

Data Recorders/Analyzers



DATA RECORDERS/ANALYZERS

Presently, strain/stress measuring instruments are required not only to enable stable measurement of microvolt signals in indoor and outdoor applications but also to provide data processing capability for compact portable packages.

Furthermore, recent advancements in electronics and the trends in information-related fields toward multimedia and downsizing have generated diversified needs including:

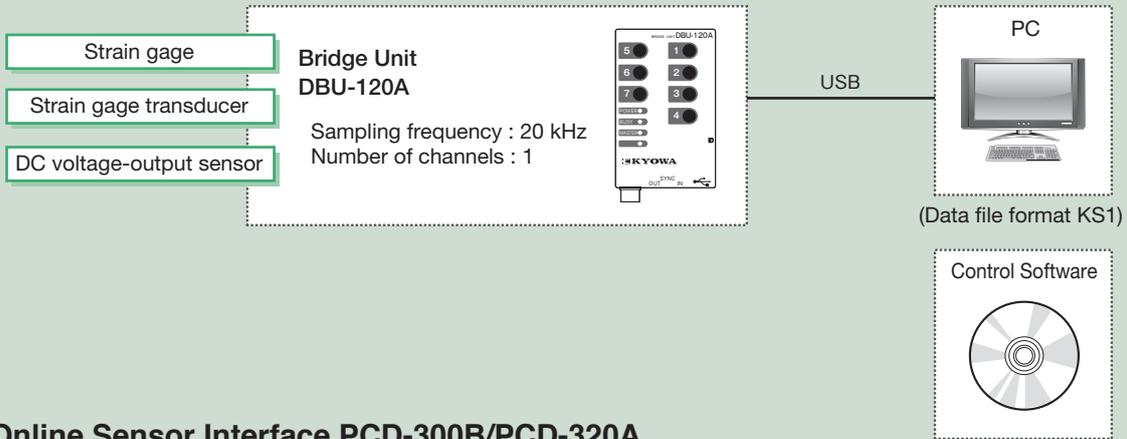
- Simultaneous measurement of static or dynamic variables ranging from strain/stress to load, pressure, acceleration, displacement, torque, temperature and frequency using not only strain gages and transducers but also voltage-output sensors, thermocouples and pulse-output sensors
- Real-time monitoring to enable smooth measurement under the engineer's judgment and control

- Statistic processing and waveform analysis of variables under measurement for time and labor savings
- Unattended wireless operation

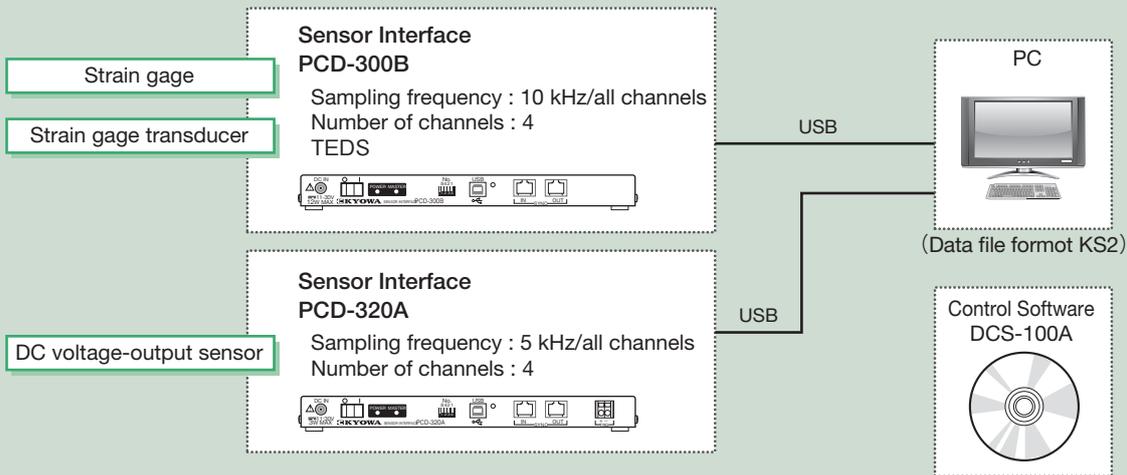
To cope with these demands, KYOWA has been making every effort to:

- Diversify signal conditioners, develop multi-channel signal conditioner systems and make the processing speed higher,
- Downsize the instruments and systems,
- Add monitor functions,
- Enable processing of data under measurement,
- Provide instruments and systems with various interfaces such as USB and LAN for operation under PC control,
- Enable long-term data recording with various storage media such as hard disk and flash memory card.

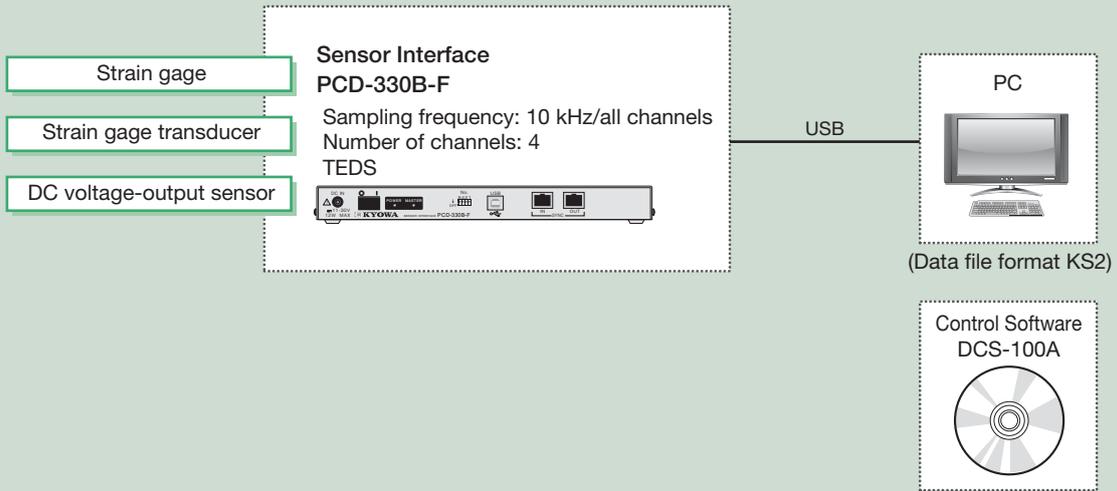
■ Bridge Unit DBU-120A



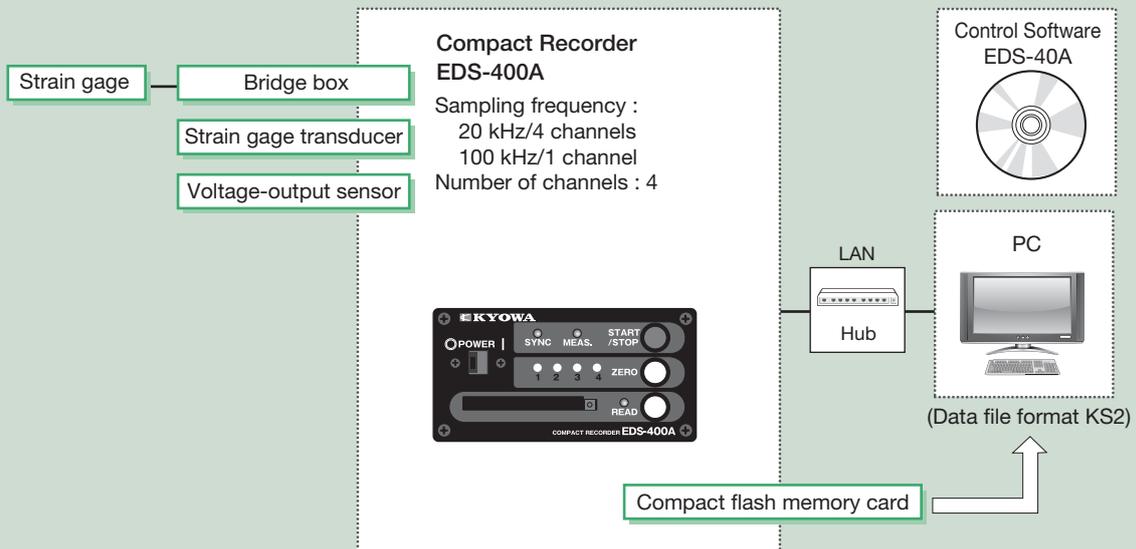
■ Online Sensor Interface PCD-300B/PCD-320A



Online Sensor Interface PCD-330B-F

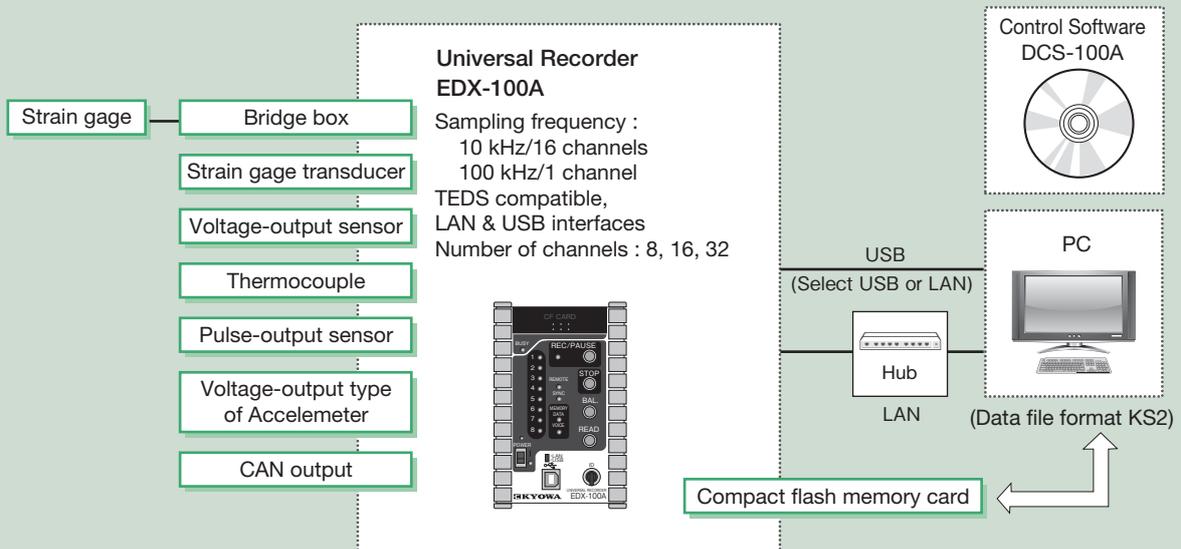


Compact Recorder EDS-400A

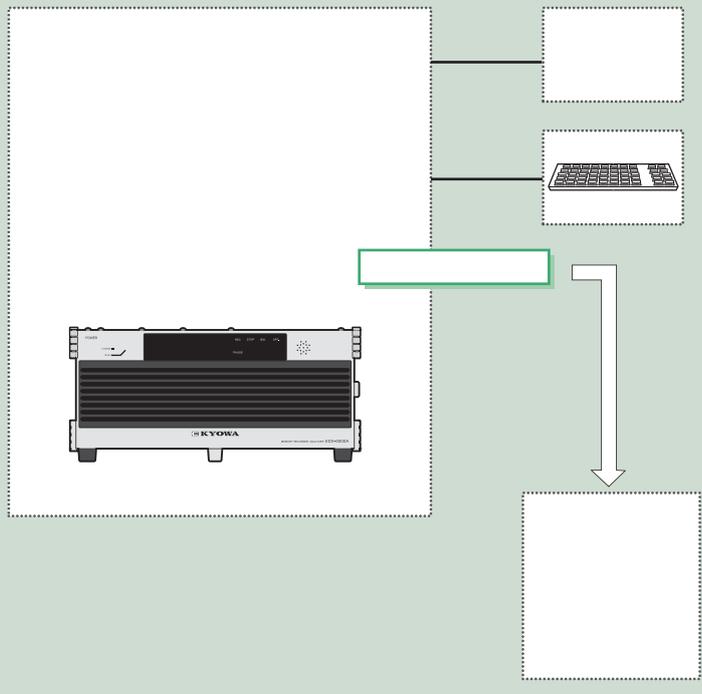
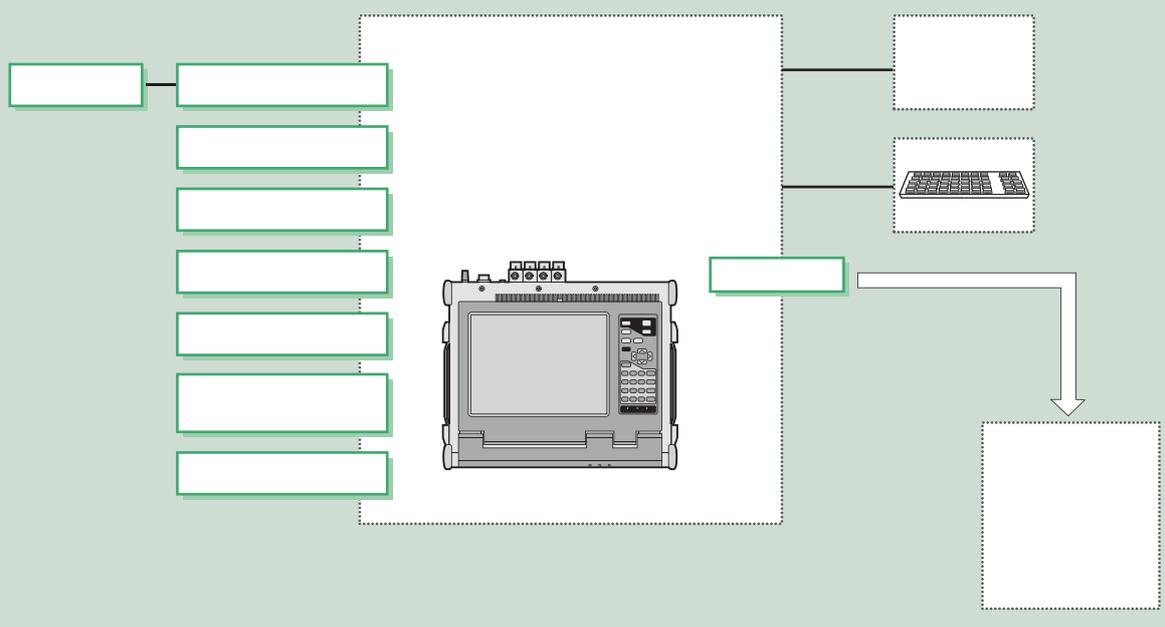


Note : For LAN connection, use a straight cable and hub.

Universal Recorder EDX-100A



Note : For LAN connection, use a straight cable and hub.



Data Recorder·Analyzer Selection Chart



Model	Number of Measuring Channels							Max.Sampling Frequency (kHz)					Applicable Sensors	PC Interface	Power Supply	Ref Page
	1	4	8	16	32	64	Max	10	20	40	100	200				
Bridge Unit DBU-120A  1 Channel and PC Control	1						4		20				Strainage Strainage transducer Voltage- output sensor	USB	Supplied from PC	3-49
Sensor Interfaces PCD-300B,320A  Reasonable Price and PC Control		4					16		20				PCD-300B Strainage Strainage transducer PCD-320A Voltage- output sensor	USB	AC100 to 240V AC adapter UI318-12 (standard accessory)	3-51
Sensor Interfaces PCD-330B-F  Reasonable Price and PC Control		4					16		20				Strainage Strainage transducer	USB	AC100 to 240V AC adapter UI318-12 (standard accessory)	3-54
Compact Recorder EDS-400A  Compact, Lightweight, and High-Speed Sampling		4					32		100				Strainage Strainage transducer Voltage- output sensor	LAN CF Card	DC10 to 16V ACAC adapter (Optional Accessories)	3-56
Universal Recorders EDX-100A  Compact Design and Easy LAN/USB Connection	1 OR 2 OR 4		8				128		20				Strainage Strainage transducer Voltage-outout sensor Piezoelectric accelerometers Thermocouple societal Pulse output sensor CAN	USB LAN CF Card	DC10 to 18V	3-58
Memory Recorder/Analyzer EDX-2000B  All-in-One Logger					32	64	64		20				Strainage Strainage transducer Voltage-outout sensor Piezoelectric accelerometers Thermocouple societal Pulse output sensor CAN	LAN USB Memory	AC100 to 120V 190 to 240V DC10 to 30V	3-62
Memory Recorder/Analyzer EDX-3000A  High-Speed All-in-One Logger NEW						64	64		20				Strainage Strainage Transducer Voltage-outout sensor Piezoelectric accelerometers Thermocouple societal Pulse output sensor CAN	LAN USB Memory. etc	AC100 to 240V	3-65
Shock Resistant Type Universal Recorder MCA-200A  Shock Resistance Approx. 196m/s ² NEW					32		256		20				Strainage Strainage transducer Voltage-outout sensor Piezoelectric accelerometers Thermocouple societal Pulse output sensor CAN	LAN	DC10 to 18V	3-70

DBU-120A

Bridge Unit



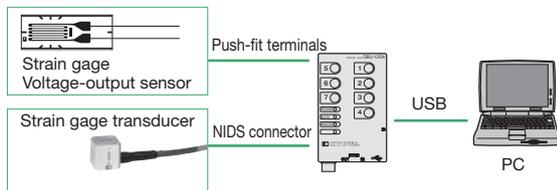
1 Channel PC Control Type

- Online instrument connected to the PC via USB port
- Connect up to 4 units
- Maximum sampling frequency 20 kHz
- Built-in bridge circuit enables direct connection of strain gages.
- Connectable to strain gage transducers and voltage-output sensors
- NDIS connector for one-touch connection of sensor
- Power supply from USB port without AC adaptor
- Analysis software DAS-100A is optionally available.

