

INSTRUCTION MANUAL
EDX-3000A-H-DC
EDX-3000A-HE-DC
EDX-3000A-S-DC
EDX-3000A-SE-DC
MEMORY RECORDER/ANALYZER
【FOR HARDWARE】

Thank you for purchasing KYOWA's product EDX-3000A-*-DC Memory Recorder/Analyzer.

Read this Instruction Manual carefully in order to make full use of the high performance capabilities of the product.

Do not use the product in methods other than described in this Manual.

This Manual only describes hardware operation of the EDX-3000A-*-DC. For Software operation, refer to the EDX-3000A Instruction Manual for Software.

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—CONTENTS—

STANDARD ACCESSORIES	1
OPTIONAL ACCESSORIES	1
SAFETY PRECAUTIONS	2
PRIOR TO USE	2
SAFETY SYMBOLS	2
NOTATIONS USED IN THE INSTRUCTION MANUAL	7
1. OUTLINE OF PRODUCT	8
1-1 OUTLINE	8
1-2 FEATURES	8
2. CONTROLS AND INDICATORS	9
2-1 FRONT	9
2-2 REAR	11
3. INSTALLING EDX-3000A-*-DC	13
3-1 INSTALLATION PROCEDURE	13
3-2 CONNECTING THE POWER SUPPLIES	13
3-3 CONNECTING SENSOR	15
3-4 CONNECTING DIGITAL INPUT CONNECTOR	18
4. MEASURING	19
4-1 MEASURING	19
4-2 FOR EXTERNAL INPUT/OUTPUT	19
4-2-1 External Trigger “TRG IN” “TRG OUT”	20
4-2-2 External Clock “CLK IN” “CLK OUT”	21
4-2-3 Recording Signal “READY”	23
4-2-4 Input/Output Timing of Signals	24
4-3 SYNCHRONOUS OPERATION	28
4-4 ONLINE CONTROL	30
4-5 TURNING OFF THE EDX-3000A-*-DC	32
5. FOR INTERNAL BATTERY AGAINST INSTANTANEOUS POWER FAILURE	33
5-1 HOW TO CHARGE	34
5-2 AUTOMATIC WARM-UP FUNCTION FOR BATTERY	34
5-3 STORING PRECAUTIONS	34
6. REMOTE CONTROL UNIT	35
6-1 RECORDING VOICE MEMO	36
7. TROUBLESHOOTING	37
7-1 TROUBLESHOOTING FOR THE EDX-3000A-*-DC	37
7-2 TROUBLESHOOTING FOR STRAIN/VOLTAGE MEASUREMENT CARD CDV-40B	38
7-3 TROUBLESHOOTING FOR DYNAMIC STRAIN MEASUREMENT CARD DPM-42A (-F)	39
8. MAINTENANCE	40
8-1 MAINTENANCE DESCRIPTIONS	40
8-2 REPLACING CONDITIONER CARD	40
9. CONNECTOR PIN ASSIGNMENT OF CDV-40B	41
9-1 CDV-40B CENTRALIZED CONNECTOR	41
9-2 DC POWER SOURCE CONNECTOR	41
10. HARDWARE SPECIFICATIONS	42
10-1 OVERALL SPECIFICATIONS	42
10-2 INTERNAL CONDITIONER SPECIFICATIONS	44
10-3 REMOTE CONTROL UNIT SPECIFICATIONS	44

11. SOFTWARE SPECIFICATIONS	45
11-1 MEASURING CONDITIONS	45
11-2 MEASURING OPERATION	46
11-3 MONITOR	47
11-4 DATA REPRODUCTION	48
11-5 CONFIGURATION	50
11-6 PRINT	50
12. EXTERNAL VIEWS	51
12-1 MEMORY RECORDER/ANALYZER: EDX-3000A-*-DC	51
12-2 STRAIN/VOLTAGE MEASUREMENT CARD: CDV-40B	52
12-3 REMOTE CONTROL UNIT: RCU-42A	52

This Manual contains operating instructions for the Memory Recorder/Analyzer EDX-3000A-*-DC (EDX-3000A that is operated with the DC power source) and CDV-40B hardware.

STANDARD ACCESSORIES

The following accessories are packed with the Memory Recorder/Analyzer EDX-3000A-*-DC. When unpacking, check the contents to ensure that all accessories are enclosed.

DC Power Cable: P-74	1
Grounding Wire: P-72	1
Instruction Manual	1 (DVD)
Warranty and Test Data Sheet	1 each
Accessories List	1

OPTIONAL ACCESSORIES

• 15-inch liquid crystal display (mountable on the EDX-3000A):	EMON-30A
• Keyboard with touchpad	
• System restore kit	
• Time synchronization module	
• High speed camera (with capture board)	
• Various conditioner cards:	See catalog.
• Dummy panel:	EDX2000-DUMMY
• Remote control unit:	RCU-42A
• Synchronous cable:	N-95 (2 m)

SAFETY PRECAUTIONS

Do not forget to read the safety precautions prior to use.

The Memory Recorder/Analyzer EDX-3000A-*-DC (hereinafter referred to as the EDX-3000A-*-DC) is designed in accordance with “10. HARDWARE SPECIFICATIONS” and “11. SOFTWARE SPECIFICATIONS.” Do not use the EDX-3000A-*-DC in an environment exceeding the specifications. Or, system may be damaged.

PRIOR TO USE

For safe use of the EDX-3000A-*-DC, do not forget to read the “Safety Precautions” prior to use.

KYOWA ELECTRONIC INSTRUMENTS CO., LTD. assumes no liability for any damage resulting from the user’s failure to comply with the safety precautions.

SAFETY SYMBOLS

For safety operation of the EDX-3000A-*-DC, the following “WARNING” and “CAUTION” symbols are used in SAFETY PRECAUTIONS of this manual and indicated on the EDX-3000A-*-DC.

 WARNING	Improper operation of the system may result in death or severe injury of the operator.
 CAUTION	Improper operation of the system may result in injury of the operator and physical damage of the system.

WARNING

- Power Supply
To prevent a fire hazard, ensure that the power supply voltage specified for the EDX-3000A-*-DC matches the local line voltage before connecting the system to the DC power source connector.
- Inflammable Environment
To prevent the risk of fire and explosion, do not operate the EDX-3000A-*-DC in area exposed to flammable gases, vapors, or dust.
- Abnormal Condition
To prevent fire hazards, if smoke is emerging from the EDX-3000A-*-DC, immediately turn OFF the power switch and disconnect the power cable from the DC power source to terminate the system operation.
- Protective Ground
Be sure to ground the “GND” terminal. Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- Maximum Input Voltage Range for Measurement by CVM-40A, CVM-41A
Do not apply an input voltage exceeding the range (-50 V to +50 V) specified for the voltage measurement mode of the CVM-40A, CVM-41A Strain/Voltage/Acceleration Measurement Card (hereinafter referred to as the CVM-40A, CVM-41A).
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- Maximum Input Voltage Range for Measurement by CDV-40B/A (-F)
Do not apply an input voltage exceeding the range (-10 V to +10 V) specified for the voltage measurement mode of the CDV-40B/A (-F) Strain/Voltage Measurement Card (hereinafter referred to as the CDV-40B/A (-F)).
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- Maximum Input Voltage Range for Measurement by CCA-40A (-F)
Do not apply an input voltage exceeding the range (-5 V to +5 V) specified for the CCA-40A (-F) Charge Amplifier Card (hereinafter referred to as the CCA-40A (-F)).
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.

- **Maximum Input Voltage Range for Measurement by CFV-40A**
Do not apply an input voltage exceeding the range (-50 V to +50 V) specified for the CFV-40A F/V Converter Card (hereinafter referred to as the CFV-40A).
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- **Maximum Input Voltage Range for Measurement by CDV-44AS**
Do not apply an input voltage exceeding the range (-50 V to +50 V) specified for the voltage measurement mode of the CDV-44AS Strain/Voltage Measurement Insulation Card (hereinafter referred to as the CDV-44AS).
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- **Maximum Input Voltage Range for Measurement by CDA-44AS**
Do not apply an input voltage exceeding the range (-50 V to +50 V) specified for the voltage measurement mode of the CDA-44AS Signal Conditioner Card (hereinafter referred to as the CDA-44AS).
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- **Maximum Input Voltage Range for Measurement by CDA-45AS**
Do not apply an input voltage exceeding the range (-50 V to +50 V) specified for the voltage measurement mode of the CDA-45AS Signal Conditioner Card (hereinafter referred to as the CDA-45AS).
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- **Maximum Input Voltage Range for Measurement by AD-40AS(-F)**
Do not apply an input voltage exceeding the range (-10 V to +10 V) specified for the AD-40AS(-F) A/D Converter Card (hereinafter referred to as the AD-40AS(-F)).
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- **Applicable input: DPM-42B/A (-F), DPM-42B-I (-F)**
The dynamic strain amplifier card DPM-42B/A (-F), DPM-42B-I (-F) is a dedicated conditioner card for inputting strain.
Do not connect an apparatus other than a strain sensor.
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- **Applicable input: CTA-40A**
The thermocouple card CTA-40A is a dedicated conditioner card for inputting a thermocouple.
Do not connect an apparatus other than a thermocouple.
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- **Applicable input: CAN-40A, CAN-41A**
The CAN card CAN-40A and CAN-41A are dedicated conditioner cards for inputting CAN data.
Do not connect a data other than a CAN data.
Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- **When using the CVM-40A, CVM-41A or CDV-40B/A (-F), keep the following points.**
 1. Use a tester or the like to measure the voltage between negative sides of the DC voltage and confirm that the voltage is approximately 0 V.
 2. Confirm that the voltage between the negative side of the DC voltage and the GND terminal of the EDX-3000A-*-DC is approximately 0 V.
 3. When connecting an input, correctly connect the positive and negative sides.

Failure to comply with the above precautions will result in a short circuit of the signal source (DC power supply, etc.) to be measured in the CVM-40A, CVM-41A or CDV-40B/A (-F), thus causing a fire hazard.
- If you mount the optional 15-inch LCD (EMON-30A) on the EDX-3000A-*-DC, do not set the display upright in a vibrating environment. Or, the display may move to contact a person or surroundings causing injury to the person or damage to the EDX-3000A-*-DC. Always lay the display and use it in the fixed position in such environment.
- The DC OUT (12 V, 2 A) connector on the rear panel is a dedicated power supply connector for the optional 15-inch LCD (EMON-30A). Do not connect other device. Or, the mistakenly connected device or the EDX-3000A-*-DC causes system failure.

CAUTION

- Use the EDX-3000A-*-DC in the specified operating temperature range of 0 to 40 °C.
Use at temperatures exceeding the specified range may lower the performance and cause troubles.
If use under direct sunlight or in a cold place is inevitable, prepare a sunscreen or take proper measures to keep it warm.
- Use the EDX-3000A-*-DC in the specified operating humidity of 20 to 80%RH.
Use in a humidity place exceeding the specified range or whether it is exposed to splashing water may lower the performance and cause troubles.
- Do not use the EDX-3000A-*-DC immediately after the change in the environment.
Leave the EDX-3000A-*-DC as it is to acclimate to the environment.
Abrupt change in ambient temperature due to transportation, etc. may cause dew condensation, which may result in lower performance and troubles.
- Do not use the EDX-3000A-*-DC where it is subject to significant vibration or impact.
 - The vibration resistance of the EDX-3000A-H (E)-DC and EDX-3000A-S (E)-DC is
When in operation: 29.42m/s²(3 G), 5 to 55 Hz,
When not in operation: 49.03m/s²(5 G), 5 to 55 Hz,
For the EDX-3000A-H (E)-DC (with HDD)
When in operation: 9.8m/s²(1 G), 10 to 200 Hz
For the EDX-3000A-S (E)-DC (with SSD)
When in operation: 19.6m/s²(2 G), 10 to 200 Hz
 - The impact resistance of the EDX-3000A-H (E)-DC and EDX-3000A-S (E)-DC is
196.1m/s²(20 G)/11 msUse the EDX-3000A-*-DC in an area where vibration and impact can be kept within the scope of specifications. Continuous vibration or severe impact may cause deteriorated performance and system failure.
Set the EDX-3000A-*-DC on a vibration isolation table to reduce the applied vibration and impact.
- Do not use the EDX-3000A-*-DC in strong electromagnetic fields.
Use the EDX-3000A-*-DC in an environment where magnetic field is acceptable to the PC.
Performance may be lowered and erroneous operation and troubles may result if it is used near a telemetry system, microwave oven, electronic furnace or any other equipment generating a strong magnetic field.
- Do not use the EDX-3000A-*-DC under poor conditions.
Operate the EDX-3000A-*-DC within the range of 19 to 32 VDC. The power supply used for the EDX-3000A-*-DC should not experience an instantaneous power failure and be free from noise.
- Do not turn ON the power switch immediately after turning it OFF.
After turning OFF the power switch, wait until the power supply is shut OFF automatically before turning ON the power switch again. Do not disconnect the power plug from the DC power source. Or, internal hard disk in the memory recorder/analyzer may be destroyed and the system may not startup again.
- Do not pull cables.
Lay cables with a certain allowance so that any unreasonable force may not be applied to the connections.
Pulling or unreasonable force may cause troubles or interrupt the measurement.
- Take proper precautions when using a USB memory or USB device (mouse and keyboard) in an environment with vibration.
Do not take measurement while the USB memory or USB device remains inserted in a vibrating environment, which may cause a system failure.
- Do not seal ventilation holes provided for a fan located at the back and two fans located at the front. Do not seal ventilation holes on the bottom and upper sides as well.
If there is not enough space to radiate heat, temperature in the EDX-3000A-*-DC may increase to lower the performance and cause troubles.

- Use a shielded cable as an I/O cable.
- The built-in battery against instantaneous power failure is Ni-MH battery. Recycle or discard your battery in a responsible manner or contact KYOWA or our representatives.
- Charge the built-in battery against instantaneous power failure within the temperature range 0 to 30°C. Or, the battery may not fully charge. In addition, the internal battery will deteriorate quickly.
- If the EDX-3000A-*-DC is to be stored for an extended period, the built-in battery against instantaneous power failure should first be fully charged. The battery discharges little by little naturally over time even if you didn't use it. If you store the battery with small remaining capacity, the storage can accelerate battery self-discharge and lead to the overdischarging. The battery can no longer be used and have to be replaced if it have been over discharged. In addition, if the EDX-3000A-*-DC is to be stored for an extended period, the self-discharge rate and deterioration rate of the battery are closely related to the storage temperature. It is recommended to store the battery at 25°C or lower temperature.
- Avoid installing sensors and EDX-3000A-*-DC near a welding machine.
Failure to do so will pose the risk of erroneous data, malfunction and failure.
- Do not disassemble or remodel the EDX-3000A-*-DC.
Failure to do so will pose the risk of electric shock and system failure.
This warranty does not cover any damaged or defective parts that results from disassembling or remodeling.
- The EDX-3000A-*-DC limits the number of CFV-40A.
The number of CFV-40A is up to 2.
When mounting two CFV-40A cards: Capable of mounting 4 other conditioner cards (2 slots: empty)
When mounting one CFV-40A card: Capable of mounting 6 other conditioner cards (1 slots: empty)
Or, deterioration or malfunction of the instrument may result.
- The EDX-3000A-*-DC limits the positions and the number of CAN-40A and CAN-41A.
Mount one CAN-40A or CAN-41A to the final slot.
- For the DPM-42 series and CDV-40 series with anti-aliasing function, conduct the internal calibration when changing the Low Pass Filter setting to or from "AUTO".

LIMITED LIFE PARTS AND PREVENTIVE MAINTENANCE

The EDX-3000A-*-DC consists of various electronic components and those components, if not all, have a useful life. Using them exceeding the years specified according to each part type (useful life) may affect the characteristics of the EDX-3000A-*-DC, resulting in a malfunction or a failure.

