note 3)
Outside dimensions and weight	265.2 (W) x 24.7 (H) x 215 (D) mm (excluding projections), Approximately 930 g (excluding the standard accessory AC adapter)
Safety standard	EN61010-1, Installation category: II, Pollution degree: 2
EMC standard	EN61326-1, Class A equipment
Standard accessories	AC adapter SA-10A, USB cable N-38 (1 m), lead wire removing tool PC-T-02, CD-R (including control software PCD-30A, Instruction Manual, etc.) (Note 4)
Optional accessories	DC power cable P-68 (2 m) (Note 5), input cable N-70 (10 cm), U-17 (50 cm), U-18 (1 m), U-19 (2 m), U-20 (5 m), USB cable N-38 (1 m), N-39 (2 m), synchronous cable N-90 (25 cm) (Note 4)

(Note 1) To connect two or more sensor interface units to take measurements, an optional synchronous cable (N-90), as well as a USB HUB and USB cable are necessary. If no USB cable is provided for the USB HUB, use an optional USB cable (N-38, N-39).

(Note 2) This is equivalent to within ±0.15%FS.

(Note 3) Be sure to use the provided standard AC adapter SA-10A.

(Note 4) To ensure compliance with the standards, the equipment must be used as follows:

- Use the provided standard AC adapter SA-10A.
- Ground the GND terminal.
- The sensor connection cable must be a shield cable less than 30 m in length, and must be used indoors.
- The cable to be connected to the TRG terminal must be less than 30 m in length, and must be used indoors.
- The USB cable to be connected to the PCD-300A should be used indoors.
- As a synchronous cable, use the N-90, which is available at an additional cost.

(Note 5) DC 11 V to 30 V

When DC power is used, the equipment does not comply with the CE markings.

## PCD-320A

Measurement object	Voltage
No. of measurement channels	4/unit (max. 16/4 units including PCD-300A) (Note 1)
Input system	Unbalance
Input resistance	Not less than 1 MΩ
Input coupling	DC/AC switching
Range	7 steps: 1, 2, 5, 10, 20, 50 V, and OFF
Accuracy	Within ±0.2%FS
Response frequency range	DC connection: DC to 1 kHz AC connection: 0.2 Hz to 1 kHz Deviation: within +1, -3 dB
Low-pass filter	Transmission characteristic: secondary Butterworth Cutoff frequency: 5 steps: 10, 30, 100, 300 Hz and FLAT Amplitude ratio at the cutoff point: -(3 ± 1) dB Attenuation characteristic: -(12 ± 1) dB/oct.
Stability	Zero point—time: within ±0.1%FS/8 h Zero point—thermometer: within ±0.01%FS/°C Sensitivity—time: within ±0.3%/8 h Sensitivity—thermometer: within ±0.03%/°C
A-D type transducers	Resolution: 12 bits System: successive approximation Sampling type: simultaneous sampling
Sampling frequency	Output: complement on 2 (-2048 to 2047) 1, 2, 5, 10, 20, 50, 100, 200, 500 Hz, 1, 2, 5 kHz Simultaneous sampling of four channels (At 5 kHz, simultaneous sampling of four units (16 channels) is possible.)
External trigger signal	System: no-volt contact, open collector, one at 5 V CMOS level CH:1
Saving of set values	Range values, balance adjustment values, and DC/AC connection settings are saved in the internal nonvolatile memory.
Interface	USB
Measurement input terminal	Input terminal: BNC connector (Note 2) Insulation between input and output: none Max. allowable input voltage: AC 30 V or DC 60 V Max. rated voltage to ground: AC 30 V or DC 60 V (Note 3)
Operating thermometer & humidity range	0 to 40°C, 20 to 85%RH (no condensation)
Power supply	AC 100 to 240 V (Use the AC adapter SA-10A supplied as a standard accessory.) (Note 4)
Outside dimensions and weight	265.2 (W) x 24.7 (H) x 215 (D) mm (excluding projections), Approximately 750 g (excluding the standard accessory AC adapter)
Safety standard	EN61010-1, Installation category: II, Pollution degree: 2 (Note 5)
EMC standard	EN61326-1, Class-A equipment (Note 5)
Standard accessories	AC adapter SA-10A, USB cable N-38 (1 m), lead wire removing tool PC-T-02, CD-R (including control software PCD-30A, Instruction Manual, etc.)
Optional accessories	DC power cable P-68 (2 m) (Note 6), output cable U-58 (BNC-alligator clip 1.5 m), U-59 (BNC-BNC 1.5 m), USB cable N-38 (1 m), N-39 (2 m), synchronous cable N-90 (25 cm)

(Note 1) To connect two or more sensor interface units to take measurements, an optional synchronous cable (N-90) as well as a USB HUB and USB cable are necessary. If no USB cable is provided for the USB HUB, use an optional USB cable (N-38, N-39).