※For details of DAS-100A, refer to page 4-10.

The DBU-120A is an online measuring instrument connected to the PC via USB port. Like a bridge box, it has push-fit terminals on the top panel, enabling direct connection of strain gage or strain gage transducer. It also has an NDIS connector for one-touch connection to a transducer.

The DBU-120A has built-in amplifier and A-D converter and be controlled by PC with standard control software. Because of power supply via USB interface, the DBU-120A doesn't require AC power supply. Applicable sensors are strain gages, strain gage transducers and voltage-output sensors. Due to sampling frequency range from 1kHz to maximum 20kHz, The DBU-120A can measure various phenomenon from static to dynamic, such as vibration and impact. Also, the DBU-120A is suitable to small-scale experiments in schools



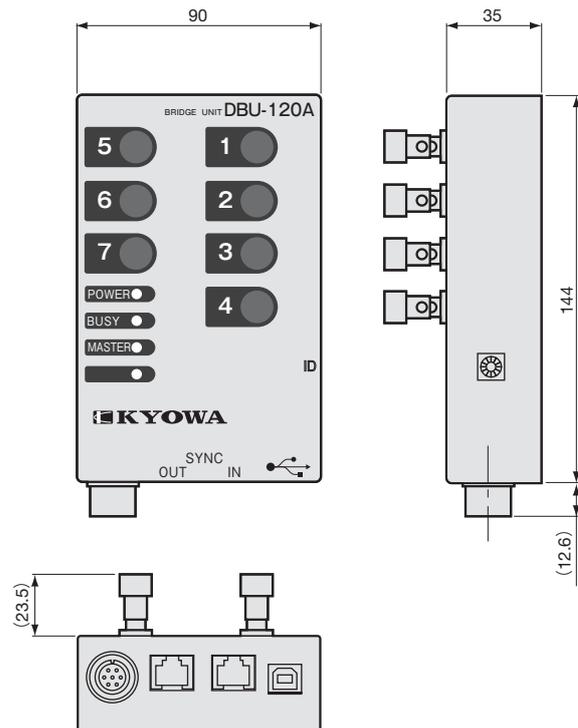
Specifications

Applicable Sensors :	Strain gages, strain gage transducers, voltage-output sensors
Number of Measuring Channels :	1, up to 4 units connectable for simultaneous measurement in 4 channels
Applicable Gage Resistance :	120Ω to 1 kΩ (120Ω only for 1-gage method)
Bridge Excitation :	0.5, 2, 5V
Input Terminals :	Push-fit terminals and NDIS connector
Balance Adjustment Range :	Resistance Within ±2%
A-D Conversion :	16bit
Sampling Frequency :	1, 2, 5, 10, 20, 50, 100, 200, 500 Hz 1, 2, 5, 10, 20 kHz
Range Selection :	1k, 10k, 100k μm/m; 10V
Accuracy :	Within ±0.2% FS
Low-pass Filter :	Cutoff frequency 10, 30, 100, 300 Hz and FLAT'
Frequency Response :	DC to 1 kHz
Interface :	USB1.1
Control Software Operating Environment	
CPU :	Pentium III 700 MHz or higher
OS :	WindowsXP/2000
Memory :	192 MB or more
Hard disk :	Blank space 10 MB or more (excluding space for measured data)
Display :	Resolution 1024 x 768 dots or more
CD-ROM drive :	Required to install control software
Dimensions :	90(W) x 35(H) x 144(D) mm (excluding protrusions)
Weight :	Approx. 350 g

Standard Accessories	USB cable N-38 1 m long (for connection to PC) Software & Instruction Manual (CD-ROM)
Optional Accessories	USB cable N-39 2 m long

Note:
Not synchronizing function when connecting plural units up to 4 units.

Dimensions



COMMENT
Comment can freely be written for each bridge unit. Blank is also acceptable.

MEASURE
Put a check mark in the box. Otherwise, the bridge unit will not measure.

BALANCE
Put a check mark in the box to execute balance adjustment.

SOURCE
Select the type of connected sensor. The buttons represent "Strain gage," "Transducer" and "Voltage" from the top.

CONNECTION
Illustrates the method of connecting a strain gage or transducer.

DB
The identification number of bridge box is indicated as set by the switch on the side panel.

EXCITOR
Select the bridge excitation voltage when the SOURCE is not the voltage.

INPUT
Select the bridge resistance and bridge connection. When "Voltage-output sensor is selected for SOURCE, this option is not displayed.

RANGE
Select a suitable range for expected strain level. When "Voltage-output sensor is selected for SOURCE, this option is not displayed.

SCALER
Input the calibration coefficient and offset value to convert the measured strain to a physical quantity. Select the unit from the option menu. Default values are also acceptable.

FILTER
Select a desired cutoff frequency of the low-pass filter.

COPY SOURCE
To copy the settings of another bridge unit, select the ID No. of the bridge unit. The selection is invalid if no condition file is saved.

CONDITION FILE LIST
Presents a list of setting condition files of other bridge units. After setting, click OK to close the setting window.

Monitor Windows

Waveform Monitor Window during Measurement

※ Various graph tools are available on measurement window.

Analog Meter Window During Measurement

Data Reproduce Windows

Y-Time Graph Window

Numeric Window

Measuring Conditions	
Measurement Modes :	Manual, level trigger
Number of Recorded Data :	2 to 100000
Sampling Frequency :	1, 2, 5, 10, 20, 50, 100, 200, 500 Hz 1, 2, 5, 10, 20 kHz
Setting Items :	Type of sensor, bridge excitation voltage, balance, connection mode, trigger level, calibration coefficient, offset value, unit
Graph Tools	
Y-Time Graph :	1, 2, 4 graphs
X-Y Graph :	1 graph
Analog Meter Window :	4 meters only

Data Recording	
Start of Data Recording :	Manual or when the trigger condition is satisfied
End of Data Recording :	Manual or when data is recorded to the preset number
Saving :	Measuring condition file (extension PRM) Data file (KYOWA standard format with extension KS1)
Data Reproduction	
Y-Time Graph :	1, 2, 4 graphs
X-Y Graph :	1 graph
Numeric Window :	Up to 10000 measured values
File Conversion :	Extracting necessary data and conversion to CSV format



PCD-300B/320A

Sensor Interfaces



PCD-300 Series Easily Make a PC a Measuring Instrument

- 7 models are available: PCD-300B (-F), PCD-301 (-F), PCD-330B-F and PCD-331B-F for strain signal measurements and PCD-320A for voltage signal measurements.
- 5 types of input adapters to make sensor connection easy are available except PCD-320A.
 - NDIS standard connector UI-10A (TEDS compatible)
 - Clamp-style terminal block UI-11 A (TEDS compatible)
 - Clamp-style terminal block with operating levers UI-15A
 - One-touch lock type clamp-style terminal block UI-16A
 - Voltage-input adaptor with BNC connector UI-30A
- USB port for connection to PC
- 4 channels per unit; up to 4 units can be connected for 16-channel measurement.
- Optional synchronous cable enables simultaneous sampling by 4 units.
- Strain measurement and voltage measurement are simultaneously available by synchronous connection of different PCD series.
- Compact and lightweight
- Data analysis software DAS-100A is optionally available.

- For data analysis software DAS-100A, refer to page . 4-10.
- For TEDS (Transducer Electronic Data Sheet), refer to page. 9-15.
- For the dynamic data acquisition software, refer to page. 4-3.

Precaution:

If PCD-300B, PCD-300A and/or PCD-320A are used in combination, be sure to connect PCD-300B to the PC, and SYNC OUT of the PCD-300B to SYNC IN of the next unit.

Connected to the PC via the USB port, the PCD-300 series makes the PC a measuring instrument by connecting via USB port. Choose the PCD-300B interface for strain gages to measure strain/stress, force, pressure, acceleration, and displacement. Choose the PCD-320A with voltage-output interface to measure various signals detected in voltage. Connect strain gages or voltage output sensors to input terminals and begin dynamic data acquisition software DCS. Each sensor interface provides 4 channels and can configure up to 16 channels by connecting 4 units.

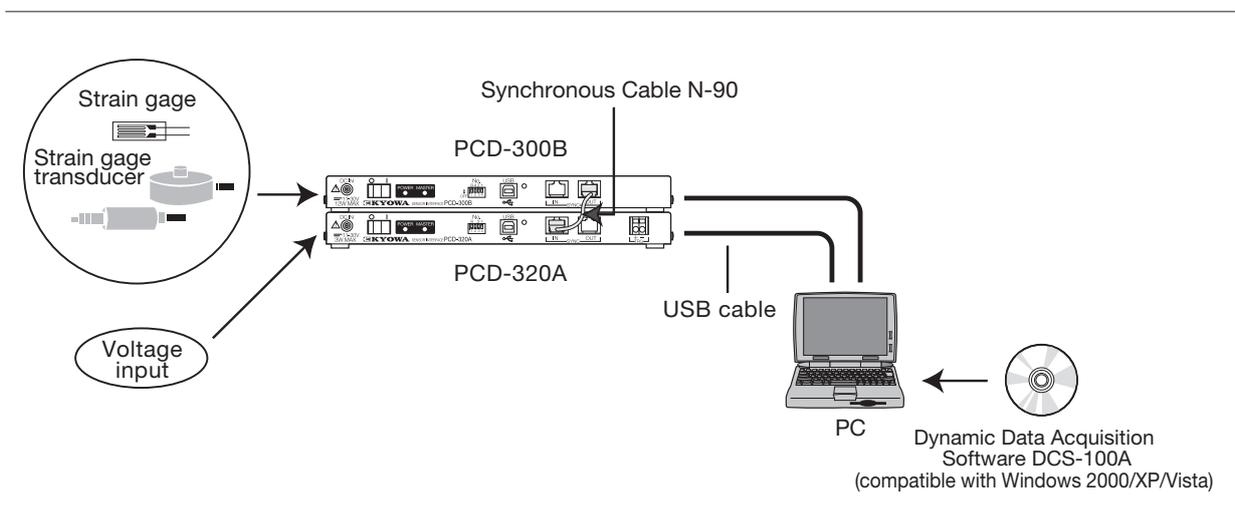
Specifications

■PCD-300B CE	
Models :	PCD-300B with no built-in low-pass filter PCD-300B-F with built-in low-pass filter
Applicable Sensors :	Strain gages, strain gage transducers
Number of Measuring Channels :	4 (max. 16 channels with 4 units connected including PCD-320A)
Applicable Gage Resistance :	1 or 2-gage method: 120Ω 4-gage method: 120Ω to 1kΩ
Input Adapter	UI-10A (With NDIS connects) UI-11A (Clamp-style terminal block) UI-15A (Clamp-style terminal block with operating levers) UI-16A (Clamp-style terminal block with quick-fitting locks)
Bridge Excitation :	2 VAC rms, carrier 1 kHz sine wave Balance Adjustment Range
Resistance :	±2% (±10000μm/m) or more Capacitance: 5000 pF or more
Balance Adjustment Method	Resistance : True electron auto balance method Capacitance: CST method (capacitance self-tracking)
Nonlinearity :	Within ±0.1% FS
Gage Factor :	2.00 fixed
Range Selection:	8 steps of 200, 500, 1000, 2000, 5000, 10000, 20000μm/m and OFF Accuracy : Within ±0.5% FS
Frequency Response Range :	DC to 200 Hz, deviation ±10%
Low-pass Filter (PCD-300B-F only) :	Second order Butterworth Cutoff frequency: 4 steps of 10, 30, 100 Hz and Flat
Amplitude ratio at cutoff point :	-3dB ±1dB
Attenuation :	-12 dB/oct. ±1 dB/oct.
Zero Stability :	Within ±1μm/m/8 h, within ±0.2 μm/m/°C Sensitivity Stability: Within ±0.3%/8 h, within ±0.05%/°C
A-D Conversion :	Resolution max. 24 bits
Sampling Frequency :	1, 2, 5, 10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10k [Hz] Simultaneous sampling of 4 channels (simultaneous sampling at 10 kHz is possible for 16 channels.)
TEDS Compatibility :	Input adapters UI-10A/UI-11A have TEDS information reading circuit built in.
Holding Setting Parameters:	Selected range and balance adjustment value are stored in internal nonvolatile memory.
Interface :	USB1.1