You need to replace parts with a regular preventive maintenance schedule.

Limited life parts used with the EDX-3000A-*-DC are as follows.

- Aluminum electrolytic capacitor
The signal-noise ratio will lower due to capacity low or smoke will be emitted due to liquid leak, resulting in a malfunction of the EDX-3000A-*-DC.
- Coin lithium battery
The settings in the EDX-3000A-*-DC and built-in clock will be reset.
- Built-in battery against instantaneous power failure
The backup time will decrease and lose capacity.
- LCD indicator
Stuck pixels or dead pixels will appear and LCD panel will fade.
- Hard Disk Drive (HDD) or Solid State Drive (SSD)
The EDX-3000A-*-DC will not start, will not load data, and will not write data.
- Fan
EDX-3000A-*-DC will results in malfunctions or degraded performance.
- Power unit
Heat and smoke will be emitted, resulting in an unstable voltage.

To operate the EDX-3000A-*-DC normally, finding a sign of the EDX-3000A-*-DC failure early by daily/periodic inspections and taking the corrective action are required.

For inspection, contact KYOWA or our representatives.

* Limited life parts: Aluminum electrolytic capacitor, coin lithium battery, built-in battery, LCD indicator, HDD, SSD, fan, and power unit

* All components do age and will fail

EDX-3000A-*-DC REPLACEMENT BEFORE THE END OF SERVICE LIFE

Preventive maintenance and replacement parts are a cost-effective way of keeping the performance and extending the service life of the EDX-3000A-*-DC.

Regardless of the replacement parts, the EDX-3000A-*-DC itself gradually deteriorates with age.

Before the expected service life is reached, consider replacing the EDX-3000A-*-DC with a new one or the latest series as preventive maintenance.

NOTATIONS USED IN THE INSTRUCTION MANUAL

Informational Notes

Certain notations are used as necessary to urge attention to information that requires special attention in the handling of the system, and to information provided for reference purposes.

Examples of Notations.

NOTE

Essential precautions when handling the EDX-3000A-*-DC.

MEMO

Reference items when handling the EDX-3000A-*-DC.

1. OUTLINE OF PRODUCT

1-1 OUTLINE

The EDX-3000A-*-DC is an all-in-one measuring instrument that is capable of measuring, displaying, recording, and analyzing data through connections with a variety of sensors, and that features excellent levels of general utility and expandability.

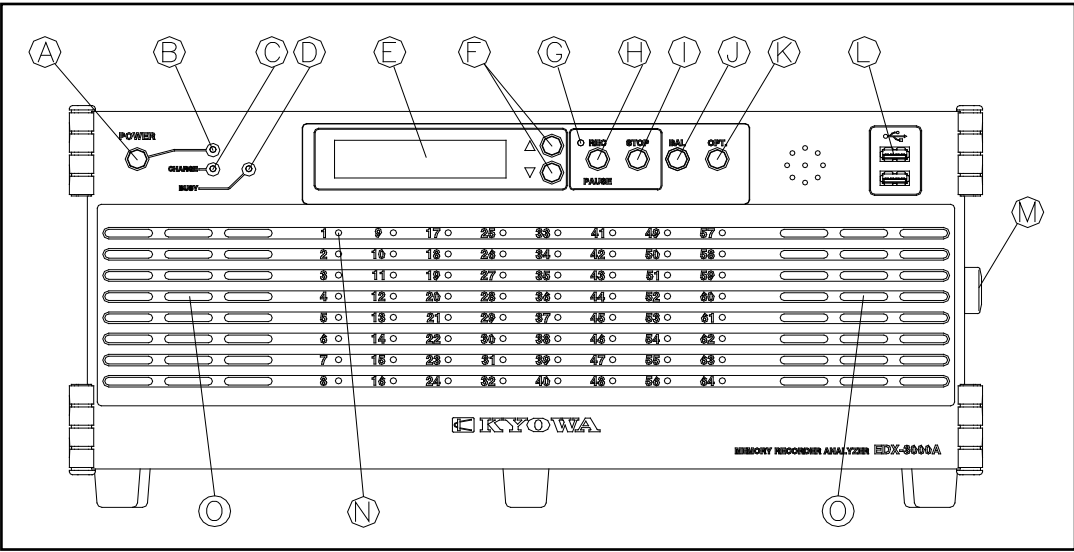
The number of conditioner cards that can mount into the EDX-3000A-*-DC is 8 and the number of channels is MAX. 64. In addition, the EDX-3000A-*-DC can deal with various measurements since the EDX-3000A-*-DC has many external I/O functions. The EDX-3000A-*-DC can record the moving image data in synchronization with the data from the sensor by using these external I/O functions and high-speed camera.

1-2 FEATURES

- An optional conditioner card may be installed in this all-in-one measuring instrument.
- Built-in battery against instantaneous power failure (hereinafter referred to as the built-in battery)
- Long-term data recording is available in the internal hard disk.
 - EDX-3000A-H-DC (with Hard Disk Drive) ・ ・ ・ storage capacity: 100 G or more
 - EDX-3000A-S-DC (with Solid State Drive) ・ ・ ・ storage capacity: 30 G or more
- Voice memo can be recorded simultaneously with data recording.
- CAN data can be recorded using an optional CAN card.
- Real-time processing such as the FFT analysis, arithmetic operations, HPF, LPF, moving average can be conducted.
- Data from 32 channels (simultaneous sampling) can be recorded at a sampling frequency of 200 kHz.
- The control software have the same usability with the KYOWA Dynamic Data Recording Software DCS-100A.
- Synchronization measurement is available with a combination of the high-speed camera, etc. by using the external trigger output and external clock output.
- Synchronizes the recording start time of remote EDX-3000A units by using the time data received from satellites (optional).

2. CONTROLS AND INDICATORS

2-1 FRONT



A: POWER switch

POWER switch

Turn ON the MAIN POWER switch on the rear panel and press the “POWER” switch for 2 seconds or longer to turn ON the EDX-3000A-*-DC.

If you press the “POWER” switch for 2 seconds or longer with the EDX-3000A-*-DC power ON state, the internal setting information is stored first and the EDX-3000A-*-DC is turned OFF.

MEMO

A short buzzer sound rings two times when the power supply is turned ON. Moreover, a long buzzer sound rings three times when the power supply is turned OFF, and POWER LED blinks green.

NOTE

When the built-in battery against the instantaneous power failure is fully discharged, do not stop supplying the DC power source when the POWER switch is ON or during shut down. Failure to observe these precautions may destroy the internal hard disk and prevent the EDX-3000A-*-DC from starting again.

B: POWER LED

Lights up in green during turning ON the power. The POWER LED lights out during OFF the power. In addition, the POWER LED blinks in red when the input voltage of the DC power source is approx. 21 V or lower.

See table 1-1.

C: CHARGE LED

Lights up in green while charging the built-in battery. After the built-in battery is fully charged, the CHARGE LED lights up for 0.1 second of every 10 seconds (hereinafter referred to as the flashing).

In addition, the CHARGE LED blinks in red and orange alternately during discharging (during power failure) the built-in battery.

See table 1-1.

D: BUSY LED

Lights up in green while accessing the internal hard disk. See table 1-1.

E: LCD indicator

Small LCD that displays the status of the EDX-3000A-*-DC.

F: LCD display changing switch

Can change the information of the EDX-3000A-*-DC that is displayed on the LCD.

G: REC/PAUSE LED

Lights up in green during monitoring, in red during recording and blinks in red during stop recording, trigger waiting, and during interval waiting. See table 1-2.

H: REC/PAUSE switch

Starts or stops the recording.

I: STOP switch	Stops the monitoring or recording.
J: BAL. switch	<u>Press the BAL switch for 1 second or longer to conduct balance.</u>
K: OPT. switch	Can set the function of the “OPT. switch” with the EDX-3000A-*-DC Control Software.
L: USB connector	USB 2.0 connector
M: Handle	Handle
N: CH LED	Indicates the status of channels. See table 1-2
O: Front fan:	Ventilating suction fan on the front panel.

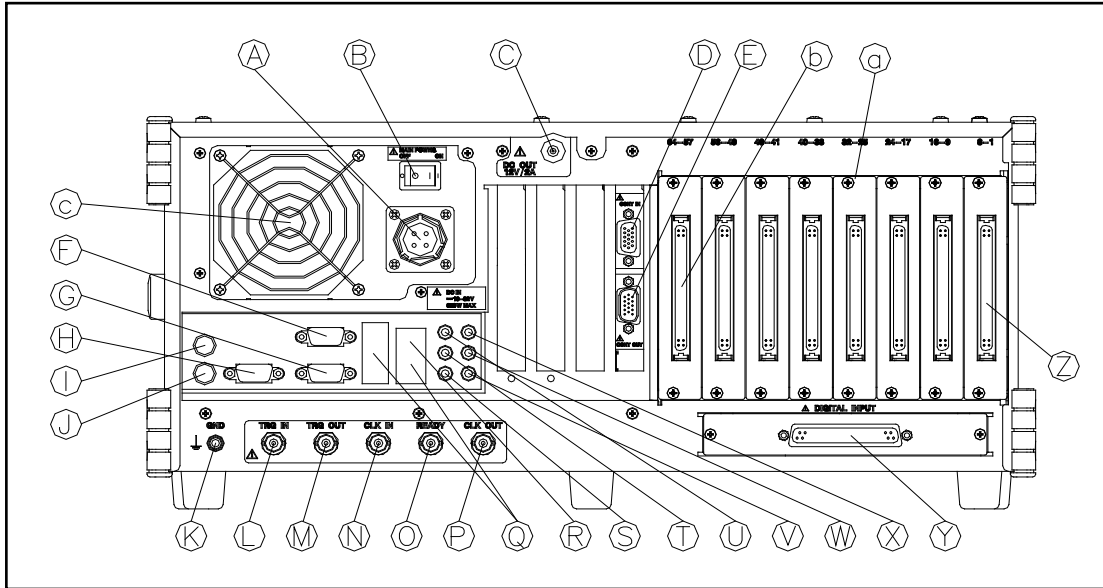
Table 1-1 LEDs status part 1

LED Status		B : POWER LED	C : CHARGE LED	D : BUSY LED
Green	ON	Power ON state	Charging the built-in battery.	Accessing to the internal hard disk.
	Blinks	Power OFF is being prepared.	The built-in battery is fully charged. (Lights up for 0.1 second approx. every 10 seconds)	
Orange	ON			
	Blinks			
Red	ON			
	Blinks	Input voltage of the DC power source is approx. 21 V or lower.		
Red and Orange alternately ON			Discharging the built-in battery. (During power failure)	

Table 1-2 LEDs status part 2

LED Status		G: REC/PAUSE LED	N: CH LED
Green	ON		Normal (Measurement OK)
	Blinks	Monitoring	Calibration output in progress
Orange	ON		Balancing in progress
	Blinks		Balancing not successful
Red	ON	Recording	Sensor input overflow detected
	Blinks	Pausing Trigger waiting Interval waiting	The sensor input overflow exceeding the specified range has been solved and the signal within the specified range is currently entered.
OFF			Measurement OFF Conditioner card not installed

2-2 REAR



A: DC power source connector

This connector should be connected to the DC power source (19 to 32 V) by using the DC power cable supplied with the EDX-3000A-*-DC.

B: MAIN POWER switch

The power is turned ON when this MAIN POWER switch is pressed to the [] side.

NOTE

Do not lay the MAIN POWER switch to [] side with the EDX-3000A-*-DC ON or during shut down. Failure to observe these precautions may destroy the internal hard disk and prevent the EDX-3000A-*-DC from starting again.

C: Power connector for 15-inch display

Dedicated power supply connector for the optional 15-inch display (EMON-30A). Can output 12 VDC (MAX. 2A).

NOTE

The above connector is power supply output connector. Do not input the power source or signal mistakenly. Or, the connected device and the EDX-3000A-*-DC cause system failure.

D: CONT IN connector

Used for a dedicated remote control unit or for synchronized operation of multiple systems.

E: CONT OUT connector

Used for synchronized operation of multiple systems.

F: COM2 connector

Serial communication port

G: VGA connector

Used for connecting the external display.

H: COM1 connector

Serial communication port

I: PS/2 mouse connector

Mouse connector

J: Keyboard connector

Used for connecting the external keyboard.

K: GND terminal

Always ground the GND terminal of the EDX-3000A-*-DC.

MEMO

The GND terminal is connected to the chassis and the common of the internal circuit.

L: TRG IN connector	For the external trigger measurement. Starts recording by inputting the trigger signal. (H: 2.0 to 5.0 V, L: 0 to 0.8 V)
M: TRG OUT connector	Outputs trigger signal when triggered. (H: 5 V, L: 0 V)
N: CLK IN connector	Used for operating the EDX-3000A-*-DC with the external clock signal. (H: 2.0 to 5 V, L: 0 to 0.8 V)
O: READY connector	Outputs LOW level signal when recording and other than that, outputs HIGH level signal. (H: 5 V, L: 0 V)
P: CLK OUT connector	Sampling clock is divided and output. (H: 5 V, L: 0 V)
Q: USB connector	USB2.0 connector
R: LAN connector	LAN connector
S: Side surround connector (Gray)	Do not use.
T: Read sound connector (Black)	Do not use.
U: Center woofer connector (Orange)	Do not use.
V: Micro-phone connector (Pink)	Do not use.
W: Front speaker connector (Green)	For an external speaker. Active speaker is available.
X: Line connector (Blue)	Do not use.
Y: DIGITAL INPUT connector	Digital input connector. 32 bit with TTL level input is available.
Z: 1-CH to 8-CH conditioner slots	Conditioner slots for channels 1 to 8.
a 25-CH to 32-CH conditioner slots	Conditioner slots for channels 25 to 32.
b 57-CH to 64-CH conditioner slots	Conditioner slots for channels 57 to 64.
c Rear fan:	Ventilating exhaust fan on the rear panel.

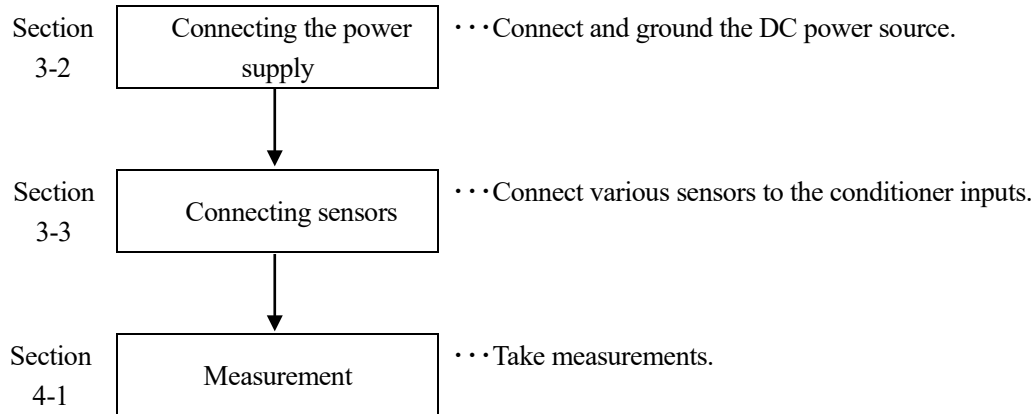
MEMO

The channel No. is determined by the position where the conditioner card is inserted.
The channel numbers are assigned from right to left as seen from the rear.

3. INSTALLING EDX-3000A-*-DC

3-1 INSTALLATION PROCEDURE

This section describes required procedures for installing the EDX-3000A-*-DC and preparing for measurements. Use the following procedures to complete the installation.



