EDX-5000A

Memory Recorder/Analyzer

High-speed Sampling at 200 kHz per 32 Channels and Simultaneous Recording of Video with a High-speed Camera

- High-speed sampling at 200 kHz/32 channels
- Up to 80 input channels
- Simultaneous recording of measuring data and video
- Conditioner cards selectable for specific applications
- Effective real-time processing capability

EDX-5000A is an advanced all-in-one measuring instrument having sophisticated features and high-speed processing capabilities.
It is the high-end model of EDX Series. Max. input channels are 80, and max. sampling frequency is 200 kHz for 32 channels in sync. It is possible to record data and video as well as rosette analysis and other arithmetic operations simultaneously.
The touch panel allows the EDX to be operated even without a keyboard.

●Conditioner Cards (See page 3-73)

Strain/Voltage/Acceleration Measurement Card	CVM-41A
Strain/Voltage Measurement Card	CDV-40B(-F)
Dynamic Strain Measurement Card	DPM-42B
	DPM-42B-F
	DPM-42B-I
	DPM-42B-I-F
Thermocouple Card	CTA-40A
F/V Converter Card	CFV-40A
Charge Amplifier Card	CCA-40A(-F)
Strain/Voltage Measurement Isolation Card	CDV-44AS
Constant Current Amplifier Card	CDA-44AS/45AS
A/D Converter Cards	AD-40AS(-F)

Hardware Specifications

Models

Models	Max. analog input channels	Slots	Storage Devices	Windows® 10
EDX-5000A-64-HE	64	8	HDD	English
EDX-5000A-64-SE	64	8	SSD	
EDX-5000A-80-HE	80	10	HDD	
EDX-5000A-80-SE	80	10	SSD	

Applicable Conditioner Cards	CDV-40B (-F), CVM-41A, DPM-42B (-F), DPM-42B-I (-F), CTA-40A, CFV-40A, CCA-40A (-F), CDV-44AS, CDA-44AS, CDA-45AS, AD-40AS (-F)
Input Channels	EDX-5000A-64: Max. 64 (CDV-40B x 8)
	EDX-5000A-80: Max. 80 (CDV-40B x 10)
Analog Input	See spec of respective conditioner cards
Digital I/O	
I/O points	Max. 8
I/O settings	Sets every bit to digital input, digital output, or remote-control input with the same common
	Remote-control input: Measuring start, stop, balance conducting, etc.
Input modes	Isolated TTL lever input
Input voltage	Max. 5 VDC
Isolation modes	Digital isolation
Output modes	Isolated open-collector output with 10 kΩ built-in pull-up resistors
Output voltage	5 VDC
Output current	Max. 25 mA per point
Voice input	1 channel, to be recorded together with measuring data. An optional remote control unit RCU-42 is required.
Sampling Frequencies	
Sampling modes	
1-2-5 series	
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 50 kHz for up to 80-channel data acquisition	
1 Hz to 10 kHz for real-time synchronous data processing	
2^n series	
2 to 131072 Hz for up to 32-channel data acquisition	
2 to 65536 Hz for up to 64-channel data acquisition	
2 to 32768 Hz for up to 80-channel data acquisition	
2 to 8192 Hz for real-time synchronous data processing	
The condition is using a 16-bit A/D converter, as for a 24-bit A/D converter, the channels above will be half of each channel.	
Storage	HDD model: 300 GB or more SSD model: 30 GB or more
Display	Channel status LED (OVER value of every channel are settable) REC, BUSY, BATTERY, POWER LED 12.1" wide touch panel
Operation Keys	Keys REC, STOP, BAL, and OPT are operated by touch panel, keys on EDX, external keyboard, or mouse
Output control connectors	CONT.IN, CONT.OUT(For remote control unit, or synchronous operation)
External I/O Connectors	External Triggers: TRG IN, TRG OUT External clock: CLK IN, CLK OUT (Output at any frequency division ratio)
External Interfaces	USB type keyboard, USB type mouse VGA connector for monitor USB I/F: 3 USB 2.0 in front, 2 USB 3.0 in rear LAN I/F: 100/1000BASE-T
Power Supply	100 to 240 VAC and 10 to 30 DC, dual supply Built-in batteries against momentary power failure
Current Consumption	EDX-5000A-64: Approx. 1.8 A (For 100 VAC, CDV-40B x 8) EDX-5000A-80: Approx. 2.0 A (For 100 VAC, CDV-40B x 10)
Operating Temperature	0 to 40°C
Operating Humidity	20 to 80% RH (Non-condensing)
Storage Temperature	-20°C to 60°C