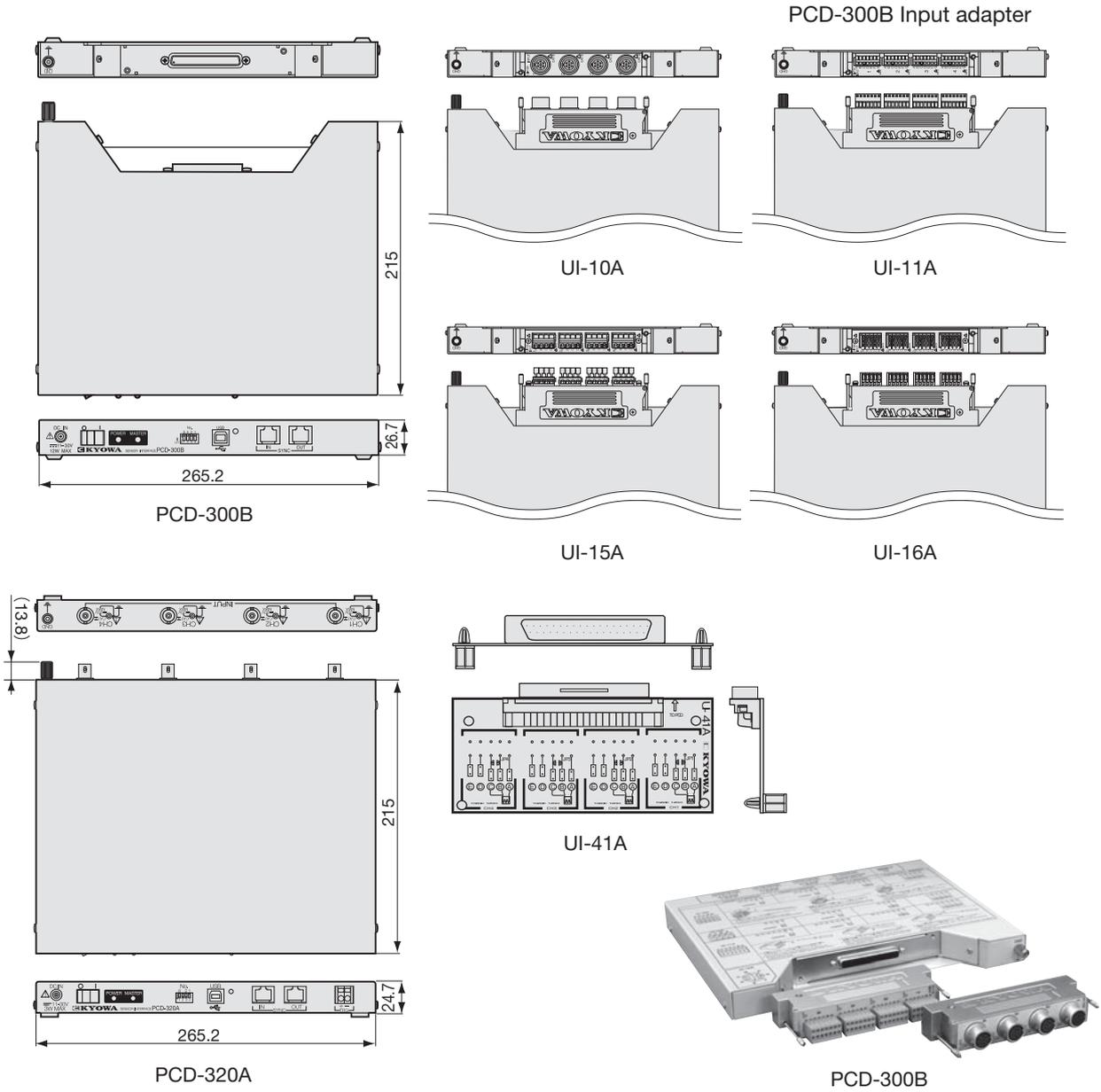


Operating Temperature/Humidity Range :	
0 to 40°C, 20 to 85% RH (noncondensing)	
Power Supply : AC 100 to 240V, 50/60 Hz (with AC adapter UI318-12, a standard provision)	
Current Consumption : 0.7 A or less (12 VDC)	
Dimensions : 265.2(W) x 26.7(H) x 215(D) mm (excluding protrusions)	
Weight : Approx. 1.1 kg (with UI-10A mounted; excluding AC adapter)	
Standard Accessories	
AC adapter UI318-12 (Do not use any AC adapter other than UI318-12.)	
USB cable N-38 1 m long, Grounding conductor P-72 5 m long	
CD-ROM (Dynamic data acquisition software DCS-100A, Instruction Manual, etc.)	
Optional Accessories	
DC power cable P-68 2 m long (11 to 30 VDC)	
Input cables N-97 10 cm long, U-115 50 cm long, U-116 1 m long, U-117 2 m long, U-118 5 m long (for connection of the transducer having the cable terminated with connector plug to an input adapter other than UI-10A)	
USB cables N-38 1 m long, N-39 2 m long	
Synchronous cable N-90 25 cm long (required for synchronous measurement with 2 or more units)	
AC adapter SA-34A (convenient when 4 units of sensor interfaces are used)	
Input adapters UI-10A, UI-11A, UI-15A, UI-16A (for connection of sensors, one of them should be mounted to the mainframe)	
■PCD-320A C €	
Applicable Sensors : Voltage-output sensors	
Number of Measuring Channels : 4	
(max. 16 channels with 4 units connected including PCD-300A/B)	
Input Mode : Unbalanced	
Input Resistance : 1 MΩ or more	
Coupling : DC/AC switchover	
Range Selection : 7 steps of 1, 2, 5, 10, 20, 50 V and OFF	
Accuracy : ±0.2%FS	
Frequency Response Range : DC to 1 kHz (DC coupling)	
0.2 Hz to 1 kHz (AC coupling)	
Deviation within +1dB-3 dB	
Low-pass Filter : Second order Butterworth	
Cutoff frequency: 5 steps of 10, 30, 100, 300 Hz and FLAT	
Amplitude ratio at cutoff point: -(3±1) dB	
Attenuation: -(12±1) dB/oct.	
Zero Stability : Within ±0.1% FS/8 h,	
Within ±0.01% FS/°C	
Sensitivity Stability : Within ±0.3%/8 h,	
Within ±0.03%/°C	
A-D Conversion : Resolution : 12 bits	
Method: Successive approximation	
Sampling : Simultaneous	
Output: Two's complement (-2048 to 2047)	

Sampling Frequency: 1, 2, 5, 10, 20, 50, 100, 200, 500, 1k, 2k, 5k [Hz]	
Simultaneous sampling of 4 channels (simultaneous sampling at 5 kHz is possible for 16 channels.)	
External Trigger Signal : No-voltage contact, open collector or 5 V CMOS	
Holding Setting Parameters : Selected range and balance adjustment value are stored in nonvolatile memory.	
Interface : USB1.1	
Input Terminals : BNC connectors	
Not isolated between input and output	
Max. allowable input voltage: 30 VAC or 60 VDC	
Max. rated voltage to ground: 30 VAC or 60 VDC	
Operating Temperature/Humidity Range :	
0 to 40°C, 20 to 85% RH (noncondensing)	
Power Supply : AC 100 to 240V	
(with AC adapter UI318-12, a standard revision)	
Current Consumption: 0.20 A or less (12 VDC)	
Dimensions : 0.20A or less (DC12V)	
Weight : 265.2(W) x 24.7(H) x 215(D) mm	
(excluding protrusions)	
Safety Feature : Conforms to IEC61010-1, installation category II, pollution degree 2	
EMC : Conforms to IEC61326-1, class A equipment	
Standard Accessories	
AC adapter UI318-12, USB cable N-38 (1m long), CD-R (Control software PCD-30A, instruction manual, etc.)	
Optional Accessories	
DC Power cable P-68,	
Input cables U-58 (BNC alligator clip 1.5m long), U-59 (BNC-BNC 1.5m long),	
USB cable N-39 (2m long),	
Synchronization cable N-90 (25cm long)	
(Note1) N-90 required for synchronous measurement with 2 or more units optional USB cable N-39 will be stocked	
(Note2) (BNC terminal) Minus pin is connected to the chassis and "GND" terminal	
(Note3) Be sure to ground GND terminal. If GND terminal cannot be connected to the ground, where plus and minus pin voltage to the ground is within the max rated voltage to the ground.	
(Note4) Be sure to use UI318-12 of standard Accessory	
(Note5) Accessory AC adapter UI318-12 is used	
· GND terminal is grounded	
· Coaxial BNC cable is Used for connection to BNC input connector	
· TRG cable is shorter than 30m long and is laid in doors	
· USB cable between PCD-320A and PC is laid indoors	
· Synchronous cable optional N-90	



■ Dimensions



Software DCS-100A (PCD-300 Series Control Specifications)

<p>Number of Controllable Units : Max. 4 (to enable the software to control 2 or more units, all units are synchronously operated.)</p>	<ul style="list-style-type: none"> · Common trigger conditions <ol style="list-style-type: none"> (1) End trigger (2) Delay : Max. 10000 data/channel for both start and stop
<p>Applicable Models : PCD-300A, PCD-320A, PCD-300B</p>	<ul style="list-style-type: none"> · Analog trigger conditions <ol style="list-style-type: none"> (1) Trigger channel: One desired channel (2) Trigger level: Set in a desired engineering value (3) Trigger slope: Up or down
<p>Control Interface : USB1.1</p>	<ul style="list-style-type: none"> · External trigger conditions <ol style="list-style-type: none"> (1) Trigger slope: Up or down External trigger is effective only when resolution of A-D conversion is 12 bits or 24 bits.
<p>Setting Channel Conditions : Measuring channel, measuring mode, range, strain mode, low-pass filter, balance ON/OFF, calibration coefficient, offset, unit, channel name, measuring range, rated capacity, rated output, number of display digits (desired display items selectable)</p>	<p>Data Conversion to CSV Format : Data can be converted to CSV format automatically upon completion of recording.</p>
<p>Setting Measuring Conditions</p>	<p>Reading TEDS Information from Transducer : Possible with PCD-300B with the input adapter UI-10A or UI-11A mounted. After reading TEDS information from transducer, the data can be used to set conditions for the channel.</p>
<p>Sampling Frequency : 1 to 10 kHz (PCD-300B) 1 to 5 kHz (PCD-300A/320A) When operating PCD-300B on Windows 2000 or when operating PCD-300B and PCD-300A/320A in combination, maximum sampling frequency is 5 kHz.</p>	<p>Environmental Setting</p> <p>Hardware Configuration : Setting the number of units connected. Communications Check : Reading versions of PCD-300 series sensor interfaces</p>
<p>Data File Size : Up to the capacity of hard disk</p>	<p>Number of A-D Conversion Bits: PCD-300B : Selectable from 12, 16 or 24 bits PCD-300A/320A : 12 bits fixed</p>
<p>Manual Measurement : Measured values are recorded from a click of the REC to a click of the STOP or from a click of the REC to completion of recording in a preset number.</p>	
<p>Interval Measurement : Measured values are automatically recorded in preset intervals from the preset starting time. The data may be saved in CSV format if desired.</p>	
<p>Trigger Measurement : Recording of measured values starts and stops according to preset trigger conditions.</p>	

PCD-330B-F

Sensor Interfaces



**4 channels per unit,
up to 4 units can be connected
for 16 channel measurement.
Enables simultaneous
measurement of strain and
voltage signals on PC.**

- There are five models of input adapters.
- Dynamic data acquisition software DCS-100A comes standard with PCD-330B-F.
- 24-bit A/D converter
- Low-pass filter mounted, DCS-100A provided standard provision.
- TEDS compatible

※For data acquisition software (DCS-100A), refer to page P4-3
 ※For TEDS, refer to page P9-15

Connected to the PC via the USB port, the PCD-300 series makes the PC a measuring instrument by connecting via USB port. Choose the PCD-300B interface for strain gages to measure strain/stress, force, pressure, acceleration, and displacement. Choose the PCD-320A with voltage-output interface to measure various signals detected in voltage. Connect strain gages or voltage output sensors to input terminals and begin dynamic data acquisition software DCS. Each sensor interface provides 4 channels and can configure up to 16 channels by connecting 4 units.

Specifications

Number of channel	: 4
Synchronous measurement	: Up to 4 units by 16 channels
Input adapter	: UI-10A (Strain gage transducer with NDIS connector) (When the voltage is measured, FV-1A (Option) is installed.) UI-11A (Strain gage, Clamp-style terminal block) UI-15A (Strain gage, Clamp-style terminal block with operating levers) UI-16A (Strain gage, Clamp-style terminal block with quick-fitting locks) UI-30A (Voltage signal, BNC)
A-D Conversion	: Max. 24bit
Sampling Frequency	: Up to 10kHz (Simultaneous sampling of 4 channels)
TEDS Compatibility	: With the UI-10A/UI-11A input adapter mounted
Holding Setting Conditions	: Range, Balance Adjustment are stored in internal nonvolatile memory.
Interface	: USB1.1
Operating Temperature/Humidity Range	: 0 to 40°C, 20 to 80% RH (noncondensing)
Vibration Resistance	: ±29.42m/s ² : (3G), 5 to 200Hz (12 cycle/axis, 10 min/cycle)
Power Supply	: DC 11 to 30V 100 to 240 VAC (Accessory UI318-12 AC adapter should be used.)
Current Consumption	: 0.9 A or less (12 VDC)
Dimensions	: 265.2(W) x 26.7(H) x 215(D) mm (excluding protrusions)
Weight	: Approx. 1.1 kg (excluding accessory AC adapter; with UI-10A mounted)
EMC	: Conforms to IEC61326-1, Class A Equipment

Standard Accessories

- UI318-12 AC adapter
- N-38 USB cable 1 m long
- P-72 grounding conductor 5 m long
- CD-R (contains DCS-100A dynamic data acquisition software, Instruction Manual, etc.)

Optional Accessories

- P-73 DC power cable 2 m long (11 to 30 VDC)
- Connection cables N-97 10 cm long, U-115 50 cm long, U-116 1 m long, U-117 2 m long, U-118 5 m long
- N-90 synchronous cable 25 cm long (required for unit-to-unit connection)
- N-39 USB cable 2m long
- SA-34A AC adapter for 4 units
- Input adapters (the mainframe should have one of them mounted.) UI-10A, UI-11A, UI-15A, UI-16A, UI-30, (FV-1A Voltage conversion adapter)



UI-10A



UI-11A



FV-1A



UI-15A



UI-16A



UI-30A



UI-41A

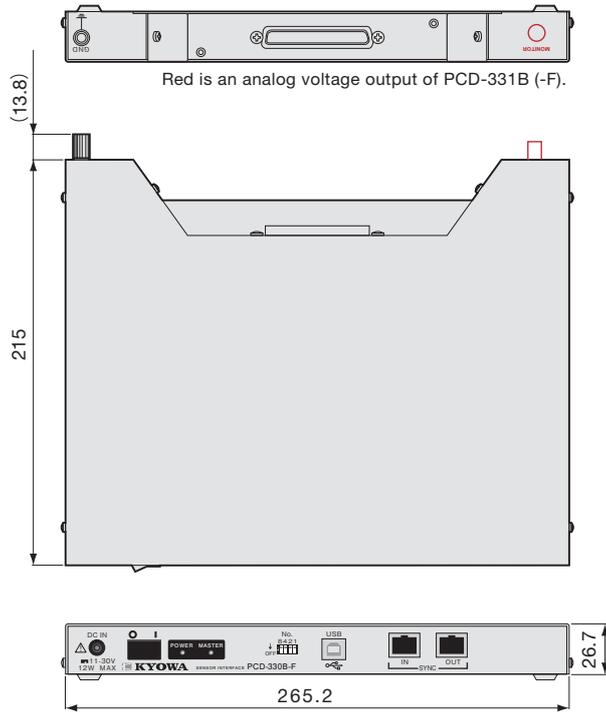




Strain/Stress measurement Mode	
Applicable Sensors :	Strain gages, Strain gage transducers
Applicable Gage Resistance :	120Ω(1-gage quarter bridge and 2-gage half bridge) 120Ω to 1 kΩ (4-gage full bridge)
Input Mode :	Balanced differential
Bridge Excitation :	2 VAC rms, carrier 1 kHz sine wave
Balance Adjustment Range :	Resistance ±2% (±10000μm/m) or more Capacitance 5000 pF or more
Balance Adjustment Method :	Resistance True electron auto balance method Capacitance CST (capacitance self tracking) method
Nonlinearity :	Within ±0.1% FS
Gage Factor :	2.00 fixed
Range Selection :	8 steps of 200, 500, 1000, 2000, 5000, 10000, 20000μm/m and OFF Accuracy within ±0.5% FS
Frequency Response Range :	DC to 200 Hz, deviation ±10%
Low-pass Filter :	Second order Butterworth Cutoff frequency : 4 steps of 10, 30, 100 Hz and Flat Amplitude ratio at cutoff point : -(3±1) dB Attenuation : -(12±1) dB/oct.
Zero Stability :	Within ±1 μm/m8 h, within ±0.2 μm/m°C
Sensitivity Stability :	Within 0.3%/8 h, within 0.05%/°C
Withstand voltage :	250VAC for 1 minute between input and chassis

Voltage measurement Mode	
Applicable Sensors/Instruments :	Voltage-output transducers, Voltage-output conditioners
Input Mode :	Unbalanced
Range :	7 steps of 1, 2, 5, 10, 20, 50 V and OFF Accuracy : Within 0.2% FS
Frequency Response Range :	DC to 1 kHz Deviation : Within -1/±3 dB
High-pass filter :	2 steps of 0.2Hz and Flat
Low-pass Filter :	Second order Butterworth Cutoff frequency : 5 steps of 10, 30, 100, 300 Hz and Flat Amplitude ratio at cutoff point : -(3±1) dB Attenuation: -(12±1) dB/oct.
Zero Stability :	Within ±0.1%FS/8h, within ±0.01%FS/°C
Sensitivity Stability :	Within ±0.3%/8h, within ±0.03%/°C

Dimensions



EDS-400A

Compact Recorder



Compact and lightweight. 4-channel measurement with one unit

- Cascade connection of 8 units enables synchronous measurement in up to 32 channels.
- High-speed sampling at 100 kHz in 1 channel
- Simultaneous sampling at 20 kHz in 4 channels
- Can measure strain and voltage signals.
- Suitable as onboard logger
- LAN port provided standard
- Analog filter provided standard
- Optional data acquisition software DCS-100A usable
- Data analysis software DAS-100A optionally available

※For the data analysis software(DAS-100),refer to page 4-10.

Connected to strain gages, strain gage transducers and voltage-output sensors, the EDS-400A digitally records 4 channels of dynamic variables at high speed through built-in signal conditioners and 16-bit A-D converters.

It can be set up from the PC via LAN or by inserting the CF card in which measuring conditions are written beforehand.

Variables under measurement are digitized and saved in the CF card. If required, the data can graphically be monitored on the PC connected via LAN.

Saved data can be transferred to the PC, online via LAN or offline via CF card.

The software, a standard provision, enables the PC to present the data on graphic window, while the optional data analysis software DAS-100A enables data analysis in various ways.