NOTE

Mounting: Fix the EDX-3000A-*-DC with band, etc. when mounting it to the place where minute vibration is applied. Set the EDX-3000A-*-DC on an appropriate vibration isolation table to reduce the applied vibration and impact when excessive impact or vibration is applied.

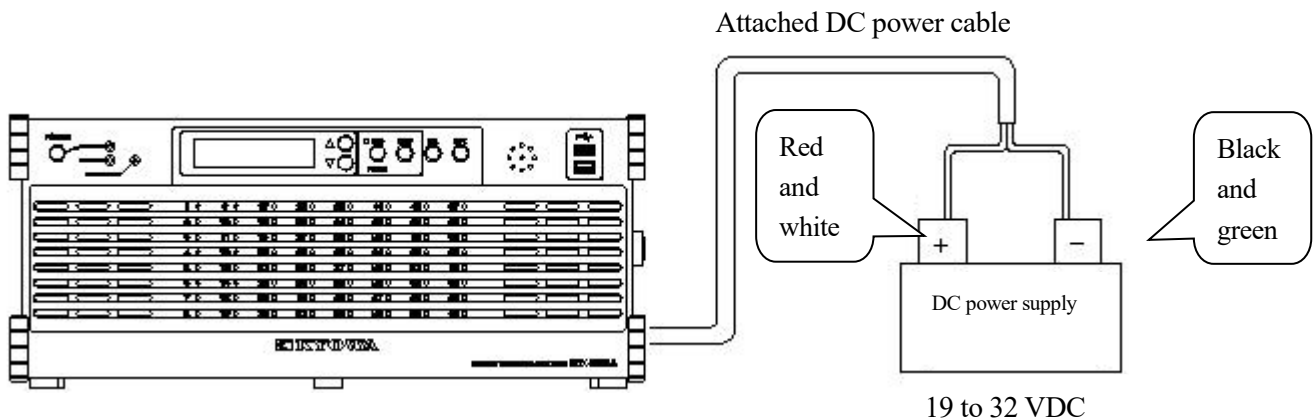
3-2 CONNECTING THE POWER SUPPLIES

Supply DC power to the EDX-3000A-*-DC with the attached DC power cable.

Check the power supply voltage before connecting the power cable to the DC power source connector.

The operating power supply voltage range of the EDX-3000A-*-DC is 19 to 32 VDC. Always operate the EDX-3000A-*-DC within the specified voltage range.

The EDX-3000A-*-DC should never be connected to the power supply with voltage outside the above specified voltage range. Doing so will cause system failure and accidents.

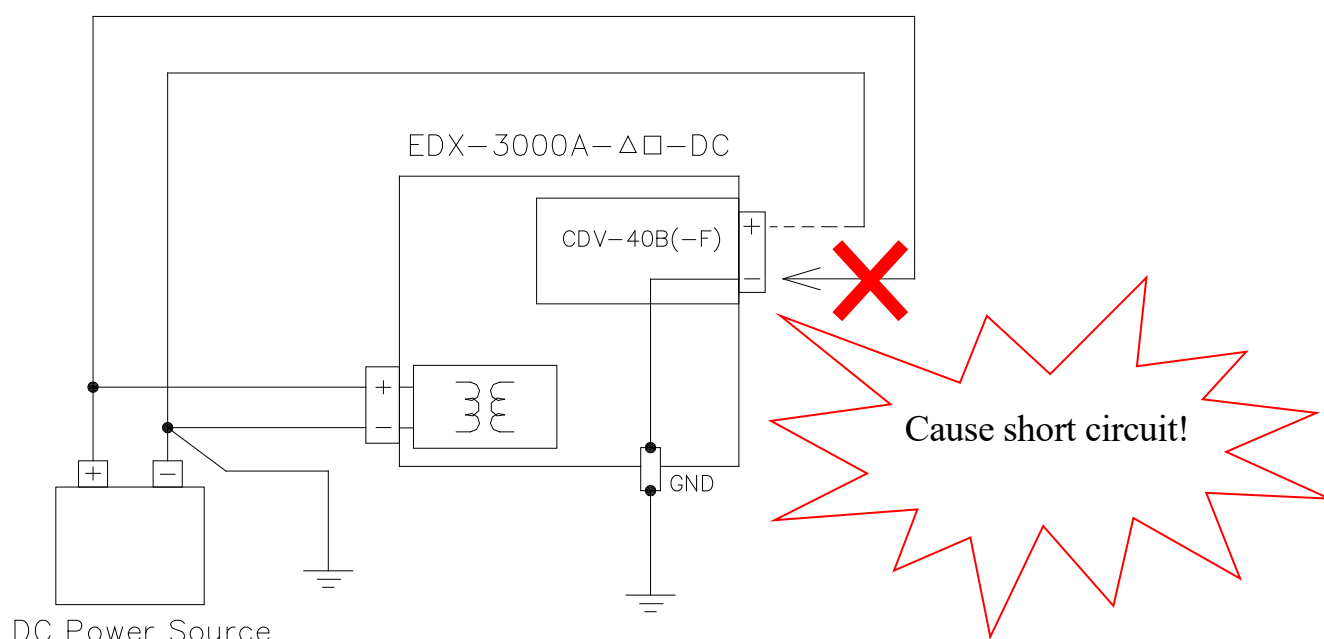


WARNING

- The negative (-) side of the DC power source connector is insulated from the chassis of the EDX-3000A-*-DC and GND terminal.
- The negative (-) sides of the CDV-40B (-F) of all channels are internally connected with the GND terminal of the EDX-3000A-*-DC.

Therefore, do not touch the positive (+) side conductor of the DC power source to the chassis of the EDX-3000A-*-DC or do not connect the positive (+) side conductor of the DC power source to the negative side of the CDV-40B (-F) when measuring voltage of the DC power source with the chassis (GND terminal) of the EDX-3000A-*-DC and negative (-) side of the DC power source connected together.

Or, the positive and negative sides are connected together, short circuit is caused and the EDX-3000A-*-DC or DC power source becomes failure.



In the above figure, insulate the chassis (GND terminal) of the EDX-3000A-*-DC from the negative (-) side of the DC power source. However, the negative (-) sides of the CDV-40B (-F) of all channels are internally connected with the GND terminal of the EDX-3000A-*-DC.

Therefore, if the voltage of the same DC power source is measured, it may cause short circuit.

For example, suppose the positive (+) and negative (-) sides of the CDV-40B (-F) in the 1-CH is connected conversely and positive (+) and negative (-) sides of the CDV-40B (-F) in the 2-CH is connected correctly.

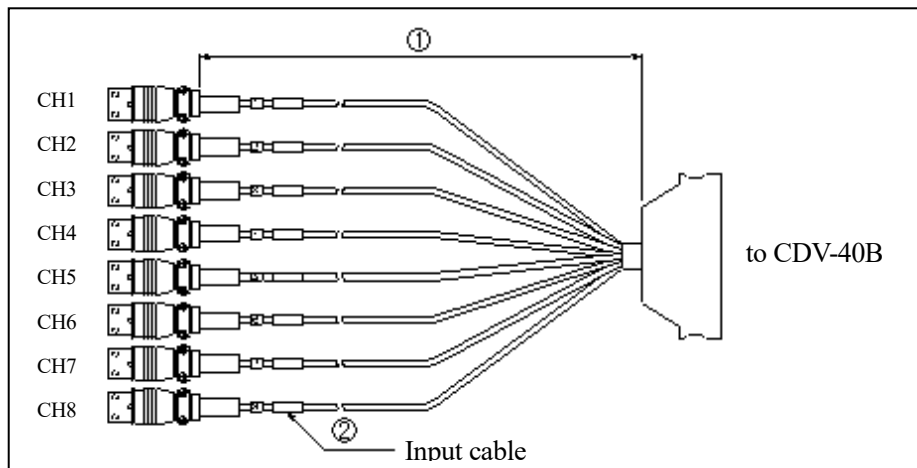
Note that the positive (+) and negative (-) sides of the DC power source cause short circuit in the CDV-40B (-F) (between 1-CH and 2-CH).

3-3 CONNECTING SENSOR

This section explains how to connect sensors to the CDV-40B strain/voltage measurement card (hereinafter referred to as the CDV-40B).

Use dedicated input cables (optional) for connecting sensors to the CDV-40B. The applicable input cables are shown in the following table.

Item	Model	Cable length (Figure ①)	Color of heat shrinkable tube (Figure ②)	Item	Model	Cable length (Figure ①)	Color of heat shrinkable tube (Figure ②)
Input cable	U-40	50 cm	None	Input cable	U-46	50 cm	Blue
	U-41		Brown		U-47		Purple
	U-42		Red		U-48		Gray
	U-43		Orange				
	U-44		Yellow		U-38	1.5 m	None
	U-45		Green		U-39	1.0 m	None

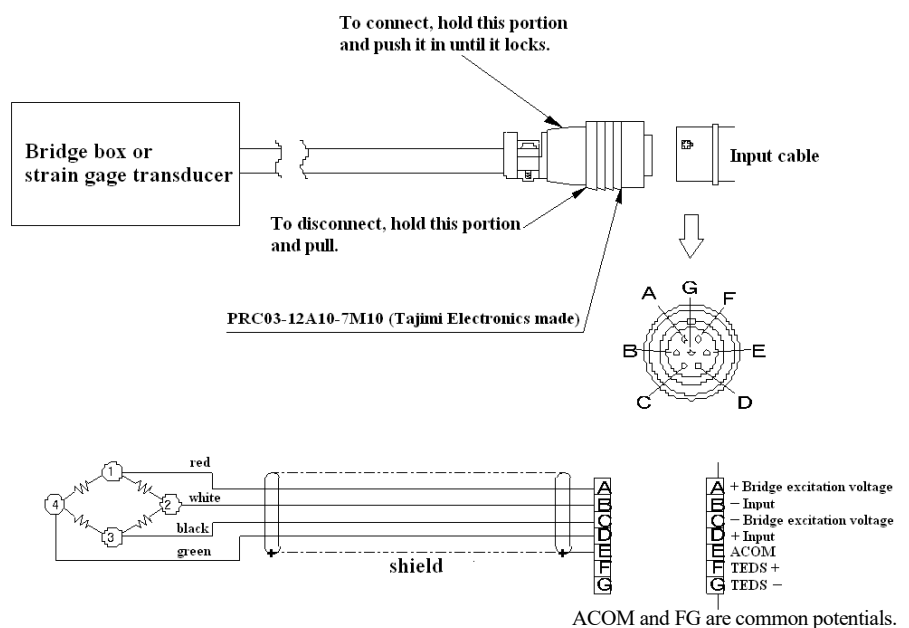


The CDV-40B can measure strain and voltage. The input cable should be connected as described below.

1) When using a strain gage or strain gage transducer

When measuring the output of the strain gage or strain gage transducer, connect the bridge box or strain gage transducer as shown in the figure at right.

Before recording the data, select the strain mode and monitor the noise. If excessive noise is measured, ground the ground terminal of the bridge box or connect it to the GND terminal of the EDX-3000A-*-DC, whichever results in less noise.



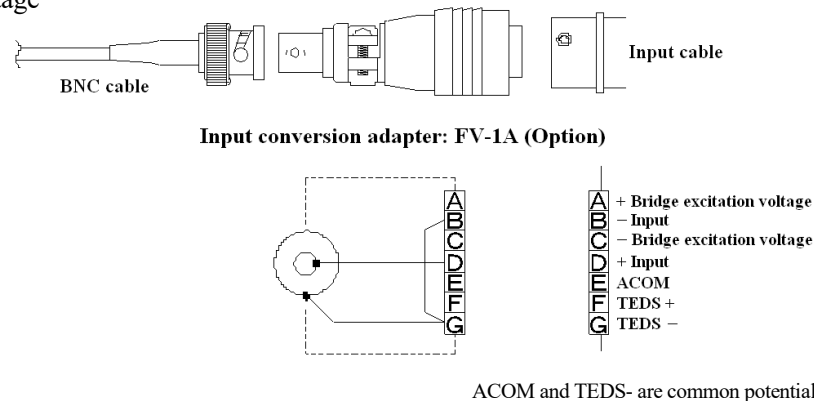
MEMO

Refer to the Instruction Manual of measurement cards when using other cards.

NOTE

- The F terminal (channel input) of the CDV-40B is intended for sensor ID signals (TEDS). Connecting any other signal to this terminal may prevent the EDX-3000A from recognizing all conditioners installed in the EDX-3000A-*-DC. If the EDX-3000A-*-DC does not recognize the conditioners, the startup screen will display “UNKOWN” when it should display the name of the conditioner (e.g. CDV-40B) in the normal state, resulting to unable the measurement.
- Strain generator: CAB-120D, 350D, WDS-10 are not available because the F and A terminals are short-circuited.
- It should be noted that when using a transducer with a remote sensing function, always locate the connection cable (N-81 to N-85) between the transducer and the input cable of the CDV-40B.
- Use the connection cable (N-81 to N-85) as the extension cable between the input cable and bridge box or between strain gage transducers.

2) When applying an input voltage



When measuring the voltage, connect an input conversion adapter (optional: FV-1A) to a quick fitting connector by using the BNC connector. Select the voltage mode to perform monitoring. For excessive noise, connect the negative side of the voltage signal source to the GND terminal of the EDX-3000A-*-DC.

WARNING

• Maximum Input Voltage Range for Measurement

Do not apply an input voltage higher than the range specified for the CDV-40B. Doing so may cause an electric shock, deteriorated performance and system failure.

Take the following precautions when measuring the DC voltage of a battery, power supply, etc.

- 1) Use a tester or the like to measure the voltage between negative sides of the DC voltage and confirm that the voltage is approximately 0 V.
- 2) Confirm that the voltage between the negative side of the DC voltage and the GND terminal of the EDX-3000A-*-DC is approximately 0 V.
- 3) When connecting the input, correctly connect the positive and negative sides.
- 4) Maximum input voltage of the CDV-40B is ± 10 V. Do not apply input voltage exceeding that range.

Failure to comply with the above precautions will result in a short circuit of the signal source (e. g. DC power source) of the measuring target in the CDV-40B card, thus causing system failure and a fire hazard.

NOTE

When using a voltage and strain sensor input signals together in the same CDV-40B card, a cross talk may generate and display a waveform different from a sensor input waveform on the strain sensor connected channel.

[The worst case]

If the worst comes to the strain sensor input channel with the following conditions, a cross talk of $120\text{ }\mu\text{m/m}_{\text{p-p}}$ may generate.

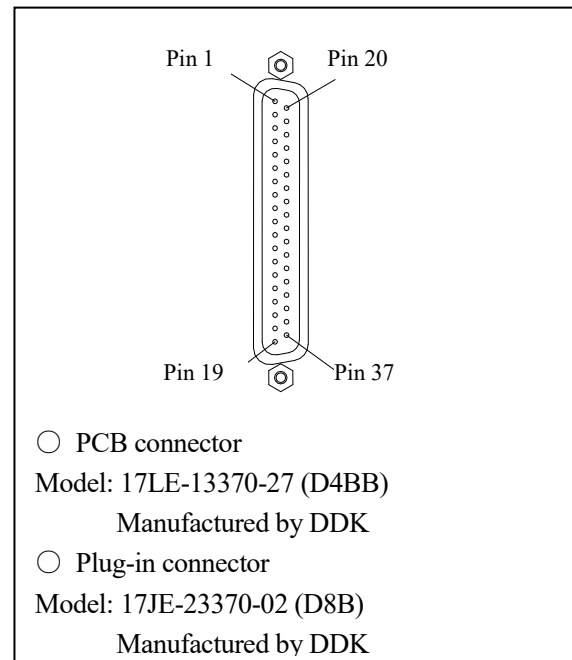
(Condition)	
Voltage input channel	• Mode Voltage • Range 10 V • LPF FLAT • Input Square-wave of $20\text{ V}_{\text{p-p}}(\pm 10\text{V})$, 50 kHz
Strain sensor input channel	• Mode Strain • Range $500\text{ }\mu\text{m/m}$ • LPF FLAT • Input Arbitrary

At this time, set the LPF of the strain sensor input channel to 10 kHz or less to eliminate the cross talk.