Vibration Resistant	EDX-5000A-64-HE, EDX-5000A-64-SE,
	EDX-5000A-80-HE, EDX-5000A-80-SE
	49.0m/s²(5 G), 5 to 55 Hz when not operating
	29.4m/s²(3 G), 5 to 55 Hz when operating
	EDX-5000A-64-HE, EDX-5000A-80-HE
	9.8m/s²(1 G), 10 to 200 Hz when operating
	EDX-5000A-64-SE, EDX-5000A-80-SE
	19.6m/s²(2 G), 10 to 200 Hz when operating
Impact Resistant	196.1m/s², (20 G), 11ms
EMC Directive	EN61326-1 (Class A)
Low Voltage Directive	EN61010-1, EN61010-2-030
	(Installation category II, Pollution degree 2,
	Measurement category O)
RoHS Directive	EN50581
Dimensions	EDX-5000A-64
	365 W × 159 H × 300 D mm (Excluding protrusions)
	EDX-5000A-80
	410 W × 159 H × 300 D mm (Excluding protrusions)
Weight	EDX-5000A-64: Approx. 11.5 kg (Mainframe only)
	EDX-5000A-80: Approx. 12.5 kg (Mainframe only)
Optional Functions	CAN data acquisition (Input channels: Max 512)
	GPS data acquisition (Tracing data acquisition,
	time synchronous function)
Online Control	Controlled by DCS-100A

Standard Accessories AC power cable P-18 (With 2-pin conversion plug CM-39), DC power cable P-70
gound wire P-72, simplified instruction manual, instruction manual (CD-R) , and EDX accessory bag

Optional Accessories Conversion cable, synchronous cable N-95
synchronous extension terminal,
remote control unit RCU-42A, and belt hook

●Software Specifications in the EDX-5000A

■Measuring Condition Settings

Measuring Channel Conditions
Measurement ON/OFF, measuring modes, range, HPF, LPF, digital HPF, digital LPF, balance ON/OFF, CAL, calibration coefficient, offset, offset zero ON/OFF, unit, channel name, measuring range, rated capacity, rated output, upper-limit check value, lower-limit check value, numeric display digits (Selects any items to display) inner sensitivity register ON/OFF, input cable, cable compensation value

Recordable Data
Sampling frequencies 1 Hz to 10 kHz:
up to remaining disk space of built-in memory
Sampling frequencies 10001 Hz to 200 kHz:
A/D data: 2 to 2 billion (Used as 16 bits)
2 to 1 billion (Used as 24 bits)

Manual Measurement Recording from REC to STOP, or preset data starts from REC

Interval Measurement Automatic recording according to designated starting time and recording interval

Trigger Measurement Recording according to preset trigger conditions
Common trigger conditions
End trigger: Settable
Pre-trigger or post trigger:
Max. 4194304 points per channel when A/D is set to 16-bit.
Delay amount depends on number of measuring channels.
Analog trigger conditions
Trigger channels: Any 1 analog channel
Trigger level: Sets in physical quantity
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: Selection of any 4 analog/digital channels, an external trigger channel, or a manual trigger channel
AND/OR: be used for analog trigger, digital trigger and external trigger.
Trigger level: An physical quantity is set for the analog channel, and 0 or 1 for the digital channel.
Trigger slope: Up, down

TEDS Reads sensor's information and sets to channel condition automatically

■Measuring Operations

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

Real-time Processing
Simultaneous monitoring and recording of data
The sampling frequencies up to 10 kHz are available.

●Video data acquisition with a web camera

Camera DirectX compatible Web camera (Recognized by the OS as an imaging 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 video
Manual mode, manual mode (Data points preset)

●Arithmetic Operation

Calculation channels Max. 64
Calculation conditions ON/OFF, operators (Max. 200 characters), unit, numeric display digits, channel name (Max. 40 characters), calculation zero, and calculation zero value

Applicable Operators and Constants
+, −, ∗, ／, ^, 《power》, PI [π], ( )
Functions:

SQR	Square root	LOG	Common logarithm
ABS	Absolute value	LN	Natural logarithm
SIN	Sine	EXP	Exponent
COS	Cosine	HMX	Max. principal strain
TAN	Tangent	HMN	Min. principal strain
ASIN	Arc sine (Return value: Radian)	HSM	Max. shearing strain
ACOS	Arc cosine (Return value: Radian)	SMX	Max. principal stress
ATAN	Arc tangent (Return value: Radian)	SMN	Min. principal stress
DSIN	DSIN (Return value: Angle)	SSM	Max. shearing stress
DCOS	DCOS (Return value: Angle)	DEG	Principal strain direction
DTAN	DTAN (Return value: Angle)		

●FFT Analysis

Analysis Types Linear spectrum, power spectrum, cross spectrum, auto-correlation, and cross-correlation
Window Functions OFF, Hamming, Hanning, Fejer, Blackman, and Gaussian
Analyzed Data Points 256, 512, 1024, 2048, 4096, and 8192
Analysis Channels 4 channels/window
Saving File Format Kyowa standard file format (KS2)
KS2 file version: 01.06

■Monitor

Y-time Graph X axis indicates the time, and Y axis the physical values of measurement for a maximum of 8 channels.
X-Y Graph X and Y axes indicate the measured data, max. 4 channels
Bar Graph Up to 80 channels are contained in a graph. Displays max. and min. values are possible
Circle Meter Any one channel is displayed in a circle meter.
Numeric Display Up to 80 channels are listed. Displays max. and min. values of each channel are possible.
FFT Graph Up to 4 channels of analyzed results are displayed
Web Camera Displays captured images
Over-input Displays the over-input values, background, etc. in red
Graph Scale Capable of displaying auto-scale value on the Y-time graph (Y axis), X-Y graph (X, Y axes) and bar graph (Y axis).
Cursors Available on Y-time graph, X-Y graph, physical values appear at the cursor positions
Windows Up to 12 different graph windows are available at the same time
Saving Images Saves each graph as a image file

■Environmental Settings

Synchronous Operation Standalone, sync host, or sync guest is selected

■Others

Inner, external oscillators switching, operating beep, balance reference value, A/D bits switching, and optional switches selection

●Specifications of Software Compatible with EDX-3000B

■**Measuring Condition Settings**

Measuring Channel Conditions
Measurement ON/OFF, measuring modes, range, HPF, LPF, digital HPF, digital LPF, balance ON/OFF, CAL, calibration coefficient, offset, offset zero ON/OFF, unit, channel name, measuring range, rated capacity, rated output, upper-limit check value, lower-limit check value, numeric display digits (Selects any items to display)
inner sensitivity register ON/OFF, input cable, cable compensation value

Recordable Data
Sampling frequencies 1 Hz to 10 kHz:
up to remaining disk space of built-in memory
Sampling frequencies 10001 Hz to 200 kHz:
A/D data: 2 to 2 billion (Used as 16 bits)
2 to 1 billion (Used as 24 bits)

Manual Measurement Recording from REC to STOP, or preset data starts from REC

Interval Measurement Automatic recording according to designated starting time and recording interval

Trigger Measurement Common trigger conditions
End trigger: Settable
Pre-trigger or post trigger:
Max. 4194304 points per channel when A/D is set to 16-bit.
Delay amount depends on number of measuring channels.
Analog trigger conditions
Trigger channels: Any 1 analog channel
Trigger level: Sets in physical quantity
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: Selection of any 4 analog/digital channels, an external trigger channel, or a manual trigger channel
AND/OR: be used for analog trigger, digital trigger and external trigger.
Trigger level: A physical quantity is set for the analog channel, and 0 or 1 for the digital channel.
Trigger slope: Up, down

Reading/Saving Measuring Condition Files
Capable of Reading/saving measuring condition files

Reading/Saving sensor's Files
Capable of Reading/saving sensor's CSV files by CH condition

Digital I/O Settings I/O points: Max. 8
I/O settings: Sets every bit to digital input, digital output, or remote-control

TEDS Reads sensor's information and sets to channel condition automatically

■**Measuring Operations**
Monitor measurement, recording start, pause, stop, balancing, CAL output, etc.

Real-time Processing
Simultaneous monitoring and recording of data
The sampling frequencies up to 10 kHz are available.