Note:

For LAN connection
Use a straight cable and hub

● Compact and Lightweight

General Specifications

Operating Temperature Range : 0 to 50°C
Operating Humidity Range : 20 to 90% RH (noncondensing)
Vibration Resistance : 49.03m/s ² (5G) (5 to 55Hz) (when operating)
Power Supply : 10 to 16 VDC, approx. 0.6 A (12 VDC)
Power connector: RM12BRD-4PH (Hirose)
Storage Temperature Range : -10 to 60°C
Operating Environment : No dust and no induction noise from large-capacity motor, etc.
Dimensions : 100(W) x 50(H) x 110(D) mm (excluding protrusions)
Weight : Approx. 500 g

Hardware Specifications

Number of Measuring Channels : 4
Connector : R05-R5F (Tajimi)
Applicable plug : R05-PB5M (Tajimi)
Applicable Sensors : Strain gages (4-gage method), Strain gage transducers, voltage-output sensors
Applicable Bridge Resistance : 120Ω to 1000Ω (4-gage method)
Gage Factor : 2.00 fixed
Bridge Excitation : 2 VDC
Measuring Range
Strain : 1000, 2000, 5000, 10000, 20000 μm/m
Voltage : 1, 2, 5, 10, 20V
Accuracy : Within ±0.5%
Balance Adjustment (Zero Suppress) :
ON/OFF setting possible for each individual channel
Adjustment method : True electron method (Adjustment value is saved in nonvolatile memory.)
Adjustment range
Strain input : Resistance ±2% (±10000 μm/m)
Voltage input : ±10V
Max. Allowable Input Voltage : ±30 V (for voltage signal)
Frequency Response Range* : DC to 20 kHz (dev. +1 dB/-3 dB)
Low-pass Filter* : 2-pole 2nd-order Butterworth
Cutoff frequency : 20 Hz, 200 Hz, 2 kHz or OFF
Cutoff frequency accuracy : -3 dB±1 dB
Attenuation: -(12±1) dB/oct.
*Properties of analog section
A-D Conversion : 16 bits
Sampling Method : Simultaneous sampling of all channels
Sampling Frequency : 1, 2, 5, 10, 20, 50, 100, 200, 500 Hz 1, 2, 5, 10, 20, 50, 100 kHz (16 steps)
Note : Sampling at 50 kHz is possible for 1 or 2-channel measurement. Sampling at 100 kHz is possible for 1-channel measurement only.
Operating Switches : START/STOP, ZERO, READ
Method of Setting Measuring Conditions :
From PC or CF card in which measuring conditions are written beforehand
Start/Stop of Recording : From PC, panel switch or ext. contact
Balance Adjustment : From PC, panel switch or ext. contact LED Lamps
LED Lamps
POWER : Lights up when the instrument is turned on.
SYNC : Lights up to indicate synchronization condition.
MEAS : Lights up to indicate measurement in progress.
1, 2, 3, 4 : Indicate channel status.
READ : Lights up to indicate condition setting in progress.
Operation Modes
Manual : START signal from PC or a press of the front panel START/STOP button starts recording. It stops recording upon recording to a preset number of measured values or when receiving STOP signal from PC or when the START/STOP button is pressed once again.
Trigger : START signal from PC or a press of the front panel START/STOP button lets it wait for trigger signal, and starts recording when the trigger condition is satisfied. It stops recording upon recording to a preset number of measured values. Pretrigger data may be included in the number of measured values by setting.
Trigger Functions
Trigger source : External trigger signal, analog input
Trigger level : Can be set for analog trigger mode only, in the full scale range in plus and minus directions.
Trigger slope: Rise, fall or both can be set.





Number of pretrigger values to be recorded :	Can be set in a range of 0 to 2000.
Backup Function :	Setting conditions, balance adjustment data
LAN Port :	10BASE-T/100BASE-TX
Connector :	RJ-45 modular jack
Monitor Display:	Waveform, bar graph and numeric data can be monitored on the PC connected to the LAN port.
Data Storage :	CF card (128 MB to 2 GB; writing speed 45x)
Synchronized Operation :	Dedicated synchronous cable enables connection of up to 8 units in cascade for synchronized recording. While data is individually recorded in separate files in CF cards inserted into recorders, it can be combined to a single file after transferred to the PC.

Control Software Specifications

Setting Measuring Conditions	
Sensors :	Strain gages, strain gage transducers, voltage-output sensors
Number of measuring channels :	Max. 32 (8 units of EDS-400A)
Sampling frequency :	1, 2, 5, 10, 20, 50, 100, 200, 500 Hz 1, 2, 5, 10, 20, 50, 100 kHz
Measurement mode :	Manual, analog trigger, external trigger
Number of recorded data :	0 to 500000000 (The number depends on blank space of CF card.) If 0 is set, data is recorded using the full capacity of card.
Setting Measuring Channel Conditions	
ON/OFF setting :	Set measurement for each channel
Range :	Individually selectable for each channel Strain : 1000, 2000, 5000, 10000, 20000 $\mu\epsilon$ ($\mu\text{m/m}$) or OFF Voltage: 1, 2, 5, 10, 20 V or OFF
Low-pass filter :	Individually selectable for each channel 20 Hz, 200 Hz, 2 kHz or FLAT (20 kHz)
Calibration coefficient :	A value by which the measured value is multiplied can be set for each channel.
Offset :	Can be set to add to the value obtained by multiplying the measured value by calibration coefficient.
Unit :	Selectable for each channel from 60 different units; also, a desired unit can be input.
Channel name :	Can be input for each channel.
Zero suppress ON/OFF :	Possible channel by channel
Saving/Reading Measuring Conditions :	
Measuring conditions and measuring channel conditions can be saved with a desired name. The file can be read to set up the recorder with the same conditions as previous.	
Monitoring Data in Graphic Format Y-Time graph:	
Data is graphed with measuring times on X axis.	
Y-Time graph :	Data is graphed with measuring times on X axis. The number of measuring times can be set up to 1200. The graph may include up to 8 channels (Numeric data is simultaneously displayed.)
Bar graph :	Data is graphed with up to 8 channels on X axis. (Numeric data is simultaneously displayed.)
X-Y graph :	Data is graphed with up to 7 channels on Y axis for 1 channel on X axis.
Real-time recording graph :	With X axis for measuring times, the graph may include variables in up to 8 channels. (Numeric data is simultaneously displayed.) Note however that waveform display is available only when recording data and not available when monitoring data.
Measuring Modes Manual mode :	
Pressing the START/STOP button starts recording data and saves the preset number of measured values in the CF card. If the sampling frequency is 10 kHz or lower and PC is connected, data may automatically be collected in real time in the PC.	
Analog trigger mode : When the trigger condition is satisfied at the trigger channel, the EDS-400A starts recording data and saves the preset number of measured values in the CF card.	
External trigger mode : An external trigger signal starts the EDS-400A recording data and saves the preset number of measured values in the CF card.	
Reproducing Data : Recorded data file can be reproduced graphically or converted to CSV format.	
Y-Time graph : Up to 8 channels of data can be graphed.	
File conversion to CSV format : A desired data portion can be extracted and converted to CSV format.	
Types of Files	
Measuring condition file :	Extension E4C
Recorded data file :	Extension KS2 (KYOWA standard format)

Operating Environment (PC)

CPU :	Pentium III 700 MHz or higher
OS :	Windows 2000 (Professional) XP (Professional, Home Edition)
Memory :	256 MB or more
Interface :	10BASE-T/100BASE-TX
Hard Disk :	Blank space 10 MB or more (excluding space for measured data)
Display :	1024 x 768 dots or more, full color
CD-ROM Drive :	Required to install the control software

Standard Accessories

- DC power cable P-57
- Compact flash memory card (128 MB)
- Control software EDS-40A and Instruction Manual (CD-R)

Optional Accessories

- Strain input conversion cable U-49 30 cm long
- Voltage input cable U-50 1.5 m long
- Synchronous cable N-79 20 cm long
- AC adapter SA-10A-EDS (100 to 240 VAC)
- Bridge connectors DB-120C-2R (2-wire)/DB-120C-3R (3-wire)
- Remote-control unit RCU-04A
- Protect unit EDS-PMF
- Battery unit ESL-04A (2.0 A)
- Synchronous signal long-distance transmission unit (A05-2452)

Battery Box ESB-04A

Number of Connectable Units :	1
Accommodable Cell Size :	AAA
Number of Cells :	10
Usable Types of Cells :	Secondary cell: NiMH battery Primary cell: Oxryide battery
Capacity Indication :	Green lamp: Indicates enough capacity remains (lights up only when the battery check switch is pressed).
Orange lamp :	Automatically lights up with less capacity.
Red lamp :	Automatically lights up with no capacity.
STOP Signal :	Output to stop measurement when the battery is fully exhausted and the red lamp lights up.
*Since the signal is the same as initiated by pressing the START/ STOP button on the EDS-400A, it may start measuring if it is placed in trigger measurement mode.	
Stop of Power Supply:	Power supply stops in 5 to 10 seconds after the red lamp lights up with no capacity.
Operating Temperature/Humidity Range: 5 to 40°C, 20 to 80% RH (noncondensing)	
Dimensions : 99.4(W) x 49.4(H) x 110(D) mm (excluding protrusions)	
Weight : Approx. 600 g (with no battery cells mounted)	
Estimated Operating Time : Approx. 1 hour (Oxryide battery) Approx. 2 hours 30 minutes (2400 series NIMH battery)	
*The operating time depends on the type of battery and operating environment.	

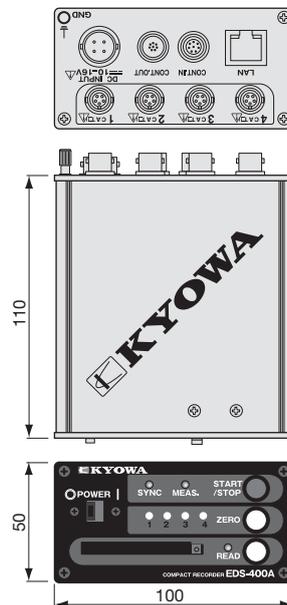
Standard Accessory

DC/DC cable (20 cm long)

Optional Accessory

Synchronous cable N-79 (20 cm long)

Dimensions



EDX-100A

Universal Recorders



EDX-100A-1H

EDX-100A-2H

EDX-100A-4H

Compact and lightweight, up to 128 channels measurement

- Compact and lightweight
- Available with 1, 2 and 4 slots
- LAN port for establishing multichannel network (max. 128 channels)
- USB port for easy connection to the PC
- Operable as a stand-alone unit
- High-speed sampling at 100 kHz (10 kHz for 16-channel measurement)
- CAN data acquisition possible with CAN-40A/41A conditioner card mounted
- Various conditioner cards available
- TEDS compatible
- Voice memo can be recorded by using an optional dedicated remote control unit.
- Dynamic data acquisition software DCS-100A is included in standard accessories.
- Measured data is saved in KYOWA standard KS2 format and can be analyzed with optional data analysis software DAS-100A.
- Operates on 10 to 18 VDC.

※For the data analysis software DAS-100A, refer to page 4-10

Available with 1, 2 or 4 slots, the EDX-100A is a universal recorder that enables flexible configuration and free arrangement while ensuring multiple functions. The wide application range extends from small-scale measurement of 8 channels to large-scale measurement of up to 128 channels by connecting 4 units of the EDX-100A.

For PC connection, LAN and USB ports are provided. The LAN port enables the PC to control up to 4 units of EDX-100A, while the USB port ensures easy connection between the EDX-100A and the PC.

In addition, the EDX-100A can be operated as a stand-alone unit with no PC connected. A compact flash memory card enables condition setting and data collection.

To respond to the need for a wide variety of measurements, 6 different types of conditioner cards are available.

Note:

For LAN connection
Use a straight cable and hub

●Conditioner cards

(For the detail refer to page P3-64)

Strain/voltage Measuring card	CDV-40B/40B-F
Dynamic Strain Amplifier card	DPM-42A/42A-F
Thermocouple card	CTA-40A
F/V converter card	CFV-40A
Charge Amplifier card	CCA-40A/40A-F
CAN Card	CAN-40A/41A

Specifications

Model	Card Slots	Max. Number of Analog Input Channels	Remark
EDX-100A-1	1	8	With handle grip
EDX-100A-2	2	16	
EDX-100A-4	4	32	
EDX-100A-1H	1	8	
EDX-100A-2H	2	16	
EDX-100A-4H	4	32	

Number of Input Channels : Refer to table above.

Analog Input : Provided by optional conditioner cards (common to EDX-2000A). For the conditioner cards, refer to page 3-64.

CAN Data Input : Provided by the optional CAN-40A or CAN-41A

Voice Memo Input : 1 channel. An optional dedicated remote control unit RCU-41A enables recording of voice memo during measurement in manual mode.
Reproduction of recorded voice memo requires an optional data analysis software DAS-100A.

Sampling Method : Simultaneous sampling of all channels

Sampling Frequency Selection Systems :
1-2-5 system in a range of 1 Hz to 100 kHz
2ⁿ system in a range of 2 Hz to 65536 Hz

Sampling Frequency (1-2-5 system):
1 Hz to 100 kHz for 1-channel measurement
1 Hz to 50 kHz for 3-channel measurement
1 Hz to 20 kHz for 8-channel measurement
1 Hz to 10 kHz for 16-channel measurement
1 Hz to 5 kHz for 32-channel measurement
1 Hz to 1 kHz for CAN data measurement

Data Storage : Compact flash memory card
(128 MB to 8 GB; 45x speed or higher)
Up to 2 GB data for 1 time of measurement

Setting Conditions
Online : From the PC through LAN or USB port
Offline : By reading from the CF card which has measuring conditions written with the DCS-100A data acquisition software

Saving Conditions : Amplifier setting conditions and measuring conditions are saved in the internal nonvolatile memory, enabling immediate setup with previous conditions upon power-on.



Measurement Modes	
Manual :	Data recording is manually started/stopped or stopped when data is recorded to a preset number of measured data.
	Manual mode allows recording of voice memo during data recording.
Trigger :	Data recording is automatically started when the preset trigger condition is satisfied. Note that any CAN data cannot be used as the trigger condition.
Interval :	Data recording is periodically made at preset intervals.
Manual Start/Stop of Data Recording :	
	Possible through the PC or by pressing the switch on the front panel or from the dedicated remote control unit
Balance Adjustment :	
	Strain input channels can be balanced by pressing the BAL. switch on the front panel or from the dedicated remote control unit or through the PC.
Saved Data Format :	
	KYOWA standard format KS2, which enables data analysis with the optional data analysis software DAS-100A
Collecting Data : LAN or USB port enables online data transfer to the PC, while CF card enables offline data transfer.	
TEDS Function : Usable when the EDX-100A is under the online control of the PC. Compatible conditioner cards are CDV-40B(-F), DPM-42A(-F) and CCA-40A(-F). The suffix F denotes that the card is equipped with 8th order Butterworth antialiasing filter.	
Synchronous Operation :	
	Synchronous cable enables cascade connection of up to 4 units of the EDX-100A. While data is recorded as a separate file in the CF card inserted into each unit, files of all cards can be combined into a single file after online or offline data transfer to the PC.
Analog Output : Except for CDV-40B(-F) and CAN-40A, conditioner cards provide an analog output connector, enabling voltage monitoring (5 V FS).	
CF Card Slot : 1 (for data recording and condition setting)	
Communication Ports : LAN and USB (for control and data transfer), switchable	
	LAN I/F : 10BASE-T / 100BASE-TX Connector: RJ45 modular jack
	USB I/F : Conforms to USB 2.0 (high speed).
	Connector: Series B receptacle
Operation Switches : REC/PAUSE : Start/pause data recording. STOP : Stop data recording. BAL. : Execute balance adjustment. READ : Read and set conditions. ID : Set ID No. of EDX-100A. LAN/USB : Switch communication port.	
Indicators : Operation status indicator LEDs: 7 Channel status indicator LEDs: The number corresponds to the number of channels provided.	
External Control Connectors :	
	CONT IN and CONT OUT(for remote control and synchronous operation)
Operating Temperature Range : 0 to 50°C	
Operating Humidity Range : 20 to 90% RH (noncondensing)	
Storage Temperature Range : -20 to 60°C	
Vibration Resistance: 29.42 m/s ² (3 G), 5 to 55 Hz (when operating) 49.03 m/s ² (5 G), 5 to 55 Hz (when not operating)	
Shock Resistance : 196.1 m/s ² (20 G)/11 ms	
EMC Standards : IEC61326-1 Class A	
Safety standards : IEC61010-1 (set certificate II, pollution degree 2)	
Power Supply : 10 to 18 VDC Connector: RM12BRD-4PH (Hirose) DC power supply or optional dedicated AC adaptor is required.	
Current Consumption:	
	EDX-100A-1: Approx. 1.2 A (when operated on 12 VDC with 1 CDV-40B card mounted and full load applied)
	EDX-100A-2: Approx. 1.8 A (when operated on 12 VDC with 2 CDV-40B cards mounted and full load applied)
	EDX-100A-4: Approx. 2.8 A (when operated on 12 VDC with 4 CDV-40B cards mounted and full load applied)
Dimensions : EDX-100A-1: 70.0(W) x 132.5(H) x 255(D) mm EDX-100A-2: 92.5(W) x 132.5(H) x 255(D) mm EDX-100A-4: 137.5(W) x 132.5(H) x 255(D) mm excluding protrusions	
Weight, Approx. : EDX-100A-1: 1.6 kg (1.7 kg with 1 CDV-40B card mounted) EDX-100A-2: 1.8 kg (2.0 kg with 2 CDV-40B cards mounted) EDX-100A-4: 2.0 kg (2.6 kg with 4 CDV-40B cards mounted)	