3-4 CONNECTING DIGITAL INPUT CONNECTOR

The pin assignment of the digital input connector is as shown in the following.

Pin No.	Name	Pin No.	Name
1	Bit 1	20	Bit 17
2	Bit 2	21	Bit 18
3	Bit 3	22	Bit 19
4	Bit 4	23	Bit 20
5	Bit 5	24	Bit 21
6	Bit 6	25	Bit 22
7	Bit 7	26	Bit 23
8	Bit 8	27	Bit 24
9	Bit 9	28	Bit 25
10	Bit 10	29	Bit 26
11	Bit 11	30	Bit 27
12	Bit 12	31	Bit 28
13	Bit 13	32	Bit 29
14	Bit 14	33	Bit 30
15	Bit 15	34	Bit 31
16	Bit 16	35	Bit 32
17	Reserved (*)	36	Common
18	Common	37	GND
19	GND		

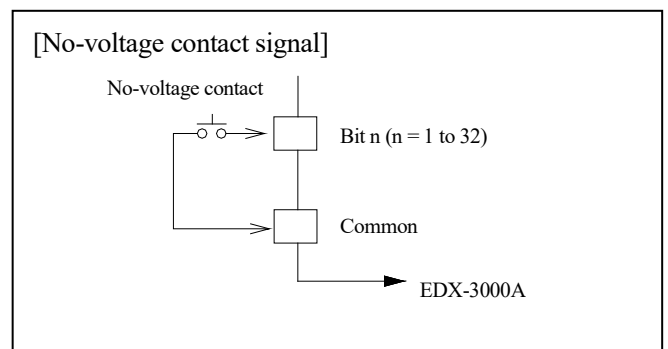
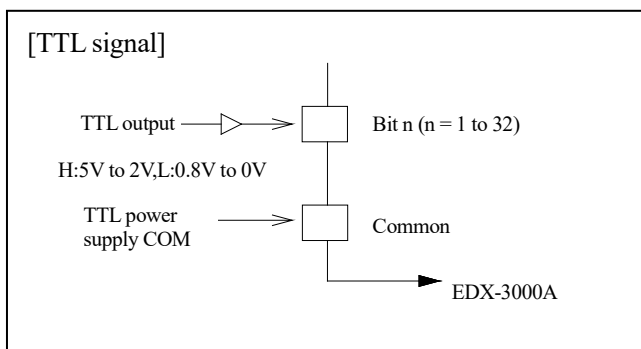


[Note] The signal common is used in common for bits 1 to 32, and is insulated from the chassis and the power supply of the EDX-3000A-*-DC.

NOTE

(*) The pin No. 17 is reserved pin. Do not connect anything.

Connect the TTL signal or no-voltage contact signal as shown in the figures below.



NOTE

The input signal between each bit and the common should be within the range of -30 to +30 V. The digital input card may fail if a voltage exceeding that range is applied.

4. MEASURING

4-1 MEASURING

After connecting the sensor, turn ON (“ | ”) the MAIN POWER switch on the rear panel of the EDX-3000A-*-DC. Then press the POWER switch on the front panel for 2 seconds to activate the EDX-3000A-*-DC. For details of the conditioner settings and measuring condition settings, see the Instruction Manual for Software.

MEMO

- For the MAIN POWER switch

This is the MAIN POWER switch of the EDX-3000A-*-DC. The DC power is supplied through this MAIN POWER switch. When the MAIN POWER switch is ON, the EDX-3000A-*-DC is consuming standby power even if the POWER switch of the EDX-3000A-*-DC is OFF.

4-2 FOR EXTERNAL INPUT/OUTPUT

The EDX-3000A-*-DC equips the following BNC connector for the external input/output on the rear panel.

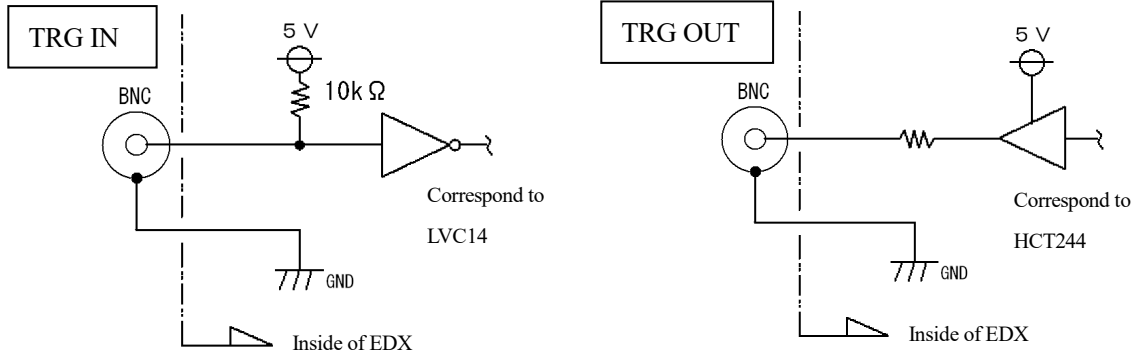
TRG IN connector	Used for the external trigger measurement. Starts recording by inputting the trigger signal. (H: 2.0 to 5.0 V, L: 0 to 0.8 V) See “4-2-1 External Trigger.”
TRG OUT connector	Outputs trigger signal when triggered. (H: 5 V, L: 0 V) See “4-2-1 External Trigger.”
CLK IN connector	Used for operating the EDX-3000A-*-DC with the external clock signal. (H: 2.0 to 5.0 V, L: 0 to 0.8 V) See “4-2-2 External Clock.”
READY connector	Outputs LOW level signal when recording and other than that, outputs HIGH level signal. (H: 5 V, L: 0 V) See “4-2-3 Recording Signal.”
CLK OUT connector	The sampling clock is divided and output. (H: 5V, L: 0 V) See “4-2-2 External Clock.”

NOTE

The input voltage range of the TRG IN connector and CLK IN connector is 0 to 5.5 V.
Or, the EDX-3000A-*-DC may cause system failure.

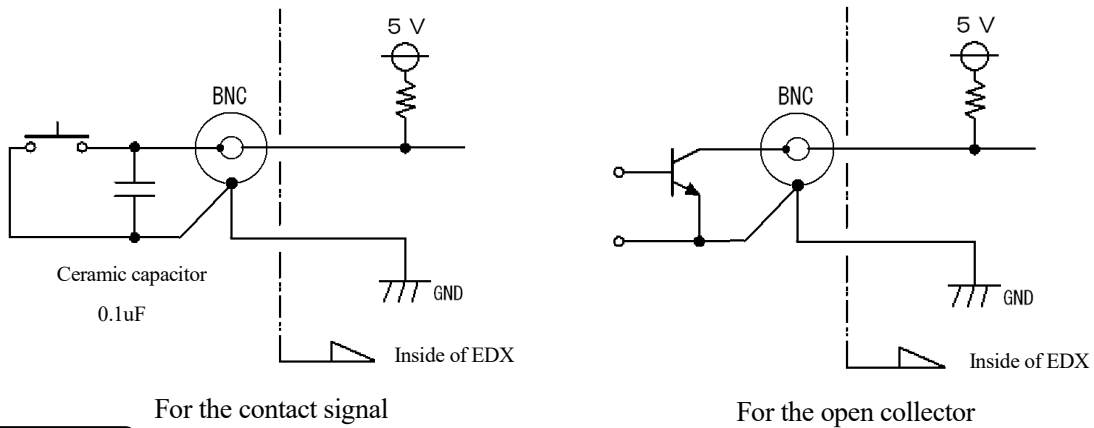
4-2-1 External Trigger “TRG IN” “TRG OUT”

The EDX-3000A-*-DC starts recording by inputting the external trigger input signal to the “TRG IN.” In addition, the EDX-3000A-*-DC can supply the external trigger output signal from the “TRG OUT” to the external device. The internal circuits of the “TRG IN” and “TRG OUT” are as follows.



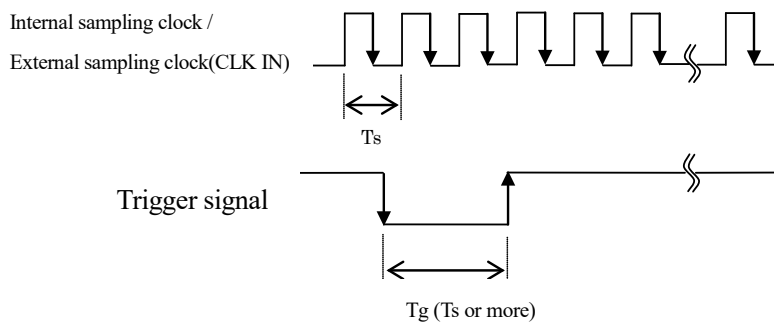
1) Input signal of the “TRG IN”

Input any signal of no-voltage contact signal, open collector signal, or TTL level (H: 2.0 to 5.0 V, L: 0 to 0.8 V) signal. The “Slope (positive)” or “Slope (negative)” of the start trigger or end trigger is set with the control software.



NOTE

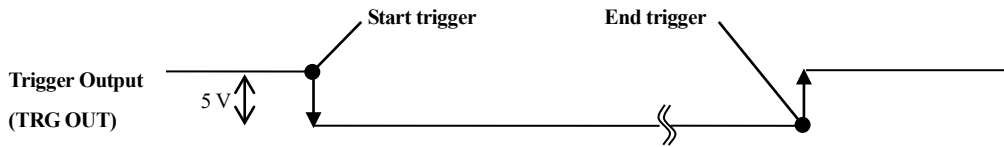
- Avoid noise such as chattering, etc. from happening in the trigger input signal.
- It is recommended to use the open collector signal as the trigger input to prevent external noise and recommended to use an insulation element such as photocoupler, etc.
- The trigger signal is issued every one cycle (T_s) of the predetermined sampling clock or more.



- The input threshold value is 2.0 to 5.0 V (HIGH level) and 0 to 0.8 V (LOW level). In addition, MAX. input voltage range is 0 to 5.5 V. Or, the EDX-3000A may cause system failure.
- Pre-test and check if the EDX-3000A is correctly triggered before the main-test.

2) Output signal of the “TRG OUT”

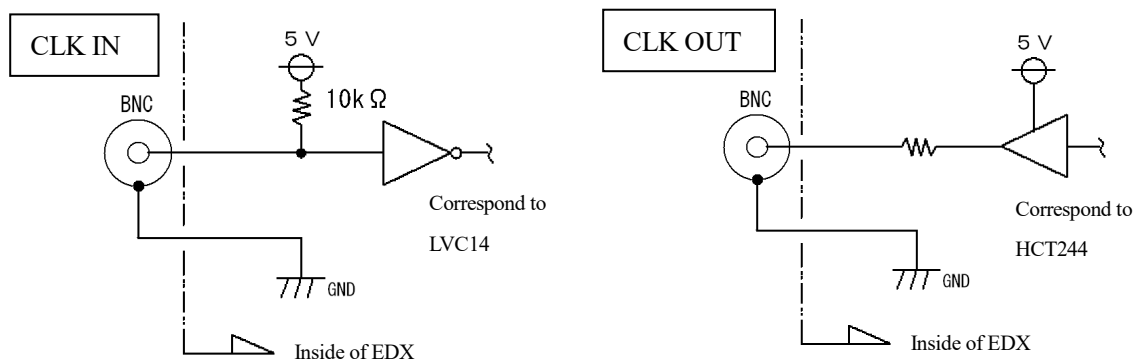
The voltage level of the output signal is 5 V in HIGH level and 0 V in LOW level. When the voltage level is moved from HIGH level to LOW level, it is called the “start trigger” and when the voltage level is moved from LOW level to HIGH level, it is called the “end trigger.”



4-2-2 External Clock “CLK IN” “CLK OUT”

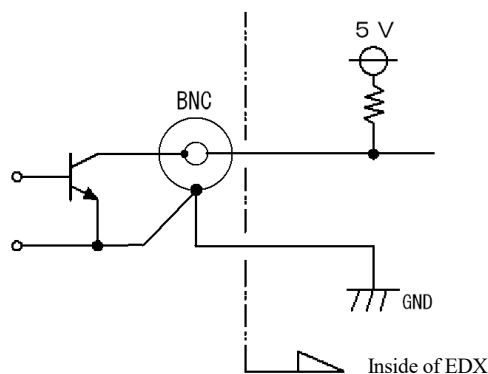
If a pulse signal supplied from the external device such as oscillator is input as the external clock input signal to the “CLK IN,” the pulse signal can be used as the sampling clock of the EDX-3000A-*-DC. In addition, the EDX-3000A-*-DC can supply the sampling clock of the EDX-3000A-*-DC as the external clock output signal from the “CLK OUT” to the external device. This makes the clock synchronized data recording available between the EDX-3000A-*-DC and external devices such as data loggers, high-speed camera.

The internal circuits of the “CLK IN” and “CLK OUT” are as follows.



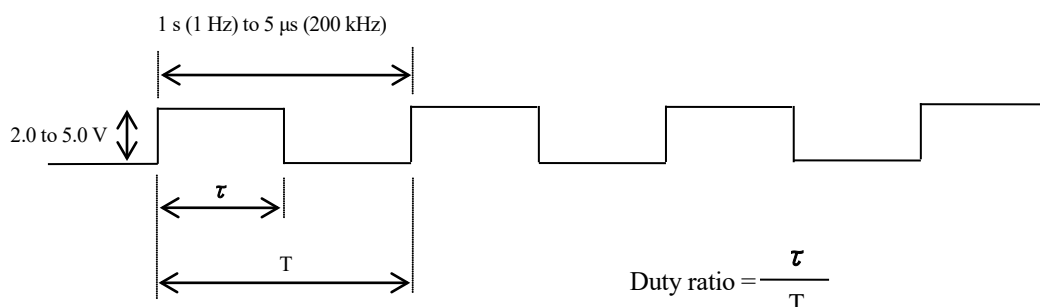
1) Input signal of the “CLK IN”

Input the open collector signal or TTL level (H: 2.0 to 5.0V, L: 0 to 0.8 V) signal.



For the open collector

In addition, the target pulse signal must square wave with duty ratio 0.5 ± 0.1 ($50 \pm 10\%$).



2) Restrictions related to “CLK IN”

- Input a fixed clock (frequency does not change) to the external clock supplying to the EDX-3000A-*-DC.
- It is necessary to supply the external clock while the EDX-3000A-*-DC is measuring data. The EDX-3000A-*-DC cannot start measuring data if the external clock is not supplied.

In addition, an external clock error occurred and the EDX-3000A-*-DC stops measuring data if the external clock frequency changes approx. $\pm 5\%$ or more or if the external clock supply is disrupted during measuring.

NOTE

- It is assumed that fixed frequency is input if the external clock frequency is within approx. $\pm 5\%$ of the preset frequency.

[Example]

Suppose the reference frequency is 8,000 Hz.

It is required to supply the clock having range of 7,600 to 8,400 Hz.

In addition, supply a clock having the preset standard frequency preferably not to interrupt analysis processing after recording the data.

- If an error happened on the external clock during recording, the measuring is stopped, the recorded data, REC/PAUSE information, and voice data from the recording start point to the error recognized point are automatically saved.

- Available frequency range of the external clock is 1 to 200,000 Hz and settable in 1 Hz step. However, the external clock frequency is restricted according to the number of measuring channels, measure the data with or without CAN card, and specifying or not specifying the AUTO of the low pass filter.