(Note 2) The "-" of the BNC terminal is connected to the housing and the GND terminal.

(Note 3) Be sure to ground the GND terminal. If grounding is not possible due to unavoidable reasons, use the PCD so that the voltage between "+" and "-" of BNC terminal and the ground will be within the maximum rated voltage.

(Note 4) Be sure to use the standard AC adapter SA-10A.

(Note 5) To ensure compliance with the standards, the equipment must be used as follows:

- Use the provided standard AC adapter SA-10A.
- Ground the GND terminal.
- The cable to be connected to the measurement input terminal (BNC connector) must be a BNC coaxial cable.
- The cable to be connected to the TRG terminal must be less than 30 m in length, and must be used indoors.
- The USB cable to be connected to the PCD-320A should be used indoors.
- As a synchronous cable, use the N-90, which is available at an additional cost.

(Note 6) DC 11 V to 30 V

When DC power is used, the equipment does not comply with the CE markings.

# SOFTWARE (PCD-30A)

The control software (PCD-30A) controls the sensor interface (PCD-300A/320A) from the PC, and executes operations such as setting of measurement conditions, recording of data, displaying of graphs, and converting of data into the CSV format on English version MS-Windows98/Me/2000/XP. This software is provided on the CD-R, and can be used by installing into the hard disk of a PC.

## ■ Functions

- Set measurement conditions
- Execute and control measurement
- Data monitor and record
- Display graphs
- Generate printer output
- Save and read measurement conditions
- Display recorded data and convert data format
- Perform digital-filter processing of recorded data

## ■ Setting of measurement conditions

Measurement objects	Strain gage, and Strain gage type transducers (PCD-300A), voltage (PCD-320A)
No. of measurement channels	Max. 16 (Up to 4 PCD-300A/320A units can be controlled.)
Sampling frequency	1, 2, 5, 10, 20, 50, 100, 200, 500 Hz, 1, 2, 5 kHz
Measurement modes	Selectable from 4 modes: manual measurement, interval measurement, analog trigger measurement, and external trigger measurement
Manual measurement	Manual data recording at any time
Interval measurement	Automatic data recording at preset intervals
Analog trigger measurement	Automatic data recording under the preset trigger condition
External trigger measurement	Automatic data recording with an external signal
No. of recorded data	Set any number from 2 to 100000.
No. of repetitions	Set any number from 1 to 1000 for interval measurement, analog trigger measurement, and external trigger measurement.
Title	Enter a title that is 1 to 40 letters long for each recorded data file.
Interval conditions	Set the interval start time (year, month, day, hour, minute, and second). Set the interval length from 5 seconds to 99 hours 59 minutes 59 seconds.
Analog trigger condition	Set conditions to any 2 channels out of 1 to 16 channels (2 conditions). Trigger level: set % of the range value (-99 to 99%). Trigger slope: select rise, fall, or both.
External trigger condition	No. of pre-triggers: set any number from 0 to 1000. Trigger slope: select rise, fall, or both. Data No. before trigger: Set any number from 0 to 1000.

## ■ Measurement Channel Condition

Execution of measurement	Set execution of measurement for each channel.
Range	Set a range value for each channel.
Range value	7 steps: (200, 500, 1000, 2000, 5000, 10000) x 10 <sup>-6</sup> strain and OFF (PCD-300A) 7 steps: 1, 2, 5, 10, 20, 50 V and OFF (PCD-320A)
Low-pass filter	5 steps: 10, 30, 100, 300 Hz and FLAT (PCD-320A)
Input coupling	Set DC or AC (PCD-320A).
Calibration coefficient	Set a value to multiply the measured data for each channel.
Setting range	-1E8 to 1E8 (0 cannot be set.)
Offset	Set an offset value to be added to the measured data for each channel (data multiplied by the calibration coefficient).
Setting range	-1E8 to 1E8 (0 can be set.)
Unit	Set a unit for the measured data for each channel. 63 units are available to choose from. In addition, 3 units of 1 to 7 letters each can be set.
Channel name	Enter a comment 1 to 18 letters for each channel.
Execution of balance	Set the execution of balance for each channel (PCD-300A).