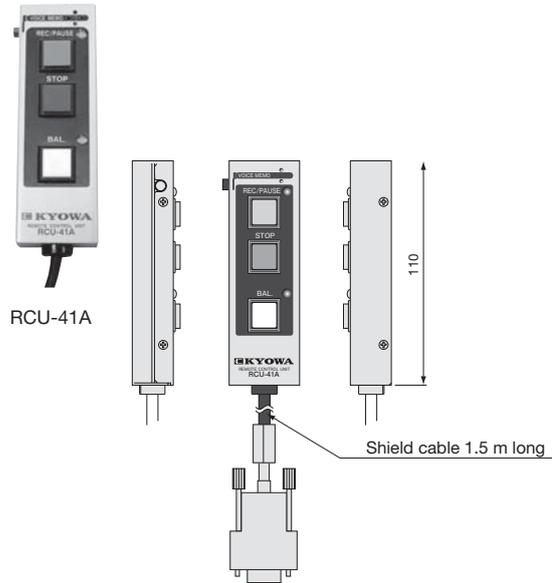
Standard Accessory	Power cable P-57, USB cable N-38 Dynamic Data Acquisition Software DCS-100A CF card
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Optional Accessories	USB cable (N-39) 2 m long Synchronous cable N-95 2 m long AC adapter UIA 345-12 Input: 100 to 240 VAC, 50/60 Hz, 1.2 A Output: 2 VDC, 3.8 A Dummy panel EDX-DUMMY
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● Remote Control Unit RCU-41A

Control Buttons : RCU-41A	
(1) REC/PAUSE :	Start/pause data recording.
(2) STOP :	Stop data recording.
(3) BAL. :	Execute balance adjustment.
(4) VOICE MEMO :	Record voice memo.
LED Indicators : REC/PAUSE, BAL	
Cable :	1.5 m long (to be connected to CONT IN connector of EDX-100A)
Dimensions : 35(W) x 110(H) x 20(D) mm (excluding protrusions)	
Weight : Approx. 200g	

■ Dimensions



● EDX-100A Instantaneous stop battery units EDB-41A

Built-in Battery : Battery type : Ni-MH rechargeable battery Nominal capacity : 730mAh, nominal voltage : 12V	
External Power Input : DC11V to 18V [DC IN] terminal model: RM12BRD-4PH (Hirose) Use DC power or EDX-100A AC adaptor (optional)	
Power Output : External power voltage when using external power drive Approx. 11 to 15V when using this units drive (in instantaneous stop) [DC OUT] terminal model : RM12BRD-4S (Hirose)	
Charging Method : Start automatic charging (max. 3.5hs) through the external power supply Start discharging through resetting button to ON (Recovery time: Max.6.5hs)	
Display : BATTERY LEVEL LED (Residual capacity display) CHARGE (charge/discharge display)	
Buzzer : Alarm through buzzing sound in instantaneous stop	
Operating Temperature Range : 0 to 50°C (0 to 30°C in recovery during the charging)	
Operating Temperature Range : 20 to 90%RH (noncondensing)	
Storage Temperature Range : -20 to 50°C	
Dimensions : 25(W)x132.5(H)x255(D) mm (excluding protrusions)	
Weight : Approx. 500g	
Backup time ※ (reference value) :	
	Approx.30min with 1 (8CH) CDV-40B card mounted on EDX-100A-1 (H) and full load applied
	Approx.15min with 2 (16CH) CDV-40B cards mounted on EDX-100A-2 (H) and full load applied
	Approx. 5min with 4 (32CH) CDV-40B cards mounted on EDX-100A-4 (H) and full load applied
※Built-in battery is fully charged when ambient temperature is 20 to 30°C	

● Specifications of DCS-100A Software

Number of Controllable Units : Max. 4 (To control 2 or more units, all units should be operated in synchronization.)
Applicable Conditioner Cards : CDV-40A/B(-F), DPM-42A(-F), CCA-40A(-F), CTA-40A, CFV-40A, CAN-40A/41A
Setting Channel Conditions : Measuring channel, measuring mode, range, high-pass filter, low-pass filter, balance ON/OFF, calibration range, calibration ON/OFF, calibration coefficient, offset, unit, channel name, measuring range, rated capacity, rated output, number of display digits (Display items can freely be selected.)
Reading TEDS Information : Possible for automatic setting by reading conditions
Measuring Conditions for Saving Data in CF Card Sampling frequency : 1 Hz to 100 kHz (depends on the number of measuring channels.)
Data file size : Max. 2 GB
Manual measurement : Measurement is made from a press of the REC button to a press of the STOP button or to completion of recording to the preset number of measurements.
Interval measurement : Measurement is made automatically at preset intervals from the preset starting time.
Trigger measurement · Common trigger conditions (1) End trigger : Can be set. (2) Delay : Max. 262144 values for both start and end Delay differs depending on sampling frequency and the number of measuring channels. · Analog trigger conditions (1) Trigger channel : 1 desired channel of stand-alone or master unit (2) Trigger level : Set in a proper engineering unit (3) Trigger slope : Rise or fall · External trigger condition (1) Trigger slope : Rise or fall · Composite trigger conditions (1) Trigger source : Selectable from 2 desired channels of stand-alone or master unit and external trigger (2) AND/OR : Signals of selected trigger channels and external trigger signal can be AND or OR. (3) Trigger level : Set in a proper engineering unit (4) Trigger slope : Rise or fall
Measuring Conditions for Saving Data in Hard Disk of PC Sampling frequency : 1 Hz to 100 kHz (depends on the number of measuring channels.)
Data file size : Capacity of hard disk
Manual measurement : Measurement is made from a press of the REC button to a press of the STOP button or to completion of recording to the preset number of measurements.
Interval measurement : Measurement is automatically made at preset intervals from the preset starting time.
Trigger measurement : Measurement starts/stops based on preset trigger conditions. · Analog trigger conditions (1) End trigger : Can be set. (2) Delay : Max. 262144 values for both start and end Delay differs depending on sampling frequency and the number of measuring channels. (3) Trigger channel : Desired measuring channel (4) Trigger level : Set in a proper engineering unit (5) Trigger slope : Rise or fall
Setting/Reading Measuring Conditions : Measuring conditions can be saved in and read from CF card. They can also be set from the PC connected via USB or LAN port.
Measurement-Related Operations : Monitor measurement, start/pause/stop of data recording, balance adjustment and calibration can be executed from the PC.
Monitor Display : Y-Time graph : Physical variables are graphed on Y axis with X axis for time. Up to 16 channels can be graphed and 1 to 4 graphs can be presented on a window. Y-Time (DIV) graph : XPhysical variables of up to 16 channels are graphed on Y axis with X axis for time. Different from the above Y-Time graph, zero point of channel can freely be moved to a desired position on a division of Y axis. X-Y graph : Variables of desired 8 channels each for both X and Y axes are graphed in free combinations. Bar graph : One bar graph can contain up to 32 channels and 1 to 4 graphs can be presented on a window. Peak hold ON/OFF is possible.

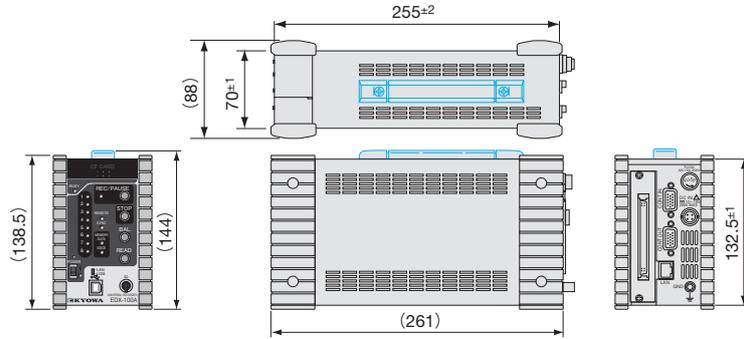
Bar meter : Variable of 1 desired channel can be displayed on a horizontal or vertical bar meter.
Circular meter : Variable of 1 desired channel can be displayed on a circular meter.
Numeric window : Presents numeric data of desired 1 or 16 channels or all channels.
Display color : Freely changeable graph by graph
Title and labels : A desired title and labels for X and Y axes can be set.
Number of simultaneously displayed windows : 0 numeric windows and 10 graph windows, 20 in total, can simultaneously displayed, including reproduced data windows. Note however that the maximum number of windows may not be available depending on the CPU speed and memory of the PC.
Data Reproduction : Y-Time graph : Physical variables of up to 16 channels are graphed on Y axis with X axis for time. Y-Time (DIV) graph : Physical variables of up to 16 channels are graphed on Y axis with X axis for time. Different from the above Y-Time graph, zero point of channel can freely be moved to a desired position on a division of Y axis. X-Y graph : Variables of desired 8 channels each for both X and Y axes are graphed in free combinations.
Numeric window : Presents data in a list.
Display color : Freely changeable graph by graph
Title and labels : A desired title and labels for X and Y axes can be set.
Cursor : Enables indication of the value at the cursor position in a proper engineering unit.
Number of simultaneously displayed windows : 10 numeric windows and 10 graph windows, 20 in total, can simultaneously displayed, including graph and numeric windows in monitor measurement. Note however that the maximum number of windows may not be available depending on the CPU speed and memory of the PC.
Size of data file available on a single screen : Size of data file which can be displayed at a time on graph and numeric windows is maximum 10 MB. If the file size exceeds 10 MB, 10 MB data of a desired portion can be displayed by setting the range.
File conversion : Desired range or data of a desired channel can be cropped and converted to CSV or Excel format file.
Data File Saving format : KYOWA standard file format KS2 to save data in the PC. Readable format : File format with which the data is saved in the medium of the controlled recorder, and KS2 format used by the DCS-100A to save data
File coupling : Data files saved in controlled recorders operated in synchronization can be combined to a single data file at the time of collection by the PC.
Collecting data : Data can automatically be collected and converted to CSV file upon completion of data recording, if the PC is connected. Data saved in CF card may be transferred to the PC, online or offline.
Erasing data : Data can be erased from CF card by commanding via USB or LAN.
Setting Environment Hardware configuration : Number of connected recorders, types of mounted conditioner cards. Number of slots and types of conditioner cards can freely be set. Hardware configuration of the recorder can be read if it is connected to the PC via USB or LAN. IP address : Can be set from the PC via USB or LAN, or saved in CF card. Communication status : Checked by reading the version of the EDX-100A Destination of saving data : Measured data is saved in CF card inserted into the controlled recorder. Also possible is direct saving in the hard disk of PC without using CF card, while it is limited by the sampling frequency and the number of measuring channels. Optional units : 3 user-defined units can be registered.
Operating Environment CPU : Pentium III 1 GHz or higher (Pentium 4 2 GHz or higher recommended) OS : Windows 2000 Professional/XP Home or Professional Edition/ Vista (only when connected via 100BASE-TX) Memory : 512 MB or more (1 GB or more recommended) Interface : 100BASE-TX/USB 2.0 Hard disk : Blank space 10 MB or more Display : 1024 x 768 dots or more, full color or more Disk drive : CD-ROM drive



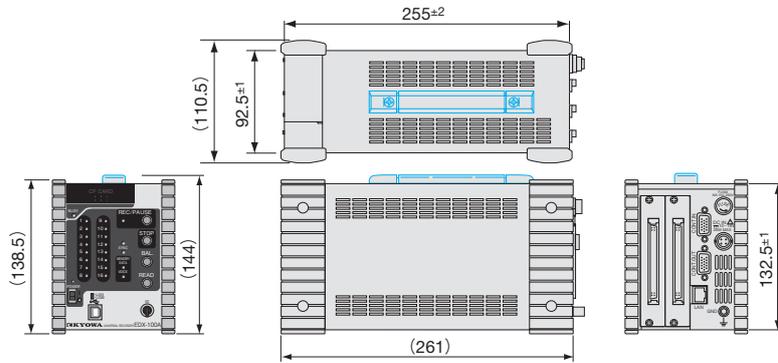


■ Dimensions(Handle grip in blue)

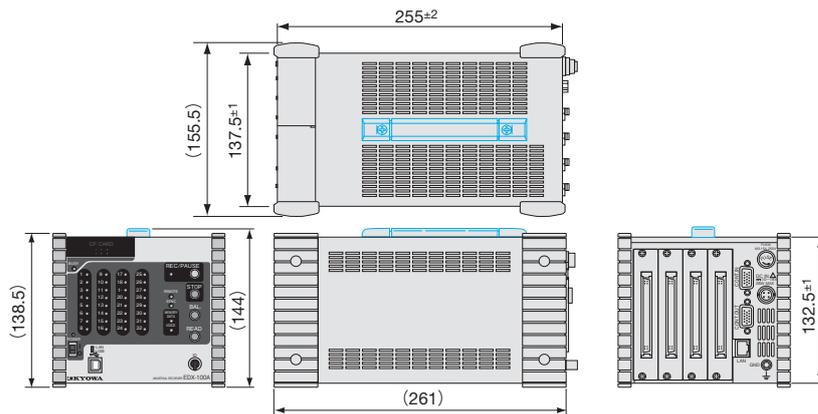
● 1 Slot
EDX-100A-1
EDX-100A-1H
(with handle grip)



● 2 Slots
EDX-100A-2
EDX-100A-2H
(with handle grip)



● 4 Slots
EDX-100A-4
EDX-100A-4H
(with handle grip)



EDX-2000B

Memory Recorder/Analyzers



All-in-one measuring instrument with optional conditioner cards mounted

- Able to monitor input signals and check processed results in real time by processing data for FFT or histogram, while measurement is in progress.
- The strain/voltage measuring card CDV-40B provides 8 channels.
- Built-in large capacity hard disk enables recording of approximately 13 hours of data sampled at 10 kHz in 32 channels.
- Voice memos can be recorded together with measured data.
- An optional CAN card enables CAN data recording.
- An optional DA card enables reproduction of analog data.
- FFT analysis, histogram analysis, arithmetic operation are possible.
- Max. sampling frequency is 200 kHz, and simultaneous sampling in 16 channels is possible even at such a high frequency.
- Interactive operation makes measuring tasks easy and speedy.
- Easy-to-handle ATA card or hard disk card is optionally available for offline data transfer to the PC.
- LAN interface enables online data transfer to the PC.
- A battery is built in to safeguard against instantaneous power failure.
- Data is saved in KYOWA standard file format KS2 and can be analyzed by the optional data analysis software DAS-100A.

※For the data analysis software DAS-100A, refer to page P4-10

The EDX-2000B is a general purpose, expandable, all in one instrument that can measure, monitor, record, and process signals detected by various sensors. It is available in 32 channel type and 64 channel type. The EDX-2000B starts measuring according to preset conditions and can simultaneously sample signals in 16 channels at 200 kHz (32 channels at 100 kHz). The recorded and processed data can easily be transferred online or offline to the PC. Furthermore, the EDX-2000B enables recording of voice memos, analog reproduction of recorded data with an optional DA card, and recording of CAN data with an optional CAN card.

●Conditioner Cards

(For the detail refer to page P3-64)

Strain/voltage Measuring card	CDV-40B/40B-F
Dynamic Strain Amplifier card	DPM-42A/42A-F
Thermocouple card	CTA-40A
F/V converter card	CFV-40A
Charge Amplifier card	CCA-40A/40A-F
CAN card	CAN-40A
DA card	DAC-40A

General Specifications

Models			
Model	Maximum analog input (CH)	Number of Slots*	Storage device (Built-in disk)
EDX-2000B-32-H (E)	32	4	HDD
EDX-2000B-32-S (E)	32	4	SSD
EDX-2000B-64-H (E)	64	8	HDD
EDX-2000B-64-S (E)	64	8	SSD

*Slots : To accommodate conditioner cards
 ※(E) is the English version.

Number of Input Channels : EDX-2000A-32: Max. 32
 EDX-2000A-64: Max. 64

Number of input channels = Number of slots x number of mounted conditioner cards, each of which provides 4 or 8 channels

Analog Input : Refer to specifications of conditioner cards.

Digital Input : 16 bits, TTL level, contact input

Voice Input : 1 channel (Voice memos can be recorded together with measured data.)

Number of Output Channels : Refer to specifications of DA card.

Sampling

Method : Simultaneous sampling of all channels

Frequency : 1 Hz to 200 kHz for up to 16-channel data recording
 1 Hz to 100 kHz for up to 32-channel data recording
 1 Hz to 50 kHz for up to 64-channel data recording
 1 Hz to 10 kHz for simultaneous data processing

Data Recording Capacity : 30 GB or more (Refer to Software Specifications - Number of Recorded Variables.)

Display : 10.4-inch color LCD (for setting various conditions and monitoring in graphic and numeric formats)

Operation : Through panel keys and external keyboard

External Control Signal : External clock input

Interface Ports

Keyboard : Mini DIN 6-pin port for connection to English keyboard; conforming to 106

External Display : 15-pin port (VGA) for monitor display

Compatible with optional ATA card or hard disk card for collecting recorded data

LAN : For transferring recorded data to the PC (10BASE-T/100BASE-TX)

Power Supply : AC line or 10 to 30 VDC; battery is built in for instantaneous power failure.