Restrictions are same with that of the internal clock.

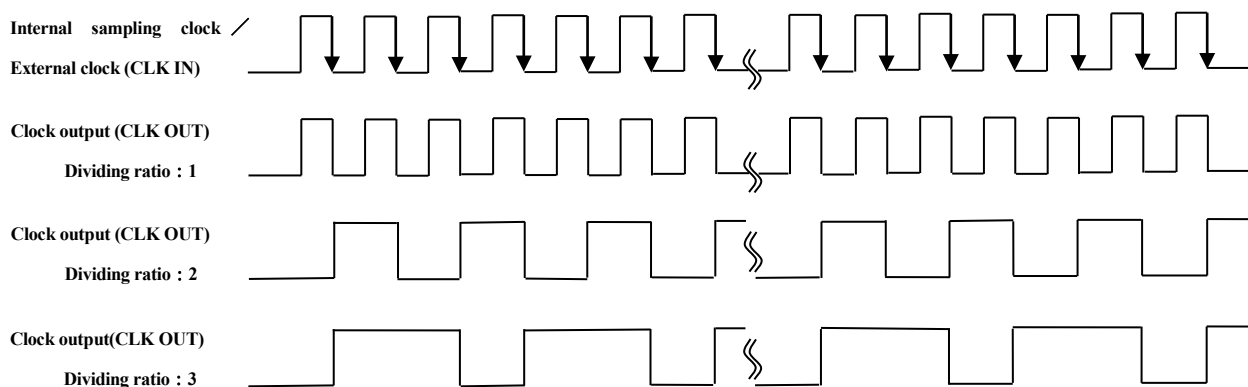
- The frequency of the supplying external clock is internally checked and it requires a certain amount of time equivalent to approx. 3 cycles of the setting frequency for checking. Therefore, start of the measurement (start of the monitor) delays a certain amount of time compared with the internal clock. Pay special attention when using low frequency 5 Hz or less.

3) Output signal of “CLK OUT”

The voltage level of the output signal is 5 V (HIGH level) or 0 V (LOW level).

In addition, the “CLK OUT” outputs divided square wave of the internal sampling clock or external clock.

Capable of setting the dividing ratio arbitrary (1 to 65534).



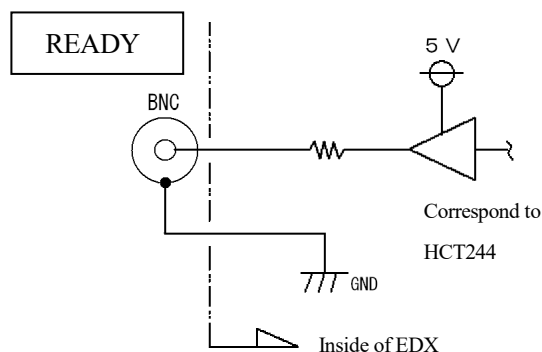
NOTE

The duty ratio of the target “CLK OUT” signal is not 0.5 (50%) when the dividing ratio is an odd value 3 or more.

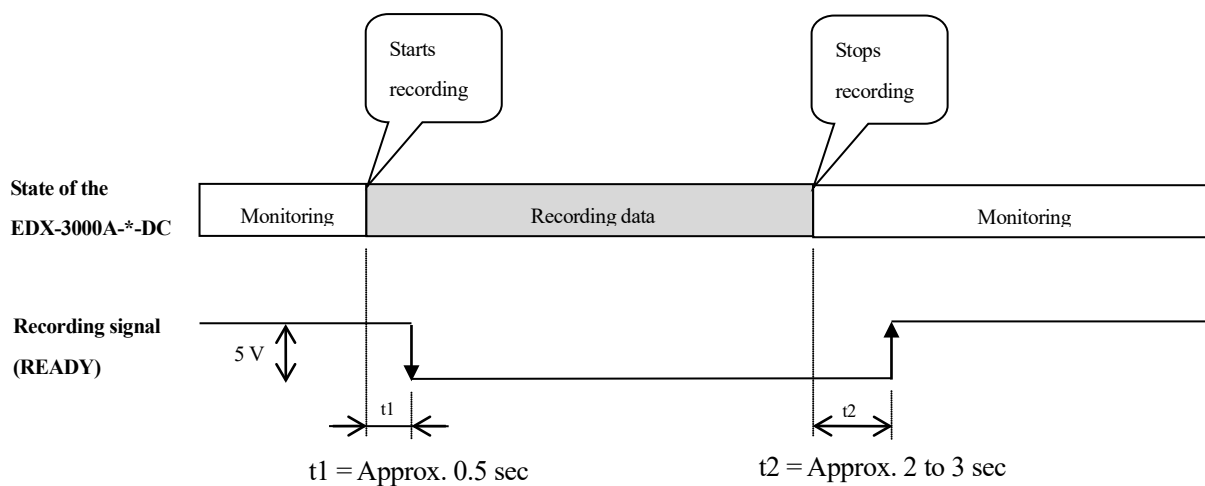
4-2-3 Recording Signal “READY”

The voltage level of the recording signal is 0 V (LOW level) during recording and 5 V (HIGH level) during not recording. The EDX-3000A-*-DC can control the external device during recording or can check whether the EDX-3000A-*-DC is recording or not by connecting this output signal to the external device.

The internal circuit of the “READY” is as follows.



In addition, starting time and ending time of the READY signal delay for approx. 0.5 to 3 seconds than the “starting time” or “ending time” of the EDX-3000A-*-DC. This amount of delay varies with the setting value of the trigger delay amount, size of the recording data, and CPU usage range of the EDX-3000A-*-DC. Note that the delay amount is not constant value.



4-2-4 Input/Output Timing of Signals

The output timing of the TRG OUT signal varies with the following settings. For the timing diagrams, see examples 1 to 5.

Table 4-2: Output timing of TRG OUT signal

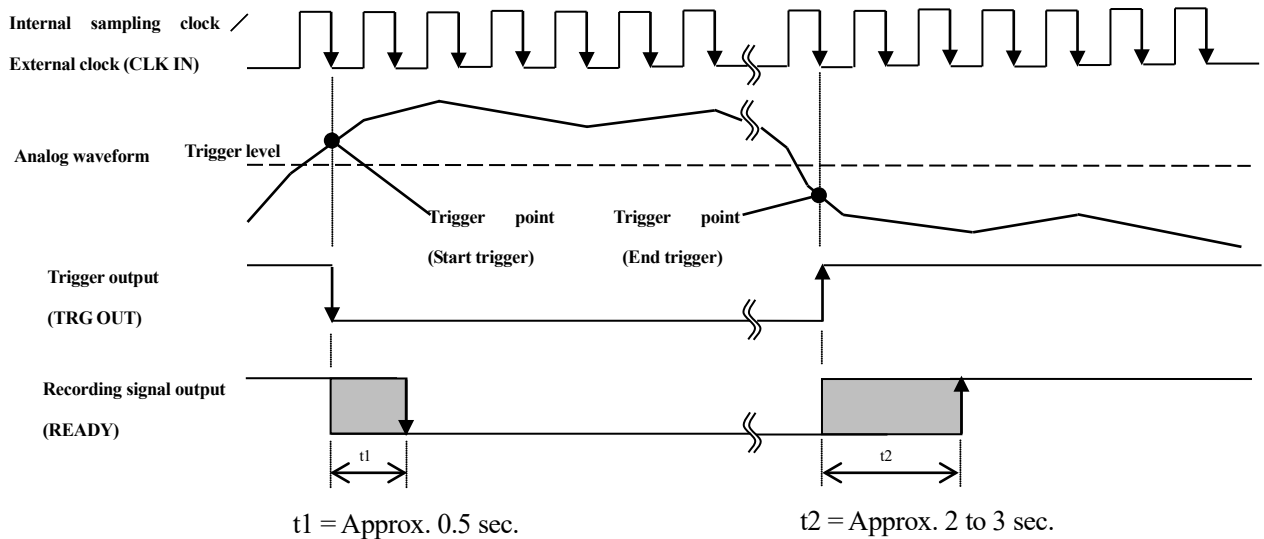
Type of start trigger	Sampling frequency	Recording moving image (Note 2)	Output timing of the TRG OUT signal from the trigger point (Note 3)	Reference
Analog trigger (Note 1)	Less than 100 Hz	Not use	Output at the same time as the trigger point.	Ex. 1
		Use		
	100 Hz or more	Not use	Outputs after the lapse of 3 clocks from the trigger point.	Ex. 2
		Use	Output at the same time as the trigger point.	Ex. 1
Digital trigger (Note 1)	Less than 100 Hz	Not use	Output at the same time as the trigger point.	Ex. 3
		Use		
	100 Hz or more	Not use	Outputs after the lapse of 3 clocks from the trigger point.	Ex. 4
		Use	Output at the same time as the trigger point.	Ex. 3
External trigger (TRG IN)	Less than 100 Hz	Not use	Output at the same time as the trigger point.	Ex. 5
		Use		
	100 Hz or more	Not use		
		Use		

Note 1: Including start trigger of the complex trigger.

Note 2: Select “Set Meas Mode Condition” – “Real Time Process” – “Recording moving image” in the EDX-3000A Software.

Ex. 1

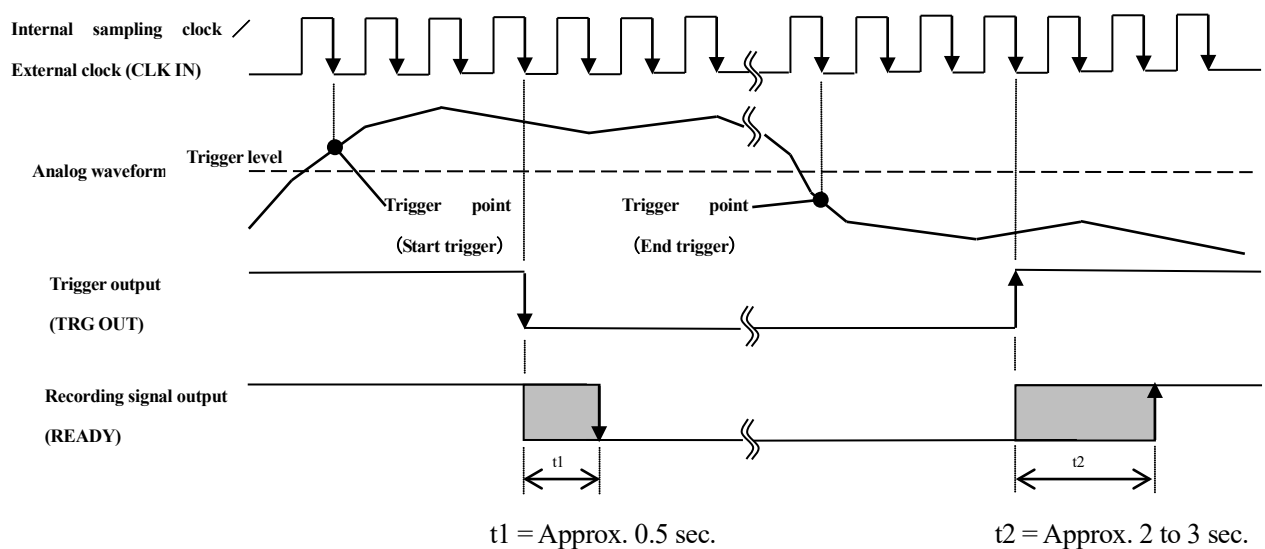
Trigger mode: Analog trigger (start trigger: Slope (positive), end trigger: Slope (negative))
 Sampling frequency: Less than 100 Hz
 TRG OUT: Output at the same time as the trigger point.



[NOTE] Note that the $t1$ and $t2$ vary with the setting value of the trigger delay amount, recording data size and CPU usage rate in the EDX-3000A-*-DC.

Ex. 2

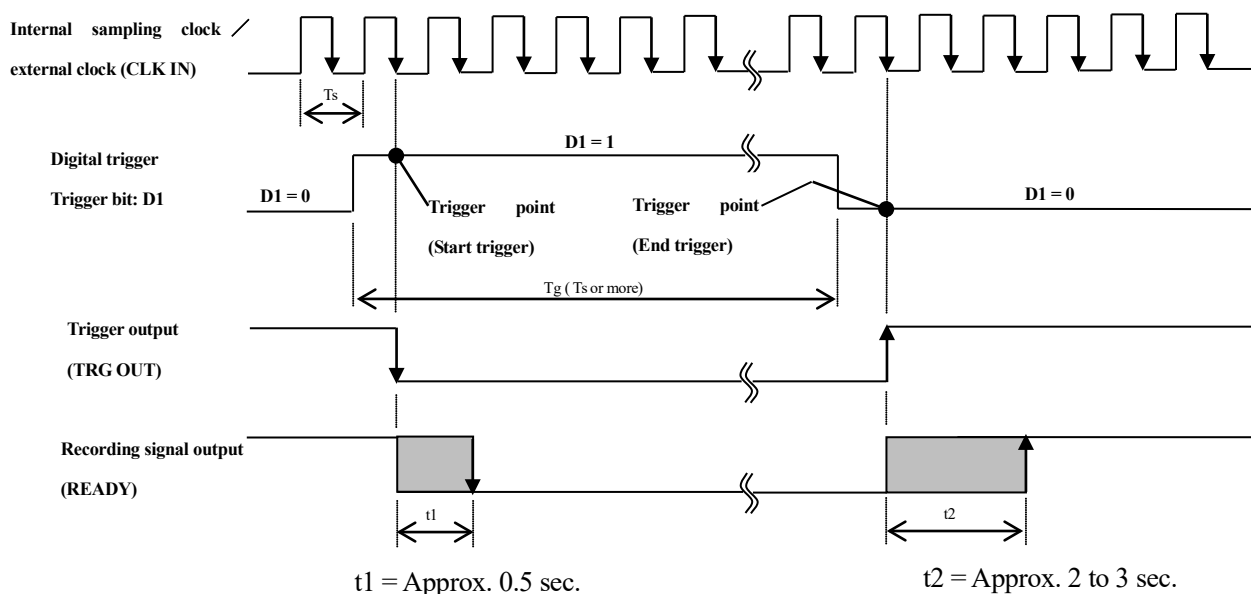
Trigger mode: Analog trigger (start trigger: Slope (positive), end trigger: Slope (negative))
 Sampling frequency: 100 Hz or more
 Real time "Recording moving image": No
 TRG OUT: Outputs after the lapse of 3 clocks from the trigger point.



[NOTE] Note that the $t1$ and $t2$ vary with the setting value of the trigger delay amount, recording data size and CPU usage rate in the EDX-3000A-*-DC.

Ex. 3

Trigger mode: Digital trigger (Start trigger D1 = "1", End trigger D1 = "0")
 Sampling frequency: Less than 100 Hz
 TRG OUT: Output at the same time as the trigger point.