●**Video data acquisition with a web camera**
Camera DirectX compatible Web camera (Recognized by the OS as an imaging 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 video
Manual mode, manual mode (Data points preset)

●**Arithmetic Operation**
Digital Filters Butterworth filters (IIR)
Type of filters: LPF, HPF
Order of filter: 1 to 8
Amplitude ratio: -3dB (At cutoff point)
Attenuation: -6 x N dB (N is the filtering orders)
Simultaneously use with built-in LPF of conditioner is possible.
Calculation channels Max. 64
Calculation conditions ON/OFF, operators (Max. 200 characters), unit, numeric display digits, channel name (Max. 40 characters), calculation zero, and calculation zero value

Applicable Operators and Constants
+,−,∗,／,^《power》,PI[π],( )

Functions:

SQR	Square root	LOG	Common logarithm
ABS	Absolute value	LN	Natural logarithm
SIN	Sine	EXP	Exponent
COS	Cosine	HMX	Max. principal strain
TAN	Tangent	HMN	Min. principal strain
ASIN	Arc sine (Return value: Radian)	HSM	Max. shearing strain
ACOS	Arc cosine (Return value: Radian)	SMX	Max. principal stress
ATAN	Arc tangent (Return value: Radian)	SMN	Min. principal stress
DSIN	DSIN (Return value: Angle)	SSM	Max. shearing stress
DCOS	DCOS (Return value: Angle)	DEG	Principal strain direction
DTAN	DTAN (Return value: Angle)		

●**FFT Analysis**
Analysis Types Linear spectrum, power spectrum, cross spectrum, auto-correlation, and cross-correlation
Window Functions OFF, Hamming, Hanning, Fejer, Blackman, and Gaussian
Analyzed Data Points 256, 512, 1024, 2048, 4096, and 8192
Analysis Channels 4 channels/window, max. 8 windows
Saving File Format Kyowa standard file format (KS2)
KS2 file version: 01.06

■**Monitor**
Y-time Graph X axis indicates the time, and Y axis the physical amount of measurement for a maximum of 16 channels. 10 graphs per window is possible
Y-time (all channel) Graph X axis indicates the time, and Y axis the physical amount of measurement. The line color is the same for all channels.
Y-time (DIV) Graph X axis indicates the time, and Y axis the physical amount of measurement for a maximum of 16 channels possible. Allows channel's zero position to be set on the Y axis.
X-Y Graph Any combination of 8 channels is plotted on X and Y axis
Bar Graph Up to 32 channels are contained in a graph. 1 to 4 graphs are indicated on a window. Peak hold ON/OFF
Digital Graph X axis indicates the time, and Y axis bit data of a digital channel (Up to 16 bits). 1 to 4 graphs are 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. The max. and min. values of each channel are possible.
FFT Graph Up to 4 channels of analyzed results are displayed
Web Camera Displays captured images
Over-input Capable of displaying the excessive channel values in red, except FFT graphs.
Graph Scale Capable of displaying auto-scale and full scale values on the Y-time graph (Y axis), X-Y graph (X, Y axes) and bar graph (Y axis).
Y axis of Y-time graph are switchable among 1-axis, 2-axis, and channel-by-channel
Display Color Any color is selectable.
Title, labels Any title or X and Y axis labels are specified.
Windows 8 numeric windows, 8 graph windows (Including an FFT window)
Auxiliary lines Capable of displaying the desired auxiliary lines on the Y-time Graphs (X axis and Y axis), X-Y Graphs (X axis and Y axis), and Bar Graphs (X axis and Y axis). (Up to 4 auxiliary lines each for both X axis and Y axis.)
Comparative Data Displays the comparative data (Previous KS2 format file) on the Y-time graphs, neither Y-time (All channels) graphs nor Y-time (DIV) graphs, and X-Y graphs for comparing the monitor data. The size of the data file is maximum 10 MB. If the file size exceeds 10 MB, displays the 10 MB data from its head.

■**Configuration**

Operation Modes Standalone, sync host, sync guest setting
Control Modes Off-line, Online switching
Automatic File Conversion Automatic file conversion upon measurement (CSV, XLS, XLSX, or RPCIII format)

Others

Oscillator switching (Internal, external), operation beep, balance reference values front speaker ON/OFF
A/D bits switching: 12 or 24 bits
Optional switch setting