Current Consumption : With the CDV-40B card mounted to all channels and with full load		
Power Supply	EDX-2000A-32	EDX-2000A-64
100 VAC, 50Hz	2.3A	2.8 A
200 VAC, 50Hz	1.3A	1.5 A
12 VDC	8.0A	9.4 A
24 VDC	3.8A	4.6 A
Operating Temperature/Humidity Range : 0 to 40°C, 20 to 80%RH (noncondensing)		
Storage Temperature Range : -20 to 60°C		
Vibration Resistance : 29.42 m/s ² (3 G), 5 to 55 Hz (when operating) 49.03 m/s ² (5 G), 5 to 55 Hz (when not operating)		
Shock Resistance : 196.1 m/s ² (20 G)/11 ms		
Dimensions & Weight		
EDX-2000A-32 : 350(W) x 132(H) x 300(D) mm (excluding protrusions), approx. 12 kg (with 2 units of 8-channel CDV-40B mounted)		
EDX-2000A-64: 430(W) x 156(H) x 300(D) mm (excluding protrusions), approx. 13 kg (with 2 units of 8-channel CDV-40B mounted)		

Standard Accessories

- Digital input card DIB-40A (built in)
- AC power cable P-18 (with conversion adapter CM-33)
- DC power cable P-70
- Simplified Instruction Manual
- Instruction manual (CD-R)

Optional Accessories

- Dummy panel EDX2000-DUMMY
- Remote control unit RCU-40A
- Synchronous cable N-94 (Synchronous measurement in a maximum 640 channels is possible by connecting 10 units.)
- 8-channel bridge box
- Data Analysis Software DAS-100A

Note:
For LAN connection
Use 2 straight cable and LAN Hub

● **REMOTE CONTROL UNIT RCU-40A**

Control Functions	REC :	Starts data acquisition
	PAUSE :	Pauses data acquisition
	STOP:	Stops data acquisition
	" VOICE MEMO" :	Records voice memo (microphone built in)
LED Lamps :	REC, PAUSE, VOICE MEMO	
Cable Length :	1.5m	

● **SOFTWARE SPECIFICATIONS**

Setting Measuring Conditions	
Measuring Channel Conditions: Measuring channel, range, high-pass filter, low-pass filter, calibration coefficient, offset, unit, channel name	
Measurement Modes	
Manual measurement : Manually starts measurement through panel keys or remote-control unit.	
Trigger measurement : Automatically starts measurement when the preset trigger conditions are satisfied.	
Interval measurement : Automatically starts measurement at the preset time intervals.	
Setting Sampling Frequency	
Number of Measurements :	
2 to hard disk remaining capacity (sampling at 1 to 10,000 Hz)2 to 2,000,000,000 (approx. 4 GB, sampling at 16,384 to 200,000 Hz)	
Test Information : Test title, date/time, comment, items/ contents	
Saving and Reading Measuring Conditions	
Measurement and Data Acquisition	
Monitor Modes	
Numeric : Measured values are digitally indicated.	
Y-Time graph : 1, 2, 3 or 4 graphs are displayed on a single screen.	
Bar graph : Values of all channels (max. 64) are displayed on bar graph.	
X-Y graph : 1 or 2 graphs are displayed on a single screen. Each graph may be traced as a relative graph with 4 channels.	

Processing Data under Measurement	
Types of simultaneous analysis :	
FFT analysis, histogram analysis	
Either one can be selected during monitoring or recording.	
FFT Analysis	
Types of FFT analysis :	
Linear spectrum, power spectrum, cross spectrum, auto-correlation, cross-correlation	
Number of analyzed data : 256, 512, 1024, 2048	
Window functions : OFF (square window), hanning, hamming, Fejer, Blackman, Gaussian	
Histogram Analysis	
Types of histogram analysis : Max/Min, Peak/ Valley, 1D rainflow, 2D rainflow	
Number of Slices : 1D : 16 (±8), 32 (±16), 64 (±32), 128 (±64), 256 (±128) 2D : 16 (±8), 32 (±16)	
Hysteresis : 2 to preset number of slices	
Offset : Can be set for the Max/Min analysis method.	

■ **Data Reproduction**

Graphic Display	
Types of Graph	
Y-Time graph : 1, 2, 3 or 4 graphs on a single screen	
X-Y graph : 1 graph is displayed on a single screen; the graph may be traced as a relative graph with 8 channels.	
All channels graph : Max. 16 channels/screen	
Graphic display conditions : Display channel(s), scale, number of values to be displayed, auxiliary line, etc.	
Graph control : Scroll, cursor operation and value indication, zoom in/zoom out, all data display/magnification, playback of voice memos, etc.	
Saving and reading display conditions	
Editing Data File	
Data : Changing and editing recorded measurements (The number of measurements which can be edited at a time is limited.)	
Header : Changing the header information (date/time of data acquisition, calibration coefficient, offset, unit, comment, channel name)	
Saving formats : KYOWA standard KS2, CSV, Excel	
Conversion to ASCII (CSV) format : Possible	
Saving as a different file : Possible	
Extracting : Possible to save a desired portion of the data file as a different file	
Statistic processing : Possible to display and save maximum, minimum, average and standard deviation of the recorded data	
Analog output : Possible to reproduce recorded analog data through the optional DA card	

■ **Analysis**

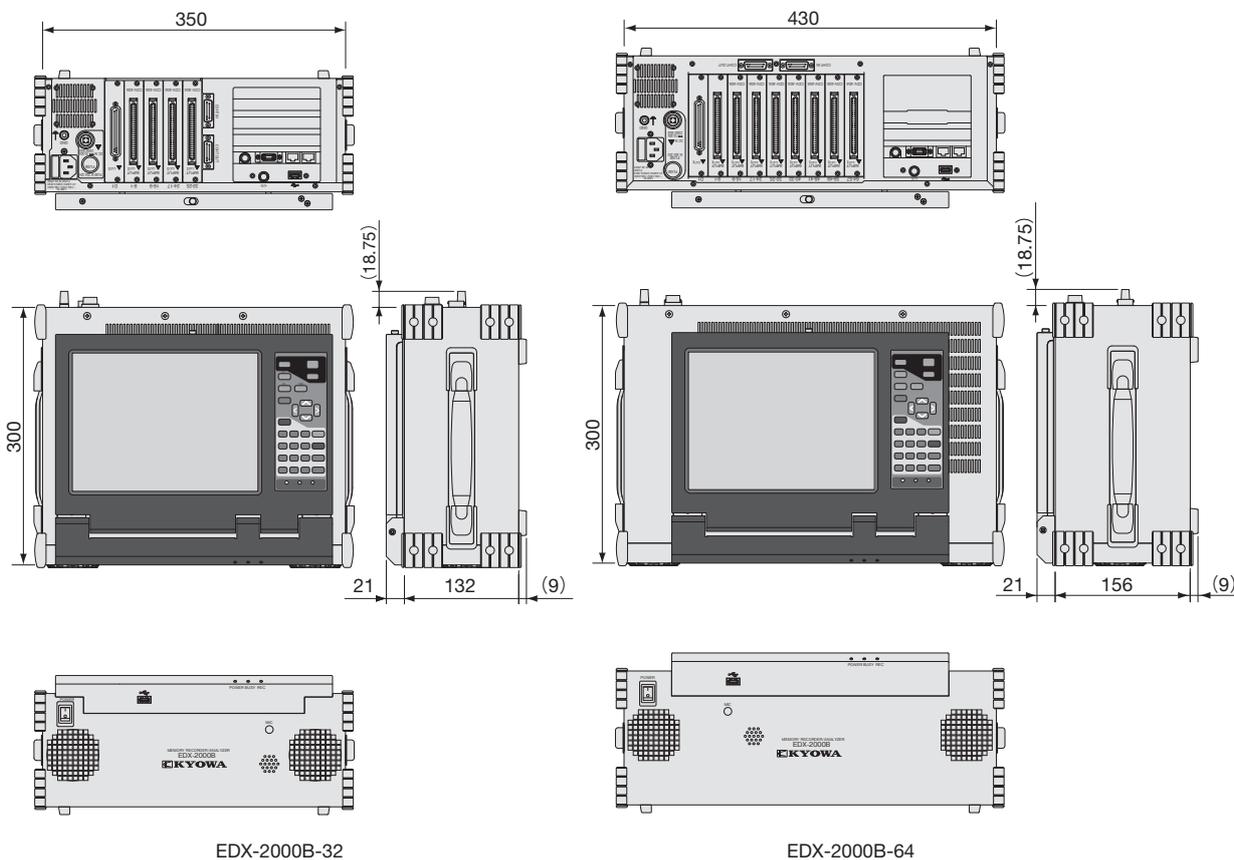
Arithmetic Operation	
Arithmetic operation is performed between desired channels in max. 2 data files and the results are saved in a designated file.	
Setting Items	
Calculating File Name(s) : Designate 1 (A) or 2 (A and B) data files. For 2 data files, the sampling frequency should be the same.	
File Name of Calculated Results : Designate the file name to save results of arithmetic operation.	
Operating Channels : Analog channels only (A01 to A64, B01 to B64) e.g. "A06" indicates channel 6 of file A and "B28," channel 28 of file B.	
Channels of Calculated Results : Max. 32 (C01 to C32) (C**, ** indicates the expression description channel.) e.g. C06 = (expression) makes the operated result saved in channel C06.	
Expression : Designate expression f () in C** = f (A**, B**). The expression should be within 60 digits. The number of expressions (channels of calculated result) available for setting is maximum 192.	
Unit : A desired engineering unit can be designated for the calculated result.	
Channel Name : Comment on the channel of calculated result	
Operators and Expression	
Operators : +, -, *, /, trigonometric functions, logarithmic function, exponential function, rosette function	
Remarks : Parenthesis (up to level 3) and variable cannot be used. "+" and "-" are also effective as signs (e.g. -5.7, -A15). Any calculated result (channel) cannot be used for any expression of other channel of calculated result. Also, any recursive processing is not possible. (e.g. C10 = C01 + C02, C12 = C12 + 3,1415 cannot be used.)	
Saving and reading calculating conditions	



FFT Analysis
FFT analysis is performed on data of desired channel(s) of recorded data file and analyzed results are saved in a designated file.
The results are graphically displayed for confirmation.
Types of FFT analysis: Linear spectrum, power spectrum, cross spectrum, auto-correlation, cross-correlation
Analysis conditions
Analyzing Channel(s) : 1 or 2 (depends on type of FFT)
Filter : Low-pass filter can be applied for pre-processing.
Integration : Data can be integrated 1 or 2 times for pre-processing
Number of analyzed data : 256, 512, 1024, 2048, 4096, 8192, 16384, 32768
Window functions : OFF (square window), hanning, hamming, Fejer, Blackman, Gaussian
Averaging times and number of shift data :
Averaging of FFT results (1 to 99 times) and number of shift values (1 to 9999)
Analysis start point : Designate the starting point of analysis on the target data.
Analysis result file : Analyzed results are saved together with the target time-series data.
Analysis result graph : Target time-series data and analyzed results are graphically displayed. Cursor display and zoom-in/zoom-out of X and Y axes are possible.
Saving and reading analysis conditions
Histogram Analysis
Histogram analysis is performed on recorded data and analyzed results are saved in a designated file. The results can be tabulated or graphed for confirmation.
Setting Items
Target channel : Selectable
Types of histogram analysis :
A) Peak/valley (P/V)
B) Maximum/minimum (MAX/MIN)
C) 1-dimensional rainflow (RAIN [1D])
D) 2-dimensional rainflow (RAIN [2D])

E) Amplitude (AMPLITUDE)
F) 1-dimensional time at level (TIME [1D])
G) Complex: 1-dimensional rainflow + Peak/Valley (RAIN&P/V)
H) Complex: 1-dimensional rainflow + Max/Min (RAIN&M/M)
Number of Slices :
10 (5) to 256 (128) for 1D types (abovementioned A, B, C, E, F, G and H)
10 to 50 (even number) for 2D type (abovementioned D)
Slice width : Designated with physical value
Hysteresis : Set the number of masking slices in a range of 0 to the preset number of slices.
Offset : Designated with physical value for max/min analysis.
Analyzing file : Recorded data file or file of results obtained through arithmetic operation
Analysis result file : File of histogram analysis results
Result Display:
Table : List of histogram analysis results for every processed channel
Graph : Graph of histogram analysis results for every channel (For 2D type, 3-dimensional graph is displayed.)
Differentiation/Integration, Filtering and Moving Averaging
Number of differentiation/integration times: 1 or 2 selectable
Average correction possible for integration
Digital Filters
IIR digital filter : 4th order Butterworth characteristics (with cutoff characteristic of -3dB and no phase lag)
High-pass filter : FLAT, 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10.0 Hz
Low-pass filter : FLAT, 10, 20, 50, 100, 200, 500, 1000 Hz (Effective at up to one-half the sampling frequency)
Moving Averaging: 1 to 999 times
File Management
Functions : Copy file, delete file, change file and folder names, sort, create/delete folder, convert data collectively
Types of Target File : Condition file, data file, and text file
Setting Environment
Setting Items : Data recording folder, condition saving folder, date/time, display of effective battery life, etc.

■ Dimensions



EDX-3000A

Memory Recorder/Analyzers



High-Speed Sampling at 200kHz/32 Channels (100kHz/64 Channels) and Simultaneous Recording of Moving Image with a High-Speed Camera

- Conditioner Cards Selectable for Specific Applications
- Up to 8 cards can be mounted for measurement of a maximum of 64 channels
- Highly User-Friendly Operation
- Simultaneous recording of measurement data and moving images
- Versatile Real-Time Processing Capability
- Transformation into All-In-One Logger
- Operable without a Monitor and Keyboard
- Easy-to-Confirm Channel Status with LEDs
- Online Remote Control of Multiple Instruments
- External I/O Connectors (BNC)
- Remote Control Unit RCU-42A (Option)
- Built-in Backup Battery
- Time synchronized measurement (option)

EDX-3000A is an advanced stationary measuring instrument having sophisticated features and high-speed processing capabilities.

It is the highest-end model of EDX Series. Both online and offline control is available, and with an optional display and keyboard, it can be used as an all-in-one logger.

Software having the similar functionality with well-received dynamic data acquisition software DCS-100A is installed in this model for monitoring and recording measurement data in a variety of graph windows, and at the same time, enabling simultaneous recording of measurement data and moving images as well as rosette analysis and other arithmetic operations

●Conditioner cards. (Refer to Page 3-64)

Strain/Voltage measuring card	CDV-40B/40B-F
Dynamic Amplifier card	DPM-42A/42A-F
Thermo couple card	CTA-40A
F/V converter card	CFV-40A
Charge Amplifier card	CCA-40A/40A-F
CANcard	CAN-40A/41A

Hardware Specifications

Model :	EDX-3000A-H: Hard disk drive (HDD) 100GB EDX-3000A-S: Solid state drive (SSD) 30GB
Conditioner cards :	CDV-40A/B(-F), DPM-42A(-F), CTA-40A, CFV-40A, CCA-40A(-F), CAN-40A, CAN-41A
Input channels :	Max. 64 (CDV-40B x 8)
Analog input :	See specs of respective conditioner cards for details.
Digital input :	32 bits (TTL level, contact input)
Voice input :	1 channel (voice memo entered during recording can be saved with measurement data)
Sampling system :	Simultaneous sampling of all channels
Sampling frequency :	1-2-5 system 1 Hz to 200 kHz for up to 32-channel data acquisition 1 Hz to 100 kHz for up to 64-channel data acquisition 1 Hz to 10 kHz for real-time simultaneous data processing or CAN data measurement 2 ⁿ system 2 Hz to 131072 Hz for up to 32-channel data acquisition 2 Hz to 65536 Hz for up to 64-channel data acquisition 2 Hz~8192 Hz for real-time simultaneous data processing or CAN data measurement
Display :	Channel status LED (OVER value can be speci_ed for each channel) REC/PAUSE LED LCD for various status display (20 char. x 2 lines)
Operation keys :	Front mounted REC, STOP, BAL, OPT.
External control connectors :	CONT IN, CONT OUT (remote control synchronous operation)
External I/O connectors :	External trigger TRG IN, TRG OUT External clock CLK IN, CLK OUT (output at any frequency division ratio) Operation status output READY
External device interface :	Mini DIN 6-pin for keyboard Mini DIN 6-pin for mouse 15-pin VGA connector for external display USB 2.0 ports, 2 on the front and 6 on the rear LAN port 10/100/1000BASE-T
Power supply :	100 to 240 VAC, 50/60 Hz Built-in battery for instantaneous power failure
Current consumption :	2.0 A (For 100 VAC, CDV-40A/B x 8)
Operating temperature & humidity range :	0 to 40°C, 20 to 80%RH (noncondensing)
Storage temperature range :	-20°C to 60°C
Vibration resistance :	49.0 m/s ² (5 G), 5 to 55 Hz (when not operating) 29.4 m/s ² (3 G), 5 to 55 Hz (when operating) EDX-3000A-H: 9.8 m/s ² (1 G), 10 to 200 Hz (when operating) EDX-3000A-S: 19.6 m/s ² (2 G), 10 to 200 Hz (when operating)
Shock resistance :	196.1 m/s ² (20 G)/11 ms
Dimensions :	440(W)×186(H)× 341(D)mm (excluding LCD and protrusions)
Weight :	Approx. 13.8kg (mainframe only)

Optional Accessories Detachable 15-in LCD EMON-30A, Keyboard, Mouse, Remote control unit RCU-42A (p.1)

※The DC24V specification can be manufactured.