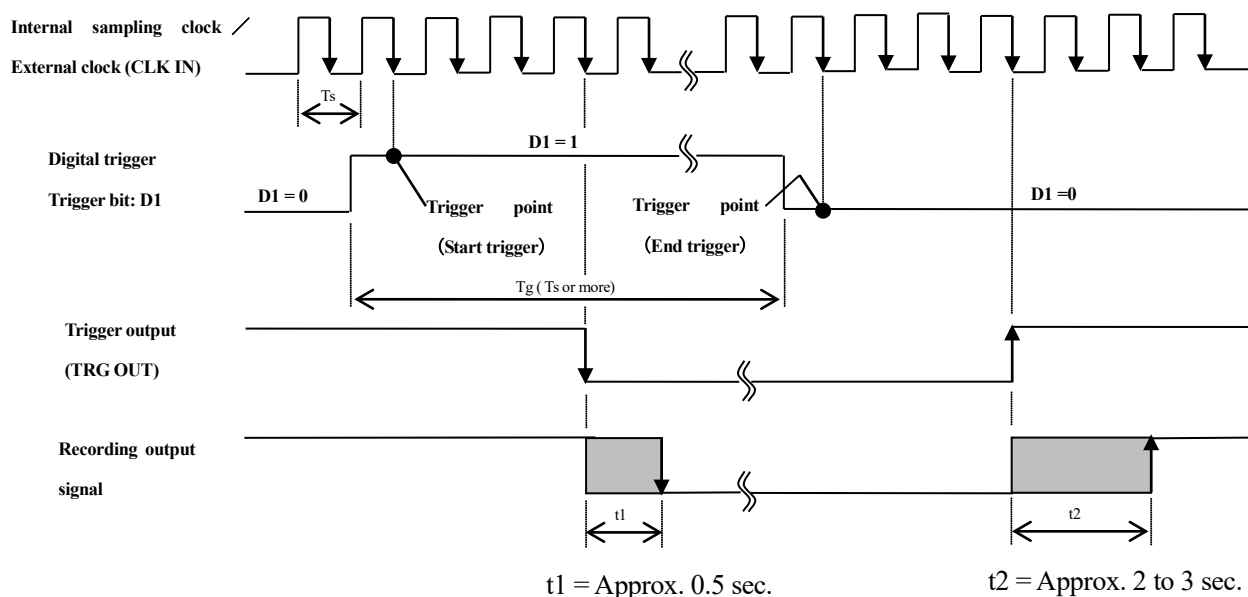


[NOTE] It is required that the time T_g (from the start trigger to end trigger) requires 1 cycle (T_s) of the sampling clock or more.

Note that the t_1 and t_2 vary with the setting value of the trigger delay amount, recording data size and CPU usage rate in the EDX-3000A-*-DC.

Ex. 4

Trigger mode: Digital trigger (start trigger D1 = "1", end trigger D1 = "1")
 Sampling frequency: 100Hz or more
 Real time "Recording moving image": No
 TRG OUT: Outputs after the lapse of 3 clocks from the trigger point.

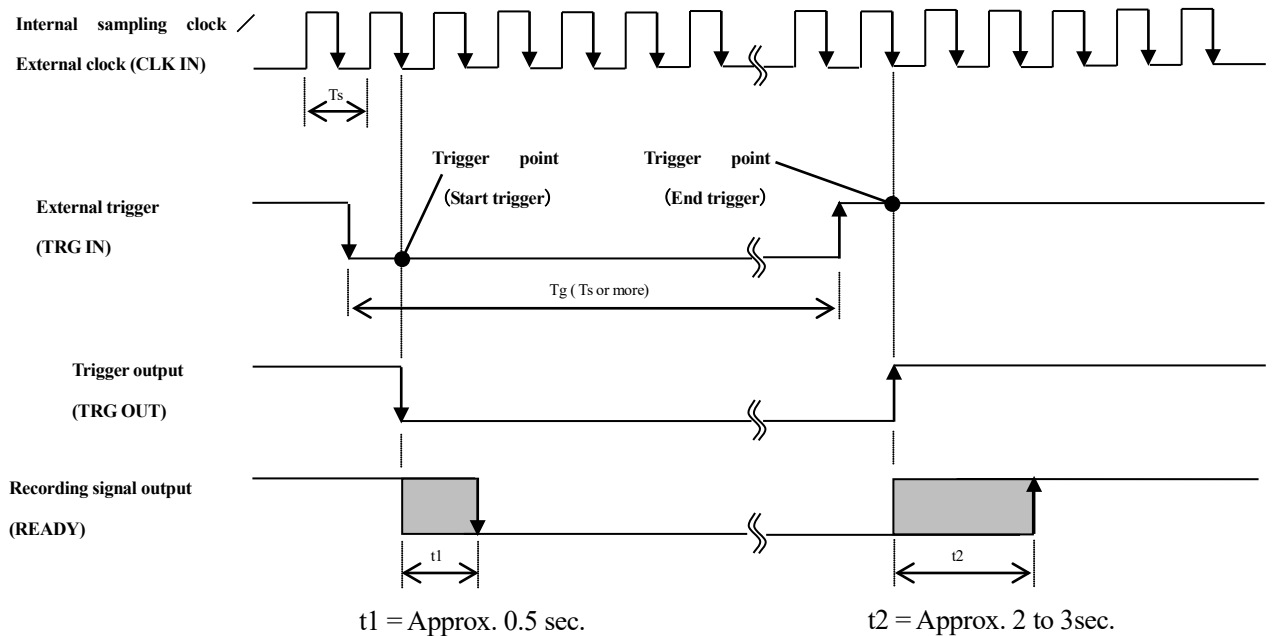


[NOTE] It is required that the time T_g (from the start trigger to end trigger) requires 1 cycle (T_s) of the sampling clock or more.

Note that the t_1 and t_2 vary with the setting value of the trigger delay amount, recording data size and CPU usage rate in the EDX-3000A-*-DC.

Ex. 5

Trigger mode: External trigger (start trigger: HIGH $\rightarrow$ LOW, end trigger: LOW $\rightarrow$ HIGH)
 TRG OUT: Output at the same time as the trigger point.



[NOTE] It is required that the time T_g (from the start trigger to end trigger) requires 1 cycle (T_s) of the sampling clock or more.

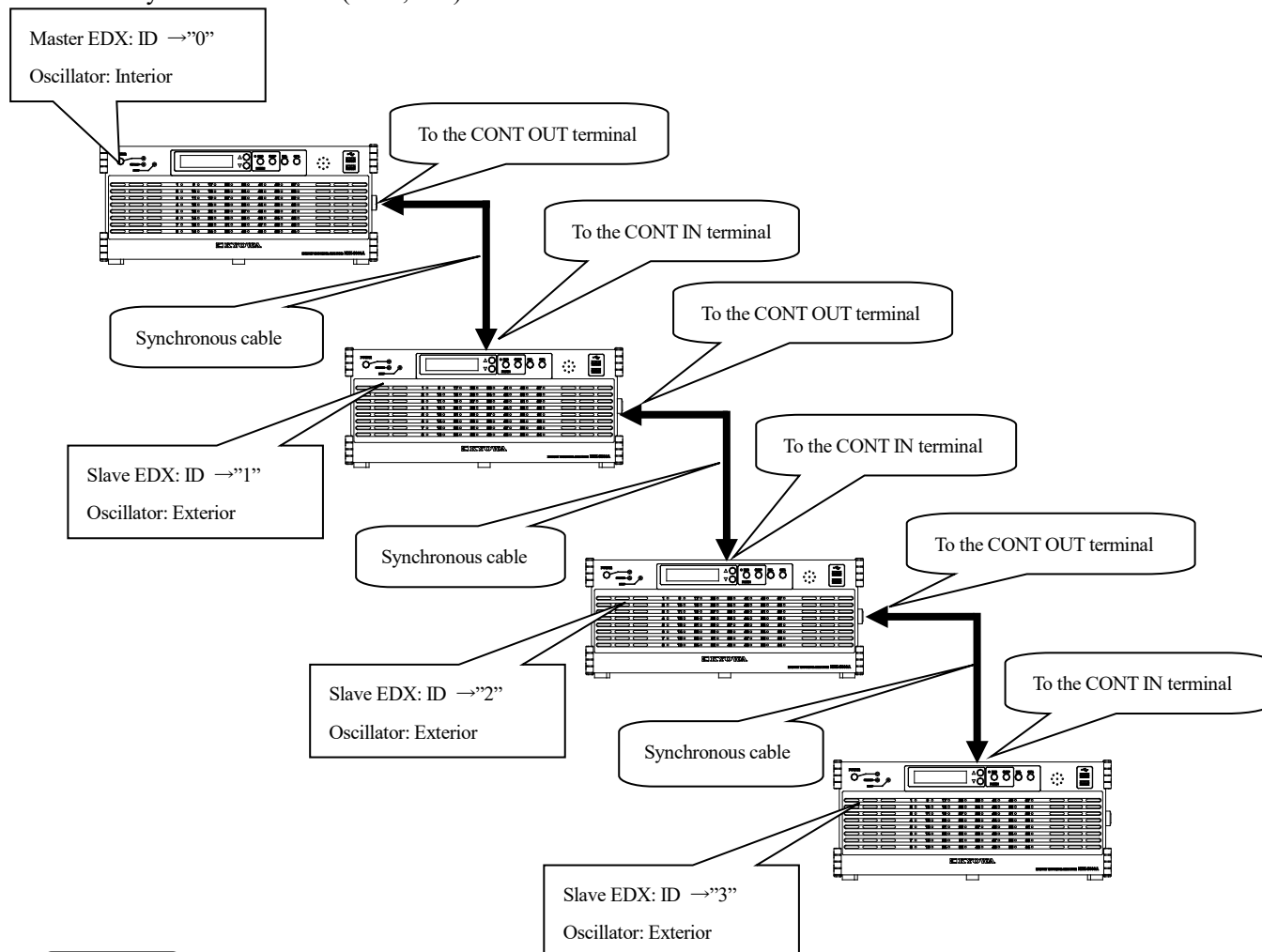
Note that the t_1 and t_2 vary with the setting value of the trigger delay amount, recording data size and CPU usage rate in the EDX-3000A-*-DC.

4-3 SYNCHRONOUS OPERATION

The synchronous operation is a function to measure data of multiple EDX-3000A units at the same timing (or at the same sampling clock). If data is measured with the synchronous operation, you can record the measured data up to 640 channels (64 channels/unit and 10 units can be connected). The synchronous operation is valid for recording data more than 64 channels.

1) Connecting the synchronous cables and turning ON/OFF the EDX-3000A

For synchronous operating the multiple EDX-3000A units, connect the EDX-3000A units as follows with the attached synchronous cables (N-95, 2 m).



NOTE

Precautions when turning ON and OFF the EDX-3000A

For synchronous operating the multiple EDX-3000A units, turn ON/OFF the EDX-3000A as follows.

For turning ON the power, turn ON the EDX-3000A from the unit having the large ID No. to small ID No. (turn On the master EDX-3000A [ID No. 0] at last). In the following figure, turn ON the power as follows.

Slave EDX-3000A (ID No. 3) → Slave EDX-3000A (ID No. 2) → Slave EDX-3000A (ID No. 1) → Master EDX-3000A (ID No. 0)

For turning OFF the power, turn OFF the EDX-3000A from the unit having the small ID No. to large ID No. (turn On the master EDX-3000A [ID No. 0] at first). In the following figure, turn OFF the power as follows.

Master EDX-3000A (ID No. 0) → Slave EDX-3000A (ID No. 1) → Slave EDX-3000A (ID No. 2) → Slave EDX-3000A (ID No. 3)

2) Setting ID Number

Connect the monitor, key board, and mouse to every EDX-3000A and set the ID settings on the **Set Environment** dialog box. Be sure to set the first EDX-3000A as the “Synchronous master (ID No. 0) and set the remaining EDX-3000A units as the “Slave master (ID No. 1 to 9). Be sure not to set same ID numbers to multiple units. In addition, be sure to allocate serial numbers from 0 as the figure in the previous page.

3) Switching oscillator

Select either Interior or Exterior of the oscillator when using the DPM card (DPM-42B/A (-F), DPM-42B-I (-F)).

Connect the monitor, key board, and mouse to every EDX-3000A, click the **Environment...** - **Configuration** tab – **Switchover Oscillator** and select either Interior or Exterior. For the master EDX-3000A, select the **Interior** and for the all slave EDX-3000A units, select the **Exterior**.

4) Setting CH conditions

Connect the monitor, key board, and mouse to every EDX-3000A and set the CH conditions of every EDX-3000A. For the settings of the CH conditions, refer to the Instruction Manual of the EDX-3000A Control Software.

5) Setting measuring conditions

Set the measuring conditions on the master EDX-3000A (ID No. 0). For the settings of the measuring conditions, refer to the Instruction Manual of the EDX-3000A Control Software.

MEMO

Precautions when setting the conditions of the synchronous operation

- 1) The number of connecting available EDX-3000A units in synchronous operation is 10 (master unit: 1, slave units: 9).
- 2) When synchronous operating the multiple EDX-3000A units, the recording available conditions are decided with the setting conditions of all EDX-3000A units that are connected with the synchronous cables.
The following two points require special care.
 - i .You cannot set the sampling frequency less than 100 Hz when using conditioner cards with antialiasing filter and when low pass filter is set to **AUTO**. For setting the sampling frequency less than 100 Hz, set the low pass filter other than **AUTO**.
 - ii .The sampling frequency is MAX. 10 kHz when any check mark is put on the **Measurement ON/OFF** column of the Set CAN Condition... dialog box.
For setting the sampling frequency 10 kHz or more, click the **Set – Set CAN Condition... - CAN-ID** tab and release all check marks on the **Measurement ON/OFF** column
- 3) You can set the trigger and interval measurement settings with the master EDX-3000A (ID No. 0) only. The trigger and interval measurement settings cannot be set with the slave EDX-3000A units.
- 4) The sampling clock is supplied from the master EDX-3000A to the slave EDX-3000A.
- 5) Be sure to set the **Oscillator switching** of the master EDX-3000A to **Interior** and that of the slave EDX-3000A units to **Exterior** when synchronous operating the EDX-3000A units with synchronous cables (N-95). In this case, carrier wave signal for the DPM-42B/A(-F), DPM-42B-I(-F) is supplied from the master EDX-3000A to the slave EDX-3000A units.

NOTE

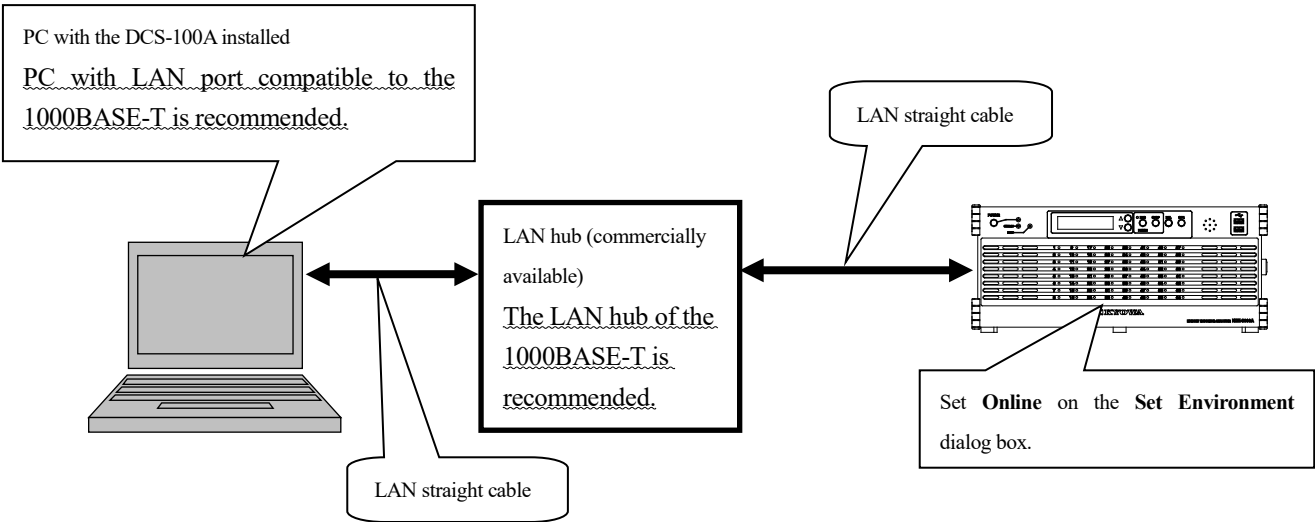
Do not turn OFF any of the EDX-3000A that is connected with the synchronous cable when synchronous operating the EDX-3000A units. Or, the data cannot be recorded correctly.