●Data Reproduction, Data Analysis Specifications

■**Data Reproduction**

Graph Display 4 patterns of display condition are set for a graph. allows 1, 2, or 4 graphs to be displayed
Y-time Graph Up to 16 channels per graph, and allows Y axis to be scaled automatically.
X-Y Graph 1 graph fixed, allows any 4 channels to be plotted on X- and Y-axis. Both axes to be scaled automatically.
All Data Display Displays all data in every 4 channels
Numeric Data Display Lists any 16 channels data
Cursor Numeric display of the engineering value of cursor position.
Zoom in data between 2 cursors.
Display max. and min. data between 2 cursors.
Scrolling Scrolls X axis on Y-time graphs.
Data File Editing Extracting of an arbitrary range or arbitrary channel from collected data file and conversion to a CSV format file are possible. Data file titles, comments, channel conditions display and editing are possible.
Max. and min. Display Showing max. and min. data of each channel (Max. 5-data) , 400-data around the max. or min. are shown in graphs.
KS2 File Block number support (1 block display, all block display) .
Displays and plays back the audio data.
Video Playback Playback, backward, repeat, frame-by-frame forward, frame-by-frame backward, jump to the beginning, jump to the end, set the beginning position, set the end position. Playback speed: ×0.1 to ×20. Plays back the measured data, video and GPS data at the same time.
AVI Files Sets playback frame rate, start frame No. (Time)
Static Measuring Files Reproduces the static measuring files (CSV format files).

●**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 Operations
Inter-channel operations for up to 2 files. The result is saved in a new file (Up to 320 expressions is possible).
Expression: Up to 200 characters
Applicable Operators and Constants
+,−,*,／,^ 《power》,PI[π],( )
Functions:

SQR	Square root	LOG	Common logarithm
ABS	Absolute value	LN	Natural logarithm
SIN	Sine	EXP	Exponent
COS	Cosine	HMX	Max. principal strain
TAN	Tangent	HMN	Min. principal strain
ASIN	Arc sine (Return value: Radian)	HSM	Max. shearing strain
ACOS	Arc cosine (Return value: Radian)	SMX	Max. principal stress
ATAN	Arc tangent (Return value: Radian)	SMN	Min. principal stress
DSIN	DSIN (Return value: Angle)	SSM	Max. shearing stress
DCOS	DCOS (Return value: Angle)	DEG	Principal strain direction
DTAN	DTAN (Return value: Angle)		

FFT Analysis
Analysis Types: Linear spectrum, power spectrum, cross spectrum, auto-correlation, cross-correlation, coherence, and transfer function
Analyzed data points: 256, 512, 1024, 2048, 4096, 8192, 16384, and 32768
Window functions: OFF, Hamming, Hanning, Fejer, Blackman, and Gaussian
LPF: 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000 Hz and FLAT, 12 steps
Integration times: 0 (None) to 2
Average times: 0 or more (0: whole waveform)
Shift data points: 2 or more

Analysis types	Y-time graph	Analysis graph 1	Analysis graph 2
Linear spectrum	Yes	Amplitude (linear)/amplitude (log)	Phase
Power spectrum	Yes	Amplitude (linear)/amplitude (log)	
Cross-spectrum	Yes	Amplitude (linear)/amplitude (log)	Phase
Auto-correlation	Yes	Correlation	
Cross-correlation	Yes	Correlation	
Coherence	Yes	Coherence	
Transfer function	Yes	Amplitude (linear)/amplitude (log)	Phase

Analyzed results are saved in CSV files.