●Remote Control Unit RCU-42A (Option)

The front panel operation of the mainframe can be performed on this remote control unit. With a buzzer from the unit, an alarm sound can be clearly heard even though the sound from the mainframe is missed.



Control function :	REC/PAUSE STOP BAL (balancing) OPT. (optional function) VOICE MEMO (recording with the built-in microphone)
Indication :	Recording, pausing and balancing are indicated with LED.
Cable length :	1.5m



■ **Measuring Condition Setting**

Measuring channel conditions

Measurement : ON/OFF, measuring modes, range, high-pass filter, low-pass filter, balance ON/OFF, CAL range, CAL ON/OFF, calibration coefficient, offset, unit, channel name, measuring range, rated capacity, rated output, numeric display digits (any display items can be selected)

Number of recordable data items :

Up to remaining disk space of built-in memory (sampling frequency 1 to 10kHz) 2 to 2,000,000,000 data items (sampling frequency 10001Hz to 200kHz)

Manual measurement : Recording from REC to STOP, or designated number of data items from REC

Interval measurement : Automatic recording according to designated starting time and recording interval

Trigger measurement : Recording starts and stops according to designated trigger conditions.

Common trigger conditions :

End trigger : Settable

Delay amount : Max. 4,194,304 data items/channel for both start and end

* Delay amount depends on the sampling frequency and number of measuring channels.

Analog trigger conditions :

Trigger channel : Any 1 channel

Trigger level : An engineering value

Trigger slope : Up/Down

Digital trigger conditions :

Trigger bit : Any 1 bit

Trigger level : 0, 1

External trigger conditions :

Trigger slope : Up/Down

Complex trigger conditions :

Trigger source : Any 4 analog/digital channels, an external trigger channel, or a manual trigger channel

AND/OR : AND/OR can be used for analog trigger, digital trigger and external trigger.

Trigger level : An engineering value is set for the analog channel, and 0 or 1 for the digital channel.

Trigger slope : Up/Down

TEDS Information : TEDS Information is read and channel conditions are set, according to the read conditions automatically.

■ **Measuring Operations**

Monitor measurement, recording start, pause, stop balancing, CAL output, etc.

Real-time processing :

Monitoring and recording of data can be done simultaneously.

The sampling frequency up to 10kHz is available.

● **Moving image data acquisition with Web camera**

Camera : DirectX compatible Web camera (recognized by the OS as an image device)

Number of cameras : 1

Resolution : Max. 640 x 480

Frame rate : Max. 30 fps

Saving file format : AVI format

* Resolution and frame rate depend on the camera.

The Web camera is optional.

Measuring conditions during recording :

Manual mode, manual mode (set record data)

● **Arithmetic Processing**

High-pass/ low-pass filter :

Cutoff frequency : One-half of the sampling frequency or less
Order : 2nd to 4th

Number of differentiations/integrations : 1, 2

Number of moving average data items : 2 to 5000

Arithmetic operation :

Max. 32 arithmetic expressions can be set (up to 200 characters)

6-component force matrix input

Operators : +, -, *, /, power, parentheses, sine, cosine, tangent, arcsine, arc cosine, arc tangent, common logarithm, natural logarithm, exponent

Triaxial rosette analysis (maximum principal strain, minimum principal strain, maximum shearing strain, maximum principal stress, minimum principal stress, maximum shearing stress, direction of principal strain)

Measuring conditions during arithmetic operation :

Measurement mode : Manual mode, manual mode (set record data), interval mode

● **FFT Analysis**

Analysis type : Linear spectrum, power spectrum, cross spectrum, auto-correlation, cross-correlation

Window function : OFF, Hamming, Hanning, Fejer, Blackman, Gaussian

Number of analysis data : 256, 512, 1024, 2048, 4096, 8192

Number of analysis windows : Max. 8

Saving file format : Kyowa standard file format (KS2)
KS2 file version: 01.04

■ **Monitor**

Y-Time graph : X-axis indicates the time, and Y-axis the physical amount of measurement for a maximum of 16 channels. 1 to 4 graphs can be displayed on a window.

Y-Time (DIV) graph : X-axis indicates the time, and Y-axis the physical amount of measurement for a maximum of 16 channels.

Y-Time (all channel) graph : Unlike the time-series graph above, the zero point of the channel can be placed at any place on the Y-axis scales. X-axis indicates the time, and Y-axis the physical amount of measurement for all channels. Unlike the time-series graphs above, the line color is the same for all channels.

X-Y graph : Any combination of 8 channels can be plotted on X- and Y-axis.

Bar graph : Up to 32 channels are contained in a graph. 1 to 4 graphs can be indicated on a window. Peak hold ON/OFF

Digital graph : X-axis indicates the time, and Y-axis bit data of a digital channel (upto 16 bits). 1 to 4 graphs can be displayed on a window.

Circle meter : Any one channel is displayed in a circle meter.

Bar meter : Any one channel is displayed in a horizontal or vertical bar meter.

Numeric display : Any one channel, 16 channels or all channels are listed.

Display color : Any color can be selected.

Title, labels : Any title or X- and Y-axis labels can be specified.

No. of windows : 8 numeric windows, 8 graph windows

Information : Various information can be appended to the title or status bar.

■ **Data Reproduction**

● **Recorded Data Display**

Graph display : 4 patterns of display condition can be set for a graph. Y-Time graph : X-axis indicates the time, and Y-axis the physical amount of measurement for up to 16 channels. 1 to 4 graphs can be displayed on a window.

X-Y graph : Any 4 graphs can be plotted on X- and Y-axis.

All data display : All data can be displayed on a window at an interval of 4 channels.

Numeric data display : A list of recorded data is displayed. Data for 16 channels, with a maximum of 10000 data items for each channel, is displayed in a window.

Cursor : Numeric display of the engineering value of cursor position. Enlarged display of two cursors. Scroll.

Header information : Display and editing of titles and channel conditions (calibration, coefficient, offset, engineering unit, etc.)

KS2 file : MAX/MIN data display, voice data list and reproduction

Moving image reproduction :

Reproducible file format AVI

Operations : Play, stop, pause, frame-by-frame forward/backward, zoom, changing reproduction speed

Synchronous display : Playback of moving image data coupled with the cursor for graph waveform.

● **Data Analysis**

Statistic processing : A list of maxima, minima, averages and standard deviations in a desired section of the data file. The results are saved in CSV files.

Arithmetic operation :

Inter-channel operation for up to 2 files. The result is saved in a new file (up to 320 expressions can be specified).

Expression : Up to 60 characters

Operator : +, -, *, /

Sine, cosine, tangent, arc sine, arc cosine, arc tangent, common, logarithm, natural logarithm, exponent Triaxial rosette analysis (max. principal strain, min. principal strain, max. shearing strain, max. principal stress, min. principal stress, max. shearing stress, direction of principal strain)

FFT analysis :

Analysis type : Linear spectrum, power spectrum, cross spectrum, auto-correlation, cross-correlation, coherence, transfer function



Window function : OFF, Hamming, Hanning, Fejer, Blackman, Gaussian

No. of analysis data : 256, 512, 1024, 2048, 4096, 8192, 16384, 32768

Filter : 12 steps of 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000Hz and FLAT

No. of integrations : 0 to 2

Average No. of times : 1 or more (0: whole waveform)

No. of shifts : 2 or more

Analysis type	Analysis graph 1	Analysis graph 2
Linear spectrum	Amplitude (linear)/amplitude (log)	Phase
Power spectrum	Amplitude (linear)/amplitude (log)	-
Crossspectrum	Amplitude (linear)/amplitude (log)	Phase
Auto-correlation	Correlation	-
Cross-correlation	Correlation	-
Coherence	Coherence	-
Transfer function	Transfer function	Phase

Analysis results are saved in CSV files.

Histogram analysis : No. of channels : All channels

Algorithms :

Peak/valley, maxima/minima, 1D rainflow, Amplitude, 1D time at level, 1-dim rainflow + peak/valley, 1D rainflow + maxima/minima, 2D rainflow

No. of slices :

1D algorithm : Even numbers from 10 (5) to 256 (128)

2D algorithm : Even numbers from 10 to 50

Slice width, hysteresis, offset (for maxima/minima), etc. can be specified.

Results : Tabular or drawing display (3D display for 2D rainflow)

Filtering : Digital filter: IIR filter for 4th order Butterworth characteristics (no delay and -6dB at the cutoff frequency)

High-/low-pass filter : FLAT to 500kHz (effective up to one-half of the sampling frequency) Mirroring

Differentiation/ integration :

No. of times of differentiation/integration(1, 2) and an engineering unit can be specified after processing.

Average correction is possible for integration.

●Utility

Multiple file conversion : Conversion to CSV, XLS or RPCIII format

File coupling : Multiple files (master and slave) acquired in synchronized operation can be coupled into one file.

Reverse file conversion : Data files converted by this software into CSV format can be converted into KS2 format.

Multiple file analysis : Analysis of multiple files under same conditions. Histogram analysis, filtering and differentiation/integration are available.

Other : Overwriting of multiple files

Up to 16 data files can be displayed and overwritten as Y-Time data.

■ Configuration

Synchronous operation setting : Standalone, synchronous master, synchronous slave

Recording setting : Storage of data files

Automatic file conversion : Automatic file conversion after measurement (CSV, XLS or RPCIII format)

Engineering unit specification : Up to three user specified engineering units can be registered.

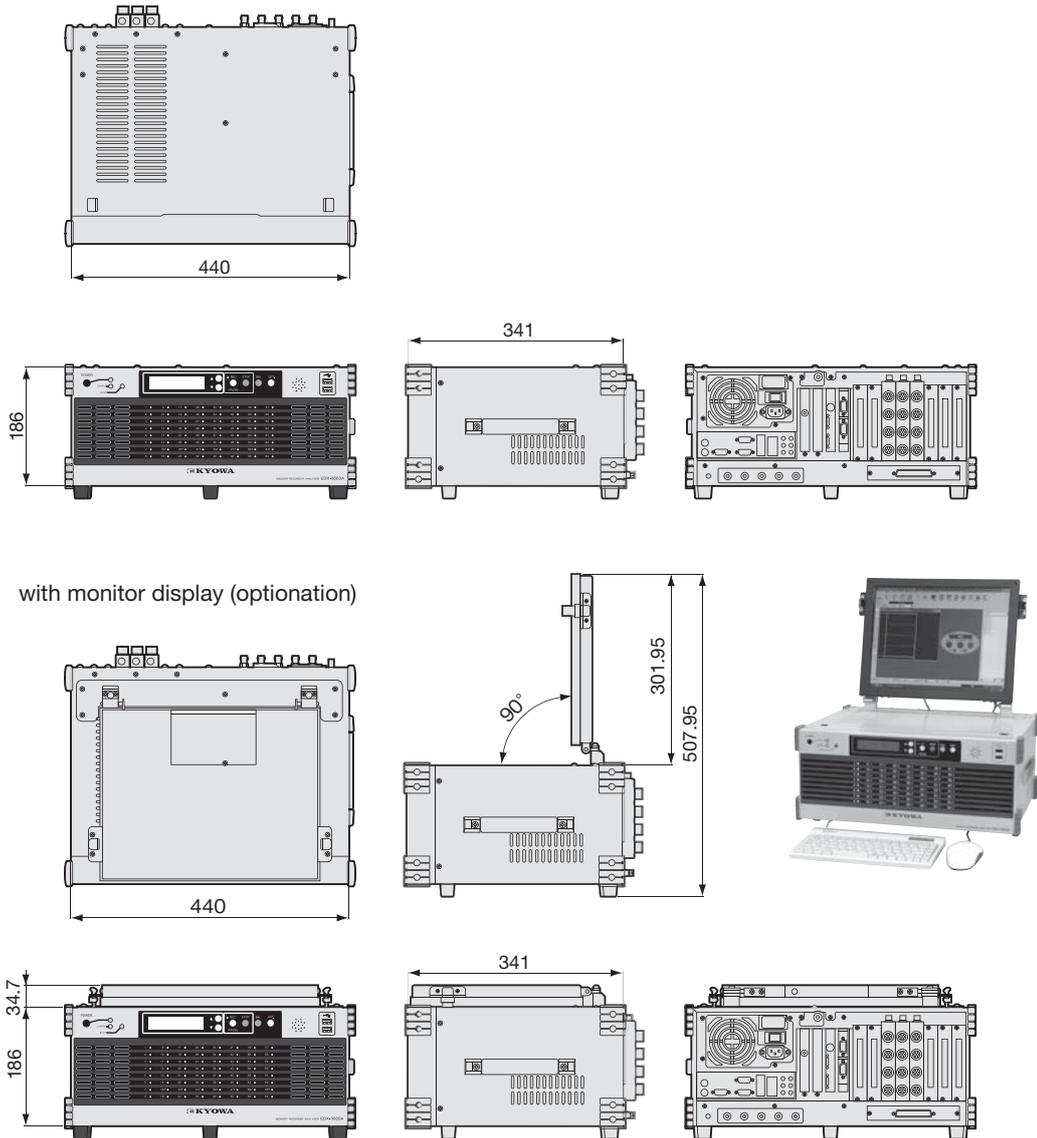
Other : Oscillator switching (internal, external), operation beep, balance standard, front speaker ON/OFF

■ Print

Printable item : Setting conditions, numeric data, graphs

Remark : Optional printer driver is required.

■ Dimensions



CONDITIONER CARDS



Optional Built-in Conditioner Cards Common to EDX-100A, EDX-2000A/B and EDX-3000A

Strain/Voltage Measuring Card CDV-40B, CDV-40B-F

The CDV-40B enables measurement of signals detected by strain gages, strain gage transducers and voltage-output sensors. CDV-40B-F equipped with antialiasing filter is also available.

Item	Strain Meas.	Voltage meas
Number of Input Channels	8 (centralized connector)	
Input Mode	Balanced differential	Unbalanced
Input Resistance	Approx. (10 MΩ + 10 MΩ)	Approx. 1MΩ
Coupling	DC/AC (DC cut)	
Applicable Gage Factor	2.00	
Bridge Excitation	2.00 VDC ±2% (120 to 1kΩ)	
Balance Adjustment Range	Resistance ±2.4% (±12000μm/m)	
Measuring Range	500, 1k, 2k, 5k, 10k, 20k, 50k [μm/m], OFF	0.1, 0.2, 5, 1, 2, 5, 10V, OFF
Range Accuracy	±0.2% FS with each range	
Calibration	±100%, ±50% of each range	
Nonlinearity	±0.1% FS	
Frequency Response Range	DC coupling : DC to 50 kHz, dev. +1 dB-3 dB AC coupling (DC cut) : 0.2, 1 Hz to 50 kHz (Refer to high-pass filter.)	
Low-pass Filter	Transfer characteristics: 2nd order Butterworth Cutoff frequency: 8 steps of 10, 30, 100, 300, 1k, 3k, 10k [Hz] and FLAT Amplitude ratio at cutoff point: -3 dB, ±1dB Attenuation: -12 dB/oct. ±1dB/oct.	
Antialiasing Filter (CDV-40B-F only)	8th order Butterworth Cutoff frequency: Automatically set at sampling frequency x 0.25 Attenuation: -48 dB±5 dB (at sampling frequency x 0.5) Provided that low-pass filter is set to AUTO on EDX-2000A.	
High-pass Filter (DC cut)	Cutoff frequency: 0.2 Hz, 1 Hz Attenuation: -6 dB/oct.	
A-D Conversion	16 bits	
Additional Function	Reading information of TEDS-installed sensor	

- Optional Accessories**
- Voltage conversion adapter FV-1A
 - 8-channel input cables U-38 to U-48
- N81 to N85 should be used in combination for remote-sensing transducers.

Dynamic Strain Amplifier Card DPM-42A, DPM-42A-F

Designed for strain gages and strain gage transducers, the DPM-42A uses carrier for bridge excitation, making it suitable for measurement of low level strain. The input and output as well as channels are isolated from each other.