4-4 ONLINE CONTROL

Online control is a function for controlling the EDX-3000A from the control software DCS-100A that is installed in the external PC via the LAN interface.

Connection diagram is shown as follows.

Online control, stand alone type (EDX-3000A: 1)

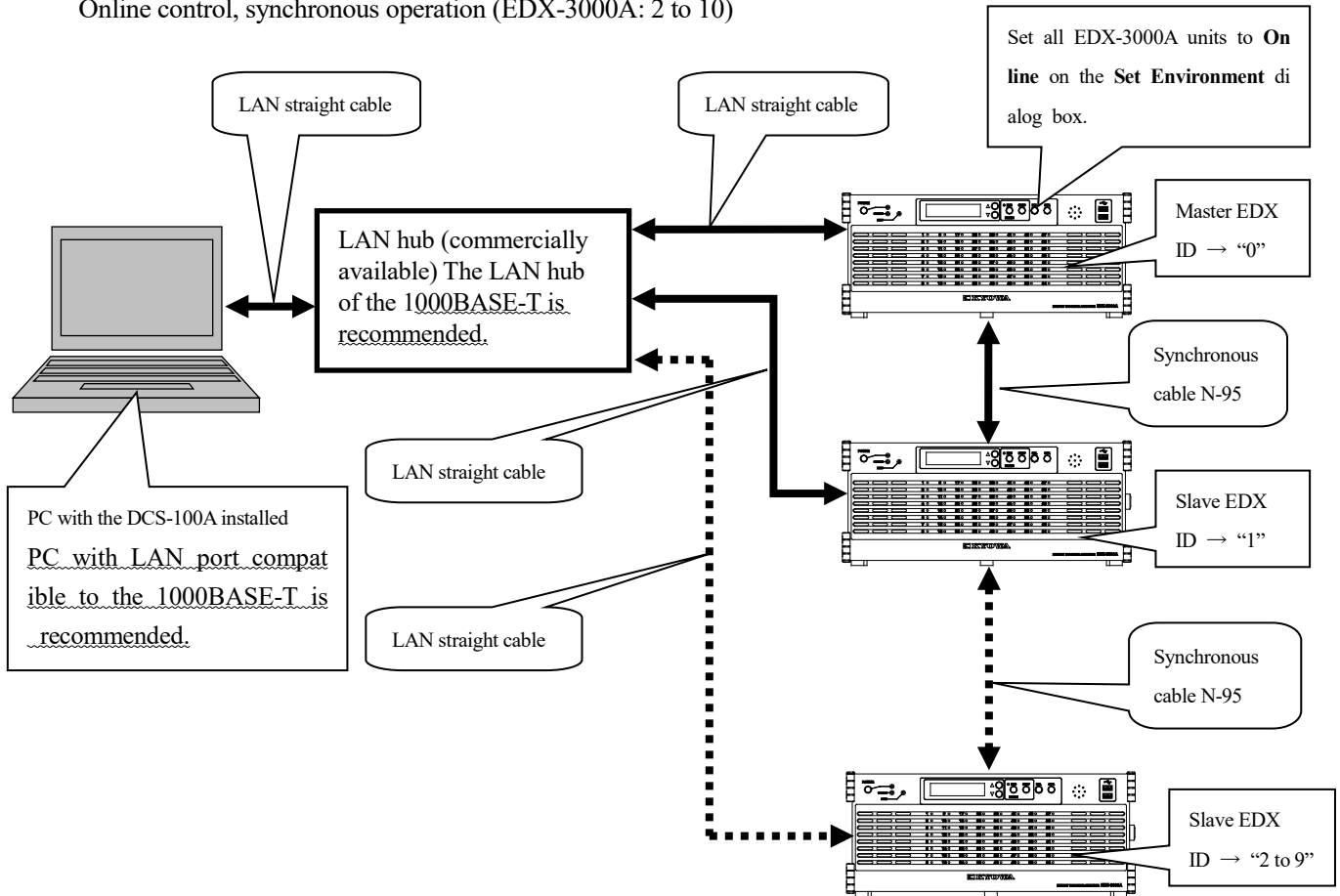


NOTE

- Use a LAN port, LAN hub, and LAN cable of the PC compatible to 1000BASE-T or higher.
- Do not use wireless LAN. Or, communication error may occur.

Connection diagram is shown as follows.

Online control, synchronous operation (EDX-3000A: 2 to 10)



NOTE

Precautions when turning ON and OFF the EDX-3000A

For synchronous operating the multiple EDX-3000A units, turn ON/OFF the EDX-3000A as follows.

For turning ON the power, turn ON the EDX-3000A from the unit having the large ID No. to small ID No. (turn On the master EDX-3000A [ID No. 0] at last). In the following figure, turn ON the power as follows.

Slave EDX-3000A (ID No. 9 to 2) → Slave EDX-3000A (ID No. 1) → Master EDX-3000A (ID No. 0)

For turning OFF the power, turn OFF the EDX-3000A from the unit having the small ID No. to large ID No. (turn On the master EDX-3000A [ID No. 0] at first). In the following figure, turn OFF the power as follows.

Master EDX-3000A (ID No. 0) → Slave EDX-3000A (ID No. 1) → Slave EDX-3000A (ID No. 2 to 9)

NOTE

For using the DPM card (DPM-42B/A (-F), DPM-42B-I (-F)).

Be sure to set the **Oscillator switching** of the master EDX-3000A to **Interior** and that of the slave EDX-3000A units to **Exterior** when synchronous operating the EDX-3000A units with synchronous cables (N-95). In this case, carrier wave signal for the DPM-42B/A (-F), DPM-42B-I (-F)) is supplied from the master EDX-3000A to the slave EDX-3000A units.

4-5 TURNING OFF THE EDX-3000A-*-DC

After the measurement, press the POWER switch of the EDX-3000A-*-DC for 2 seconds for turning OFF the EDX-3000A-*-DC .The EDX-3000A-*-DC automatically shuts off.

After the shutdown finishes, turn OFF (“○”) the MAIN POWER switch on the rear panel.

NOTE

Do not disconnect the power plug from the power outlet or do not turn OFF the MAIN POWER switch on the rear panel during shutdown. Failure to observe these precautions may destroy the internal hard disk and prevent the EDX-3000A-*-DC from starting again.

MEMO

After the shutdown finishes, keep the MAIN POWER switch ON to recharge the internal battery.

(At this time, the CHARGE LED is lighting in green.)

The charging is automatically finished after fully charged.

(At this time, the CHARGE LED is flashing every 10 seconds.)

5. FOR BUILT-IN BATTERY AGAINST INSTANTANEOUS POWER FAILURE

The EDX-3000A-*-DC has a built-in battery (NI-MH) against instantaneous power failure. When the power cable is accidentally disconnected from the EDX-3000A-*-DC or when the power supply suddenly cut off,

- 1) The buzzer is produced and the CHARGE LED lights up alternately in red and orange.
- 2) If the built-in battery is fully charged, it will supply power for approximately three minutes.

After three minutes, the internal information data and the measured data are also saved, the control software and the Windows will automatically shut down.

If the power is returned within three minutes, items 1) and 2) are automatically cancelled.

NOTE

Noise may be generated on the conditioner's waveform (measured data) according to the occurrence frequency of the instantaneous power failure, variable value of the dropped voltage at the instantaneous power failure, and a period of time when the electricity supply is interrupted if the instantaneous power failure occurred during monitoring or recording.

Before using the built-in battery against instantaneous power failure, fully charge it.

For details of charging, see "5-1 HOW TO CHARGE."

NOTE

The EDX-30000A-*-DC has an built-in battery that maintains operation in the event of a momentary power loss. However, the built-in battery is provided for supplemental purposes only. The power supply to the main unit may be lost in less than 3 minutes if the built-in battery becomes old or is not fully charged. Therefore, avoid using the EDX-3000A-*-DC under conditions in which the power supply may be lost at any time. Contact KYOWA or our representatives when the built-in battery expired. The built-in battery's expiration date is indicated at the rear of the EDX-30000A-*-DC.

5-1 HOW TO CHARGE

The built-in battery is automatically charged with the following status.

- a) The power cable is connected to the DC power source and the power is supplied to the EDX-3000A-*-DC.
- b) The MAIN POWER switch on the rear panel is ON (“|”).

When the EDX-3000A-*-DC is in the state a) or b) even if it is turned OFF, the built-in battery is automatically charged and the CHARGE LED lights up in green. In addition, the charging is automatically finished after fully charged and the CHARGE LED flashes green.

The charging time varies depending on the remaining the built-in battery level. It takes approx. 15 hours to fully charge when the remaining the built-in battery level is “0.”

MEMO

- For the flashing of the CHARGE LED

After fully charging the built-in battery, the CHARGE LED instantaneously flashes (hereinafter referred to as the flashing) green for 0.1 second every 10 seconds.

NOTE

Charge the built-in battery within a temperature range of 0 to 30°C. Or, it may not fully charge.

5-2 AUTOMATIC WARM-UP FUNCTION FOR BATTERY

The built-in battery provides an automatic warm-up heater. At low temperature, built-in battery capacity decreases and discharging characteristics become worse. The warm-up heater is for improving the above phenomenon. The heater automatically turns ON to warm up the built-in battery when the temperature of the built-in battery drops below approx. 15°C. The warm-up time is approx. 1 hour when the temperature of the built-in battery is approx. 0°C.

NOTE

The power consumption increases approx. 10 W when using the heater.

5-3 STORING PRECAUTIONS

Fully charge the built-in battery and turn OFF (“○”) the MAIN POWER switch of the EDX-3000A-*-DC before storing it for a while. If you store the built-in battery with small remaining capacity, the storage can accelerate built-in battery self-discharge and lead to the overdischarging. The built-in battery can no longer be charged if it has been over discharged. Be sure to fully charge the built-in battery every 5 months. The built-in battery has to be replaced at KYOWA if it has been over discharged.

MEMO

The self-discharge rate and deterioration rate of the built-in battery are closely related to the storage temperature. It is recommended to store the built-in battery at 25°C or lower temperature.

6. REMOTE CONTROL UNIT

Parts names and functions of the remote control unit: RCU-42A are described below.

A: REC/PAUSE switch	Operates similarly to the REC/PAUSE switch on the front of the EDX-3000A-*-DC. Pressing this switch while recording pauses the recording, and pressing the switch while the system is paused starts recording data. Data obtained while the system is paused is saved in memory. To stop recording, press the STOP switch.	
B: STOP switch	Operates similarly to the STOP switch on the front of the EDX-3000A-*-DC. Pressing the STOP switch while recording or pausing saves the recorded data and proceeds to the monitoring mode.	
C: BAL. switch	Operates similarly to the BAL. switch on the front of the EDX-3000A-*-DC. Press the BAL. switch for 1 second during monitoring to start the balancing operation.	
D: OPT. switch	Operates similarly to the OPT. switch on the front of the EDX-3000A-*-DC. The function of the OPT. switch can be set with the Control Software of the EDX-3000A-*-DC.	
E: VOICE MEMO switch	Pressing this switch lets you record voice memo. (See “6-1 RECORDING VOICE MEMO.”)	
F: REC/PAUSE LED	<u>You can record the voice during pressing the “VOICE MEMO” switch.</u> This LED indicates the state of data recording. While recording data (REC): The LED lights up in red. While recording the VOICE MEMO: The LED lights up in red. Pausing: Blinks in red rapidly. Monitoring: Blinks in red slowly. Other than above: The LED is OFF.	
G: BAL. LED	This LED indicates the balancing operation. Balancing: The LED lights up in orange. Other than above: The LED is OFF.	
H: MIC	An internal microphone is provided. During voice recording, maintain a distance of approximately 10 cm from the microphone.	
I: Connector	Connect the connector to the CONT IN connector located at the rear of the main EDX-3000A-*-DC unit.	

NOTE

Always turn OFF the EDX-3000A-*-DC before connecting the remote control unit RCU-42A.

MEMO

The remote controller incorporates a buzzer which emits same alarm of the EDX-3000A-*-DC.
You can hear the alarm from the remote controller even if it is difficult to hear from the EDX-3000A-*-DC.
For details of the alarm, refer to the Instruction Manual for software.

6-1 RECORDING VOICE MEMO

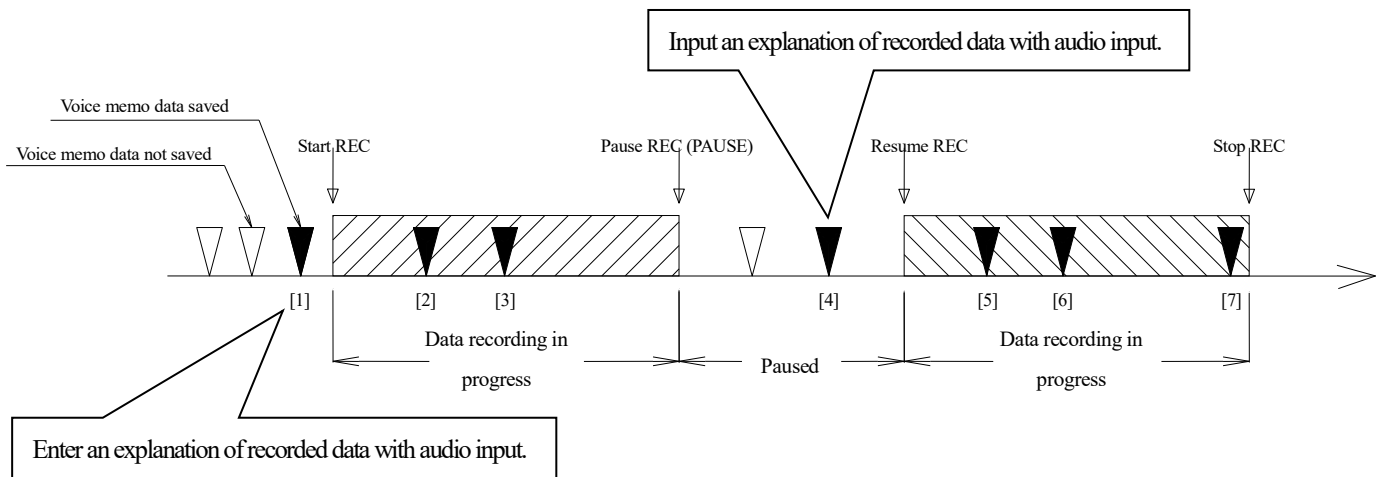
Voice memo can be recorded using the optional remote control unit (RCU-42A).

Voice memo can be recorded while recording data (REC), before starting data recording or while pausing data recording.

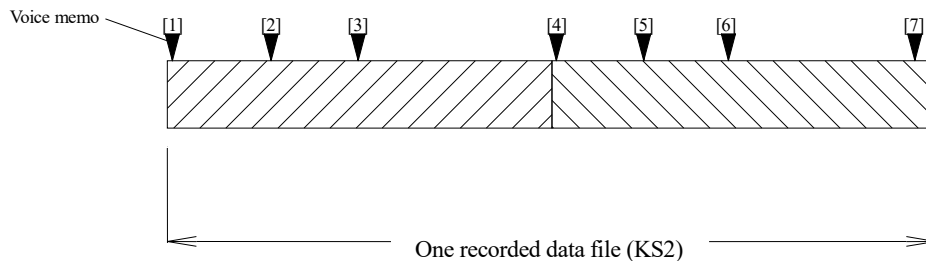
- During recording: Voice memo is recorded while the VOICE MEMO switch is being pressed.
- Before starting data recording: Voice memos is recorded while the VOICE MEMO switch is being pressed, but only the voice memo recorded immediately before starting data recording is saved in the data file.