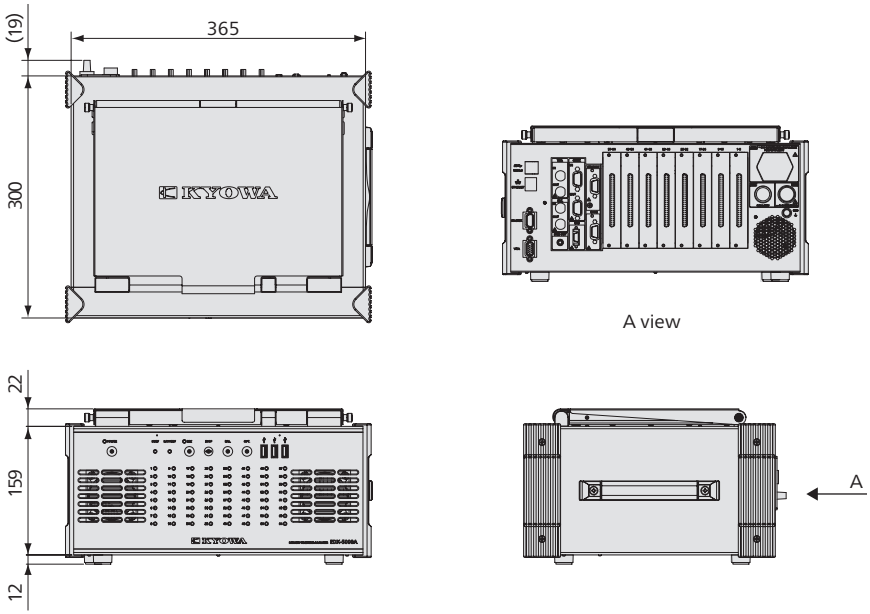
Histogram Analysis
Algorithm types
Peak/valley, maxima/minima, 1D rainflow, amplitude,
1D time at level, 1D rainflow + peak/valley,
1D rainflow + maxima/minima,
2D rainflow
Slices:
1D algorithm: Even numbers from 10 (±5) to 256 (±128)
2D algorithm: Even numbers from 10 to 50
Slice width, hysteresis, offset (For maxima/minima), etc. to be specified.
Results: Tabular or drawing display (3D display for 2D rainflow)
Life Prediction Processing
Predicts life from the result of histogram analysis of 1D rainflow method, 2D rainflow method, or amplitude method.
The life prediction data is shown and saved as a file. (Allows S-N data files to be read.)
Filtering Digital IIR filters, 4th order Butterworth (Cutoff: -6dB, no phase delay)
HPF & LPF: FLAT to 500 k Hz (Effective up to one-half of the sampling frequency)
Mirroring
Analysis results are saved as an additional format
Differentiation/ Integration
Differential/integration times 0 (None) to 2
Analysis results are saved as additional format

●**Utility**

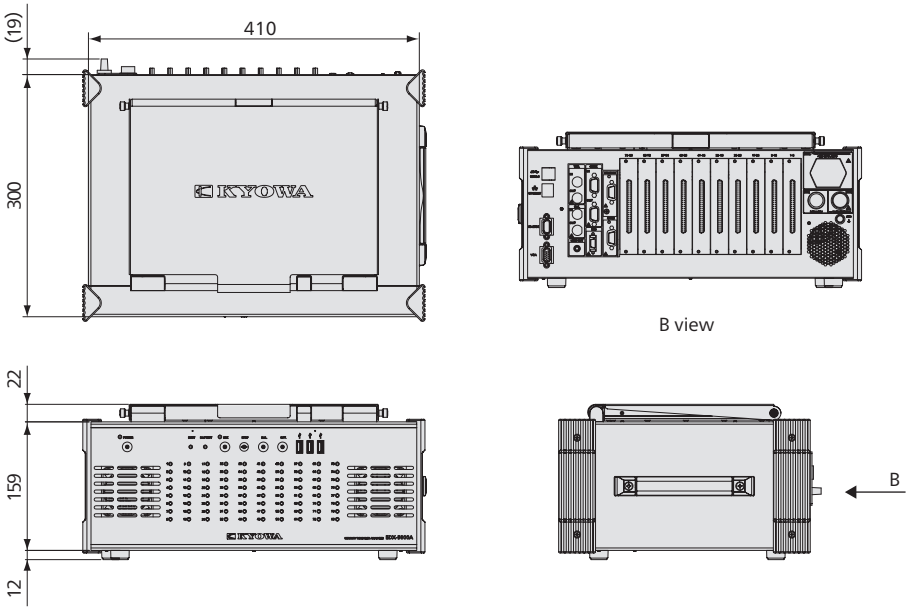
Multiple Files Conversion Conversion to CSV, XLS, XLSX, or RPCIII format
File Coupling Multiple files (Host and guests) acquired in synchronized operation are coupled into one file.
Reverse Conversion Data files converted by this software into CSV format are converted back to KS2 format.
File Division Extracts the specified block No. data of the data file into single file.
Batch Analysis Analysis of multiple files under same conditions at one time.
Histogram analysis, filtering and differentiation/ integration are available.
Overlap of Multiple Files Up to 16 data files are displayed and overlapped as Y-time data.
Allow start point of each file to be set
Multiple Files Conversion Converts multiple KS2 files acquired in the interval measurement into a CSV file.

Dimensions

EDX-5000A-64



EDX-5000A-80



EDX5000A Recommended products for combination
Data Analysis Software DAS-200A
→ 4-9