## ■ Saving and Reading of Measurement Conditions

You can save measurement conditions or measurement channel conditions in a measurement condition file (any file name). You can also read and reset a measurement condition file based on the previous measurement conditions.

## ■ Display During Measurements and Data Recording

During measurement or data recording, data can be monitored either on a Y-Cycle graph (1 graph, 2 graphs), or X-Y graph.	
Y-Cycle graph	Up to 5000 data can be displayed on a Y-Cycle graph, with its X-axis indicating measurement frequency.
Wave form 1 graph	One graph is displayed in one window. One graph can display up to 4 channels (numeric data is displayed at the same time).
Wave form 2 graph	Two graphs are displayed in one window. One graph can display up to 8 channels, with one window displaying up to 16 channels (numeric data is displayed at the same time).

## X-Y graph

One graph is displayed in one window. Up to 4 channels are set for the Y-axis, while one channel is set for the X-axis.

## ■ Recording and Saving of Data

Data recording is executed by manual or automatic measurement (interval measurement, analog trigger measurement, and external trigger measurement).	
Manual measurement	Data recording may be initiated manually at any time.
Interval measurement	Data recording automatically starts at the preset interval start time.
Analog trigger measurement	Data recording automatically starts when the preset trigger conditions are met. Two trigger conditions (two channels) can be set. Data recording is triggered by AND or OR.
Trigger AND	Data recording automatically starts when both of the two trigger conditions are met.
Trigger OR	Data recording automatically starts when at least one of the two trigger conditions are met.
External trigger measurement	Data recording automatically starts when an external trigger signal has met the trigger condition.
Completion of recording	Recording is completed when data of the preset number has been recorded.
Data saving	Measured data is saved in a recorded data file, together with data measurement conditions.

## ■ Data Regeneration

It is possible to display recorded data file on graphs and numbers, extract a part of the data file, or convert data into CSV format.	
Display of graphs	2 types: Y-Cycle graph and X-Y graph
Y-Cycle graph	1, 2, or 4 graphs are displayed in one window. One graph can display up to 4 channels, and one window can display up to 16 channels.
X-Y graph	One graph is displayed in one window. Up to 8 channels can be displayed on Y-axis, and one channel can be displayed on X-axis.
Display of numeric data	Numeric data is displayed in a table format. One window displays recorded data of any 8 channels, up to 10000 data for each channel.
File conversion	
Data extraction	Data of a designated area is extracted and saved as a new recorded data file.
CSV conversion	Data in a designated area is extracted and saved as a new CSV file.
Editing	It is possible to change measurement conditions and edit the entire recorded data (data of numeric values cannot be edited).
Condition items	It is possible to edit the calibration coefficient, offset, unit, and channel name.
Editing result	Editing result is reflected on displayed graphs, numeric values, files of extracted data, and CSV files.

## ■ Filter Process (Analysis Function)

All channels of the recorded data can undergo a digital filter process. The analysis result is saved as a separate file.	
Kind of filter	Select the kind from Butterworth, Elliptic, Bessel, and Chebyshev.
Filter type	Select the type from low-pass, high-pass, band-pass, and band-stop.
Order	Set the order of the digital filter process.
Cutoff frequency	Set the cutoff frequency for the digital filter process.

## ■ Operation environment

CPU	When one PCD-300A/320A unit is used, at least Pentium II 300 MHz or the equivalent is required (Pentium III 700 MHz is recommended). When multiple PCD-300A/320A units are used, at least Pentium III 600 MHz or the equivalent is required (Pentium III 700 MHz is recommended).
OS	English version MS-Windows98/98SE/Me/2000 (Professional version)/XP
Memory	When multiple PCD-300A/320A units are used, at least 128 M bytes is required (256 M bytes is recommended).
Hard disk	Free space of at least 10 M bytes (not including measurement data) is required.
Display	The resolution should be at least 1024 x 768 dots. (Note) Display colors: high colors of at least 16 bits
Interface	USB
CD-ROM drive	The CD-ROM drive is used to install the standard accessory control software (PCD-30A).
(Note)	A display with a lower resolution does not work properly. Note that the data recorded by Kyowa's Memory Recorder/Analyzer EDX-1500A can be read by PCD-30A, if the following conditions are met: <ul style="list-style-type: none"><li>● Sampling frequency is not external clock frequency.</li><li>● The number of individual information channels is less than or equal to 32.</li><li>● The number of recorded data is less than or equal to 100000.</li></ul>