Applicable Sensors : Strain gages, strain gage transducers

Number of Measuring Channels : 4

Frequency Response Range : DC to 5 kHz (deviation ±10%)

Carrier Frequency : 12 kHz

Applicable Bridge Resistance : 120 to 1000Ω

Gage Factor : 2.00 fixed

Bridge Excitation : 2 V/0.5 V rms, switchable, 12 kHz sine wave

Balance Adjustment Range :

Resistance : ±2.4% (12000μm/m)

Capacitance : 2000 pF

Balance Adjustment Method :

Resistance : True electron auto-balancing method

Capacitance : CST (self-tracking) method

Range : 8 steps of 200, 500, 1000, 2000, 5000, 10000,

20000μm/m and OFF with bridge voltage 2 V rms

7 steps of 1000, 2000, 5000, 10000, 20000,

50000μm/m and OFF with bridge voltage 0.5 V rms

Calibration : ±100% and ±50% in each range

Nonlinearity : Within ±0.2% FS

Low-pass Filter : 2nd order Butterworth

Cutoff frequency : 10, 30, 100, 300, 1k [Hz]

and FLAT (6 steps)

Cutoff accuracy : -3dB ±1dB

Attenuation : -12 dB/oct.±1 dB/oct.

Antialiasing Filter (DPM-42A-F only) : 8th order Butterworth

Cutoff frequency : Automatically set at sampling frequency x 0.25

Cutoff characteristic : -48 dB±5dB (at sampling frequency x 0.5)

Provided that low-pass filter is set to AUTO on EDX-2000A.

Resolution : 16 bits



Additional Functions : Checking input by inserting a resistor to a side of the bridge Reading information of TEDS-installed sensor

Monitor Output :
Accuracy : Within ± 5 V/ $\pm 0.5\%$ (full scale in plus and minus directions)
Nonlinearity : Within $\pm 0.5\%$ FS

Withstand Voltage : 250 VAC for 1 minute between input and output

Optional Accessory Monitor output cable H-10296

■ **Thermocouple Card CTA-40A**
The CTA-40A enables temperature measurement with 2 types of thermocouples, K(CA) and T (CC). The input and output as well as channels are isolated from each other.
Applicable Sensors : Thermocouples K (CA) and T (CC)
Number of Input Channels : 8
Thermocouple Resistance : 200 Ω or less with burnout ON
1000 Ω or less with burnout OFF

Measuring Range : 6 steps including OFF

Range Mode	Measuring Range
K1230	-200 to 1230 °C
K480	-200 to 480 °C
K240	-200 to 240 °C
T400	-200 to 400 °C
T210	-200 to 210 °C

System Accuracy :
Within $\pm (0.5\% \text{ rdg} + 1)^\circ\text{C}$ at an ambient temperature of $20\pm 3^\circ\text{C}$
Within $\pm (0.5\% \text{ rdg} + 2)^\circ\text{C}$ in a temperature range of 0 to 40°C

Calibration : 100%, 50% in each range and absolute 0°C

Frequency Response Range : DC to 10 Hz

Resolution : 16 bits

Burnout : Built-in burnout display ON/OFF

Note: If the thermocouple resistance is high, accurate measurement is made possible by turning the burnout function OFF.

Monitor Output : 5 V
Accuracy : Within ± 5 V $\pm 0.5\%$ (full scale in plus direction)
Nonlinearity : Within $\pm 0.5\%$ FS

Insulation Resistance : 50 M Ω or more (500 VDC) between input and output and between channels

Standard Accessories 8-channel input cable U-104
Temperature adapter CT-2A (8 pcs.)

Optional Accessory Centralized output cable U-62

■ **F/V Converter Card CFV-40A**
Designed for measurement of input pulse frequency. The CFV-40A has a power supply for sensors. Isolated between input and output.
Applicable Sensors : AC signal output sensors
Number of Input Channels : 4
Input Signals : AC (zero-cross), TTL level (including open collector signals)
Input Voltage Range : $\pm (0.5$ V to 50 V) with large hysteresis
 $\pm (0.1$ V to 50 V) with small hysteresis

Measuring Range : 9 steps of 50, 100, 500, 1k, 2k, 5k, 10k, 20k [Hz] and OFF
Accuracy : Within $\pm 0.1\%$ FS

Calibration : 100%, 50% (added) in each range and 0% (absolute)

Response Time : 10 μsec or less with pulse input continued
2 cycles of input frequency + 50 sec or less with pulse input discontinued

Resolution : 16 bits

Sensor Power Supply : 12 VDC within $\pm 10\%$ (50 mA or less for each channel)

Monitor Output : 5 V
Accuracy : Within $\pm 0.5\%$ (for full scale in plus direction)
Nonlinearity : Within $\pm 0.1\%$ FS

Insulation Resistance : 50 M Ω or more (500 VDC) between input and output and between channels

Remarks : Up to two F/V converter cards can be mounted to the 32-channel EDX-2000A. For the 64-channel type, when two F/V converter cards are mounted, up to 4 other cards, and when one F/V converter card is mounted, up to 6 other cards can be mounted.

Standard Accessory Voltage conversion adapter FV-1A (4 pcs.)

Optional Accessories Input cable U-12, Monitor output cable H-10296

■ **Charge Amplifier Card CCA-40A, CCA-40A-F**
For piezoelectric accelerometers. (CCA-40A-F with antialiasing filter is also available.)
Applicable Sensors : Voltage-output piezoelectric accelerometers with built-in amplifier
Number of Measuring Channels : 8

Sensor Power Supply : Constant-current 4 mA. applied voltage approx. 24 VDC, load 1k Ω or less

Frequency Response Range : 1 Hz to 20 kHz (dev. +1 dB, -3 dB)

Range Selection : 9 steps of 20, 50, 100, 200, 500, 1000, 2000, 5000 mV and OFF. Accuracy: Within $\pm 1\%$ FS

Calibration :
DC calibration : $\pm 100\%$, $\pm 50\%$ in each range
Accuracy : Within $\pm 0.2\%$ FS
AC calibration : 100%, 50% in each range
Accuracy : Within $\pm 1\%$ FS
Frequency accuracy : 100 Hz within $\pm 5\%$

Low-pass Filter : 2nd order Butterworth
Cutoff frequency : 5 steps of 300, 1k, 3k, 10k [Hz] and FLAT
Cutoff accuracy : -3 dB ± 1 dB
Attenuation : -12 dB/oct. ± 1 dB/oct.

Antialiasing Filter (CCA-40A-F only) : 8th order Butterworth
Cutoff frequency : Automatically set at sampling frequency x 0.25
Cutoff characteristic : -48 dB ± 5 dB (with sampling frequency x 0.5)
Provided that low-pass filter is set to AUTO on EDX-2000A.

Distortion : 1% or less

Resolution : 16 bits

Monitor Output : 5 V
Accuracy : Within $\pm 1\%$ (for full scale in plus and minus directions)

Additional Function : Reading information of TEDS-installed sensor

Standard Accessory Input cable U-111

Optional Accessories
Centralized output cable U-62
Conversion adapter BNCP-C25J-A (BNC - Miniature)

■ **CAN Card CAN-40A, CAN-41A**
(※NOTE : CAN-41A is for EDX-100A or EDX-3000A)
For measurement of data frames on the controller area network.
CAN-40A records a maximum of 16 different data frames, and dual-input CAN-41A records data frames of two systems (up to 32 frames) simultaneously with usual analog data..

Number of CAN Ports : CAN-40A : 1 CAN-41A : 2 (two nodes)

Connectors : D-sub 9-pin for high and low speed CANs

Compatible CAN Version : Bosch 2.0B active (conforms to ISO 11898)
Switchable between high-speed CAN and low-speed CAN

Number of Measured IDs : CAN-40A : Max. 16 CAN-41A : Max. 32

CAN Controller Operating Clock : 40 MHz, 32 MHz

Communication Speed :
High-speed CAN : 1000/800/500/250/125/100/83.3/62.5/50/33.3/25/20/10 kbps
Low-speed CAN : 125/100/83.3/62.5/50/33.3/25/20/10 kbps

Communication Conditions : Sampling point, number of sampling times, re-synchronization jump width

Measuring Channel Conditions :
Start bit, bit length, data type, calibration coefficient (parameters to convert the extracted CAN data to physical quantities)

Graph Display : Together with numeric display, frame display, and analog data

Remarks : Only one CAN card can be mounted to the last slot of the EDX- 2000A. The maximum sampling frequency is 10 kHz when CAN data is measured.

■ **DA Card DAC-40A**
For analog reproduction of the data recorded with EDX-2000A.

Number of Output Channels : 8

Resolution : 14 bits

Connectors :
OUTPUT 1 : BNC connector outputs data of a selected channel.
OUTPUT 2 : D-sub 9-pin connector outputs 8-channel data.

Output Voltage : ± 5 V FS (load resistance: 5 k or more)
Accuracy : Within $\pm 0.15\%$ FS
Nonlinearity : Within $\pm 0.05\%$ FS

Setting Conditions for D-A Conversion :
Reproduction rate : 1 to 10 kHz (selected from internal sampling clock)
Simultaneous playback of voice data: Yes/No
Number of reproducing times : 1 to 1000 or infinite Recording data channels, output full scale and shift level

Reproduce Data : All measured data or data in a display range

Calibration : Absolute values of $\pm 50\%$ and $\pm 100\%$ of full scale

Standard Accessory Centralized output cable U-62

MCA-200A

Combined G-resistant data logger



Build-in signal amplifier Maximum 256 measuring channels

- Applicable for measurement of static and dynamic phenomena alternately
- Simultaneous sampling of all channels with a resolution of 16bit
- Max. sampling frequency is 100kHz, and simultaneous sampling at 5kHz is possible under the state of 128ch
- Have 196m/s^2 (20G) G-resistance or more and can be used under static and dynamic acceleration states
- Can read TEDS build-in sensor information
- Compatible with variety of amplifiers (thermocouple card, FV card, charge amplifier card, dynamic strain amplifier card)

※Amplifier card specifications refer to P3-64

Measure up to 256 channels with G resistant amplifiers. Combine all types of amplifiers to connect sensors for strain gage, voltage, and thermocouple. The A-D conversion is built-in and maximum sampling frequency is 100kHz enabling high speed applications.

Note:

For LAN connection
Use a straight cable and hub

Specifications

Number of Input Channels :	Up to 32 channels (Up to 4 slots)
Analog Input :	Provided by optional conditioner cards (common to EDX-100A). For the conditioner cards, refer to page 3-64
Sampling Frequency :	
Sampling Method :	Simultaneous sampling of all channels
Sampling Frequency Selection Systems :	
	1-2-5 system in a range of 1Hz to 100 kHz
	2 ⁿ system in a range of 2 Hz to 65536 Hz
Sampling Frequency(1-2-5 system) :	
	1 Hz to 100 kHz for 1-channel measurement
	1 Hz to 50 kHz for 3-channel measurement
	1 Hz to 20 kHz for 8-channel measurement
	1 Hz to 10 kHz for 16-channel measurement
	1 Hz to 5 kHz for 32-channel measurement
Data Storage :	Compact flash memory card (128MB to 8 GB; 45x speed or higher) Up to 2GB data for 1 time of measurement
Setting Conditions :	Online: From the PC through LAN
Saving Condition :	Amplifier setting conditions and measuring conditions are saved in the internal nonvolatile memory, enabling immediate setup with previous conditions upon power-on.
Measurement Modes :	Manual/Trigger/Interval
Manual :	Data recording is manually started/stopped or stopped when data is recorded to a preset number of measure data. Manual mode allows recording of voice memo during data recording.
Trigger :	Data recording is automatically started when the preset trigger condition is satisfied
Interval :	Data recording is periodically made at preset intervals.
Manual Start/Stop of Date Recording :	Possible through the PC or by pressing the switch on the front panel of from the dedicated remote control unit
Balance Adjustmen :	Strain input channels can be balanced by pressing the BAL. Switch on the front panel or from the dedicated remote control unit or through the PC.
Saved Data Format :	KYOWA standard format KS2, which enables data analysis with the optional data analysis software DAS-100A
Collecting Data :	LAN port enables online data transfer to the PC, while CF card enables offline data transfer.
TEDS Function :	Usable when the EDX-100A is under the online control of the PC. Conditioner cards are CDV-40B (-F), DPM-42A (-F), CCA-40A (-F). The suffix F denotes that the card is equipped with 8th order Butterworth ant aliasing filter.
Synchronous Operation :	Synchronous cable enables cascade connection of up to 8 units of the MCA-200A. While data is recorded as a separate file in the CF card inserted into each online or offline data transfer to the PC.
Analog Output :	Except for CDV-40B(-F) conditioner cards provide an analog output connector, enabling voltage monitoring ($\pm 5\text{V FS}$).
CF Card Slot :	1(for data recording and condition setting)
Communication Ports : LAN	
LAN Port :	10BASE-T/100BASE-TX Connector: RJ45 modular jack
Operation Switches :	ID : Set ID No. of MCA



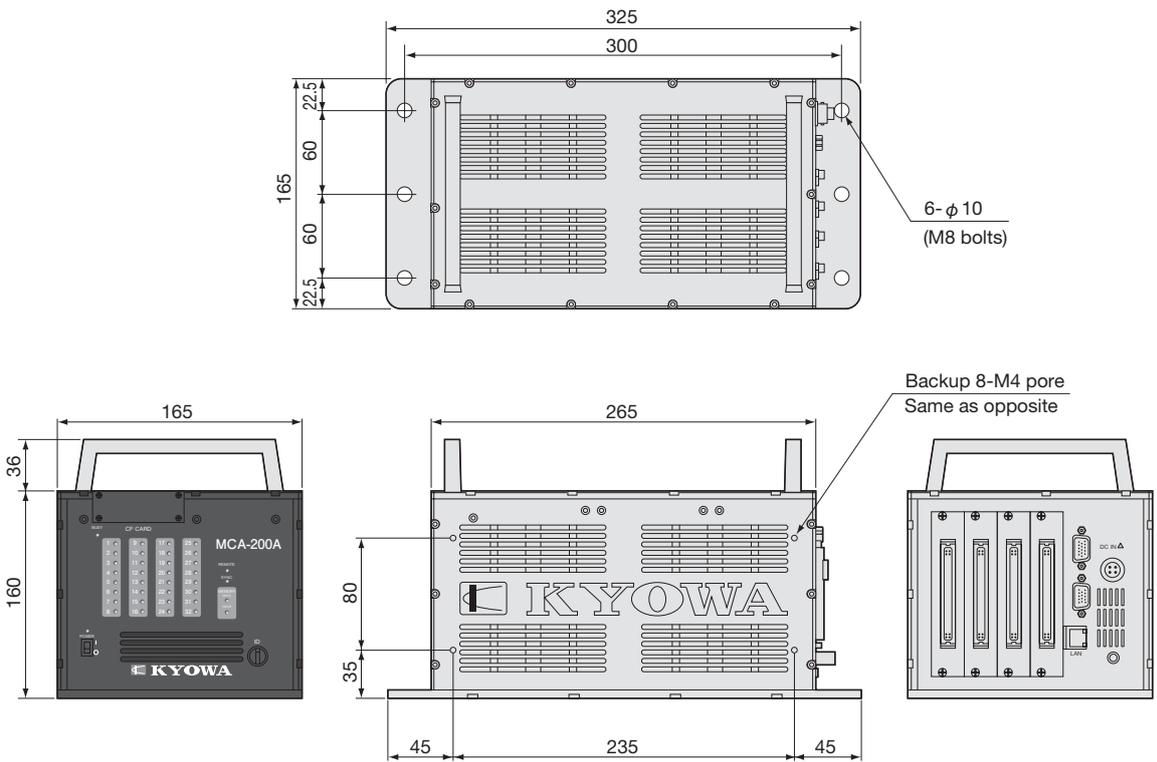
Indicators : Operation status indicator LEDs : 6
Channel status indicator LEDs : The number of channels provided.
External Control Connectors : CONT IN and CONT OUT (for remote control and synchronous operation)
Operating Temperature/Humidity Range : 0 to 50°C , 20 to 90%RH (noncondensing)
Storage Temperature Range : -20 to 60°C
Vibration Resistance : ±29.42m/s ² (3G), 5 to 55Hz (when operating) ±49.42m/s ² (5G), 5 to 55Hz (when not operating)
Shock Resistance : 196.1m/s ² (20G)/11ms

Power supply :	10 to 18 VDC
Connector:	RM12BRD -4PH(Hirose)
	DC power supply or optional dedicated AC adapter is required.
Current Consumption :	Approx.2.8 A (when operated on 12VDC with 4 CDV-40B cards mounted and full load applied)
Dimensions(excluding protrusions) :	165(W)×150(H)×265(D)(mm)
Weight :	Approx. 10kg (2.6kg with 4 CDV-40B cards mounted)

Standard Accessories Power cable P-57
Dynamic Data Acquisition Software DCS-100A
CF card

Optional Accessories Synchronous cable N-95 2m long
Ac adapter UIA 345-12
Input: 100 to 240 VAC,50/60 Hz, 1.2A
Output: 2VDC, 3.8A

■ Dimensions



■ System Configuration Chart (Example)