Triangular marks ▽ and ▼ parts in the figure below indicate a point when voice memos are recorded. As shown in the figure, voice memos recorded during data recording are saved into a data file (marked with ▼), but among voice memos recorded when data recording is not in progress, only those immediately before a data recording are saved into the data file. (Voice memos marked with ▽ are not saved in the data file.)

By using this function, at items [1] and [4] in the following figure, an “explanation” (e.g. purpose, conditions, etc.) of the data to be recorded can be saved as voice memo (instead of entering detailed memo of the recorded data file from the keyboard).



If data and voice memos are recorded as shown above, the data file (KS2 file) will be as shown below.



Voice memo can be recorded up to either of the following:

- 1) Total recording time of 1048 seconds (approx. 17 minutes), or
- 2) Total recording times of 255 times

The EDX-3000A can record voice memo up to satisfying the either 1) or 2).

NOTE

Data recording (REC) does not start by pressing the VOICE MEMO switch.

7. TROUBLESHOOTING

If the EDX-3000A-*-DC does not operate as expected or in a stable manner, examine the facts that may be causing such a condition before concluding that the system has failed. Items to be checked and countermeasures for various symptoms are described below. If the problem still occurs even after corrective action is taken, contact KYOWA or our representatives.

If the system is damaged due to a cause other than as specified in this Instruction Manual, or if the user has disassembled or modified the system, KYOWA ELECTRONIC INSTRUMENTS may not be able to offer repair service.

7-1 TROUBLESHOOTING FOR THE EDX-3000A-*-DC

Symptom	Check item and/or countermeasures
Power is not supplied to the main unit. The POWER LED does not light up.	• Does the DC power source have the specified voltage? Check the voltage using a tester or the like. See “3-2 CONNECTING THE POWER SUPPLIES.” • Is the power cord securely connected? • Is the MAIN POWER switch on the rear panel ON ?
A balance cannot be achieved even if the BAL. switch is pressed.	• Are all balance target channels turned OFF in the channel condition? Set the target channel with the Control Software.
The CHARGE LED does not light up.	• Charging completed. Is the CHARGE LED flashing? See “5 FOR INTERNAL BATTERY AGAINST INSTANTANEOUS POWER FAILURE.” • Is the MAIN POWER switch on the rear panel ON? • The built-in battery might be dead or failure. Contact KYOWA or our representatives.
The CH LED does not light up.	• Is the conditioner card correctly inserted? • Is not available card mounted to the EDX-3000A-*-DC. Only 1 CAN card can be mounted to the last slot. • Are all measurement ON/OFF channels turned OFF in the channel condition? Set the CH condition with the control software.
Though the POWER LED lights up correctly after turning ON the power, the external display does not work.	• Is the power of the display ON? • Turn OFF the EDX-3000A-*-DC and release all connecting items when interfaces (LAN, USB, keyboard, mouse) of the EDX-3000A-*-DC are connected and turn ON the power again. The EDX-3000A-*-DC may failure if the external display still does not work. Contact KYOWA or our representatives. • Check that the VGA cable is correctly connected.
When playing the recorded VOICE MEMO, the beginning part of the voice memo cannot be heard.	• Capable of recording voice during pressing the VOICE MEMO switch. Check that you are pressing the VOICE MEMO switch and input voice. See “6-1 RECORDING VOICE MEMO.”

7-2 TROUBLESHOOTING FOR STRAIN/VOLTAGE MEASUREMENT CARD CDV-40B

Symptom	Check item and/or countermeasures
The CH LED does not light up even if the card is installed.	- Refer to “The CH LED does not light up.” in “TROUBLESHOOTING FOR THE EDX-3000A-*-DC.” - Pull out the conditioner card and check for any bent connector pins located on the other side of the panel. If the connector pins are bent, correct the problem and install the card, then confirm that the card type is displayed. If the same display still appears even after the problem is remedied, contact KYOWA or our representatives for service.
A balance cannot be achieved.	Is OFF selected for the BAL item in the conditioner settings? If “OK” doesn’t appear even if “ON” is selected, it is suspected that there is a sensor that is not connected to the input, there is a sensor error or the sensor input is unstable.
Excessive noise is present in the waveform display.	- Is the GND terminal of the EDX-3000A-*-DC grounded? - When using the strain gage, noise may be reduced by connecting the GND terminal of the EDX-3000A-*-DC and the test specimen to which the strain gage is attached. See “3-3 CONNECTING SENSOR.” - Is there an inverter motor, machining equipment, welder or AC power supply for power systems placed near the input cable for the EDX-3000A-*-DC? If so, move the input cable apart from the power source. - Set low pass filter to reduce noise. Set cutoff frequency of the low pass filter to about 2 to 5 times the frequency of the input signal. (Example: If the input is DC to 100 Hz, select a cutoff frequency of 300 Hz.) If input signals change abruptly, set the parameter to about 10 times the frequency of the input signal.

7-3 TROUBLESHOOTING FOR DYNAMIC STRAIN MEASUREMENT CARD DPM-42B/A (-F), DPM-42B-I (-F)

Symptom	Check item and/or countermeasures
“NG” appears on the Result of Comp IntSense dialog box.	· Is a sensor connected correctly? Is there a sensor error? In addition, is bridge resistance of the sensor within 120 to 1000 ohm? · Are Interior/Exterior of Switchover Oscillator correctly set? - Standalone (EDX-3000A: 1) Set oscillator to Interior. - Online (EDX-3000A: 1) Set oscillator to Interior. - Synchronous master Set oscillator to Interior. - Synchronous slave Set oscillator to Exterior. - Online and synchronous master Set oscillator to Interior. - Online and synchronous slave Set oscillator to Exterior. · Did you turn ON/OFF the EDX-3000A units in the correct order when synchronous operating them? Turn OFF the all EDX-3000A units, wait approx. 2 hours and turn ON the power again by referring to “4-3 SYNCHRONOUS OPERATION” and “4-4 ONLINE CONTROL.” · If the same display still appears even after the problem is remedied, contact KYOWA or our representatives for service.
A balance cannot be achieved.	· Is OFF selected for the BAL item in the conditioner settings? If “OK” doesn’t appear even if “ON” is selected, it is suspected that there is a sensor that is not connected to the input, there is a sensor error or the sensor input is unstable. · Are Interior/Exterior of Switchover Oscillator correctly set? - Standalone (EDX-3000A: 1) Set oscillator to Interior. - Online (EDX-3000A: 1) Set oscillator to Interior. - Synchronous master Set oscillator to Interior. - Synchronous slave Set oscillator to Exterior. - Online and synchronous master Set oscillator to Interior. - Online and synchronous slave Set oscillator to Exterior. · Did you turn ON/OFF the EDX-3000A units in the correct order when synchronous operating them? Turn OFF the all EDX-3000A units, wait approx. 2 hours and turn ON the power again by referring to “4-3 SYNCHRONOUS OPERATION” and “4-4 ONLINE CONTROL.” · If the same display still appears even after the problem is remedied, contact KYOWA or our representatives for service.

8. MAINTENANCE

8-1 MAINTENANCE DESCRIPTIONS

The following items are provided for scheduled maintenance for the EDX-3000A-*-DC.

Maintenance service is performed at the intervals specified below.

Item	Description	Service intervals
Charging the built-in battery (Ni-MH) during long-term storage	In order to prevent over discharging, fully charge the built-in battery once every 5 months. The built-in battery can no longer be used and have to be replaced at KYOWA if it have been over discharged.	Once every 5 months
Replacement of built-in battery (Ni-MH)	The life of an built-in battery is approximately 2 years. Replace the built-in battery within 2 years or, the built-in battery capacity becomes short. The expiration date is indicated on a label affixed to the rear of the main unit. The built-in battery must be returned to KYOWA for the scheduled inspection.	Once every 2 years
Replacement of Internal Hard Disk (HDD)	The internal hard disk (HDD) is a mechanical part that may be deteriorated due to vibration and impact applied during operation. It is recommended to replace the internal hard disk once every 2 years. The internal hard disk must be returned to KYOWA for replacement.	Once every 2 years
Evaluation of accuracy of the internal conditioner card	An annual inspection is recommended to ensure the accuracy of the internal conditioner card. The conditioner card must be returned to KYOWA for the scheduled inspection.	Once a year
Replacement of fan	The fan is a mechanical part. Replace the fan within 3 years. The fan must be returned to KYOWA for replacement.	Once every 3 years
Replacing coin type lithium battery (CR2032) for memory backup	The CPU board incorporates coin-type lithium battery for memory back up. The battery last at about 3 to 5 years at normal temperature (20 to 30°C). Replace the battery within 5 years. The battery must be returned to KYOWA for replacement.	Once every 5 years

8-2 REPLACING CONDITIONER CARD

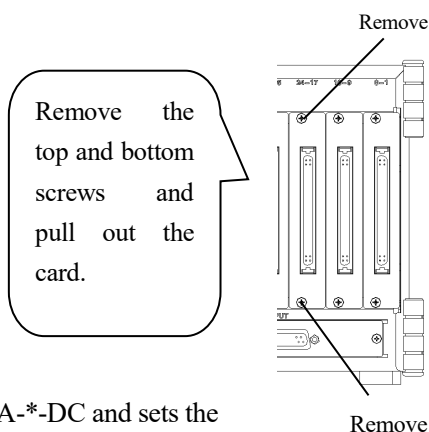
To replace the conditioner, turn OFF the power and take the following steps.

- 1) Remove the screws located at the top and bottom of the conditioner panel.
- 2) Pull the conditioner card outward slowly.
- 3) Slowly push in the new card along the guide rail in the casing, and then tighten the screws at the top and bottom of the conditioner.
- 4) After replacing the conditioner cards, turn ON the EDX-3000A-*-DC and sets the measuring conditions.

The card is correctly replaced when you see the target CH LED applicable to the changed slot is lightning.

The CH LED is OFF even after setting the measuring conditions when the EDX-3000A-*-DC is not operate correctly.

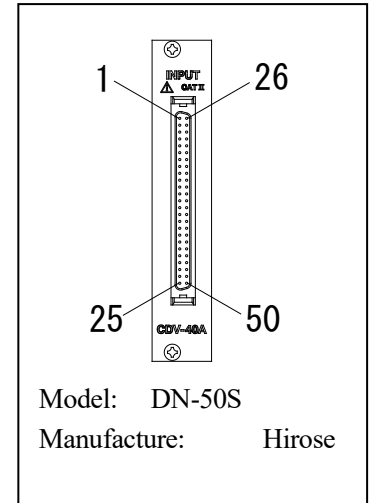
At this time, remove the card and reinsert the conditioner card once again.



9. CONNECTOR PIN ASSIGNMENT OF CDV-40B

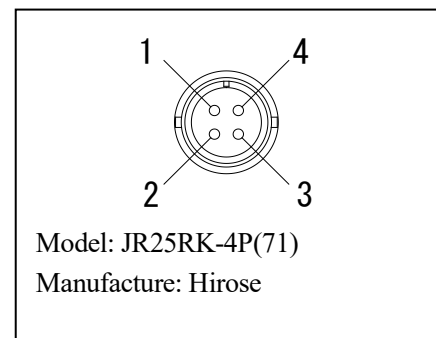
9-1 CDV-40B CENTRALIZED CONNECTOR

Pin No.	CH	Name	Pin No.	CH	Name
1	1	+BV	26	1	− IN
2		−BV	27		+IN
3		COM	28		ID
4	2	+BV	29	2	− IN
5		−BV	30		+IN
6		COM	31		ID
7	3	+BV	32	3	− IN
8		−BV	33		+IN
9		COM	34		ID
10	4	+BV	35	4	− IN
11		−BV	36		+IN
12		COM	37		ID
13	5	+BV	38	5	− IN
14		−BV	39		+IN
15		COM	40		ID
16	6	+BV	41	6	− IN
17		−BV	42		+IN
18		COM	43		ID
19	7	+BV	44	7	− IN
20		−BV	45		+IN
21		COM	46		ID
22	8	+BV	47	8	− IN
23		−BV	48		+IN
24		COM	49		ID
25	-	Shield	50	-	Shield



9-2 DC POWER SOURCE CONNECTOR

Pin No	Name
1	Positive (+) side
2	Positive (+) side
3	Negative (-) side
4	Negative (-) side



NOTE

The negative (-) side of the DC power source connector is insulated from the chassis (GND terminal) of the EDX-3000A-*-DC.

Refer to “3-2 CONNECTING THE POWER SUPPLY.”

10. HARDWARE SPECIFICATIONS

10-1 OVERALL SPECIFICATIONS

1) Models

Model	Storage device (Internal disk)	Language
EDX-3000A-H-DC	HDD	Japanese
EDX-3000A-HE-DC	HDD	English
EDX-3000A-S-DC	SSD	Japanese
EDX-3000A-SE-DC	SSD	English

[Note] HDD: Hard Disk Drive SSD: Solid State Drive

2) Conditioner cards

Strain/voltage/acceleration measurement card: CVM-40A, CVM-41A
 Strain/voltage measurement card: CDV-40B/A, CDV-40B/A-F
 Dynamic strain measurement card: DPM-42B/A, DPM-42B/A-F
 DPM-42B-I, DPM-42B-I-D
 Thermocouple card: CTA-40A
 F/V converter card: CFV-40A
 Charge amplifier card: CCA-40A, CCA-40A-F
 Strain/voltage measurement insulation card: CDV-44AS
 Direct rated current expansion card (120 ohm): CDA-44AS
 Direct rated current expansion card (360 ohm): CDA-45AS
 A/D converter card: AD-40AS, AD-40AS-F
 CAN card (1 port, maximum 128 channels): CAN-40A
 CAN card (2 port, maximum 256 channels): CAN-41A
 [Note] Can mount one CAN-40A or CAN-41A to the final slot.

3) Input channels

4) Analog input

5) Digital input

6) Voice input

Max. 64 (CDV-40B × 8)
 See specs of respective conditioner cards for details.
 32 bits (TTL level, contact input)
 1 channel
 (voice memo entered during recording can be saved with measurement data)

7) Sampling frequency

Sampling system Simultaneous sampling of all channels
 A/D data format: 16 bits
 Sampling frequency
 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 data processing or CAN data measurement
 A/D data format: 24 bits
 Sampling frequency
 1 Hz to 200 kHz for up to 16-channel data acquisition
 1 Hz to 100 kHz for up to 32-channel data acquisition
 1 Hz to 50 kHz for up to 64-channel data acquisition
 1 Hz to 10 kHz for real-time data processing or CAN data measurement

8) Storage device

Hard Disk Drive (HDD) Capacity: 100 Gbytes or more
 Solid State Drive (SSD) Capacity: 30 Gbytes or more

9) Display

Channel status LED
 (OVER value can be specified for each channel)
 REC/PAUSE LED
 LCD for various status display (20 char. × 2 lines)

10) Operation keys

11) External control connectors

12) External I/O connectors

Front mounted REC, STOP, BAL., OPT.
 CONT IN, CONT OUT (remote control, synchronous operation)
 External trigger TRG IN, TRG OUT
 External clock CLK IN, CLK OUT
 (output at any frequency division ratio)
 Operation status output READY

13) 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
14) Power supply	19 to 32 VDC Built-in battery for instantaneous power failure
15) Current consumption	8.0 A (For 24 VDC, CDV-40A/B × 8)
16) Operating temperature and humidity ranges	0 to 40°C, 20 to 80%RH (noncondensing)
17) Storage temperature range	-20°C to 60°C
18) Vibration resistance	EDX-3000A-H (E)-DC, EDX-3000A-S (E)-DC 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 (E)-DC 9.8 m/s ² (1 G), 10 to 200 Hz (when operating) EDX-3000A-S (E)-DC 19.6 m/s ² (2 G), 10 to 200 Hz (when operating)
19) Shock resistance	196.1 m/s ² (20 G)/11 msec
20) Dimensions	440 (W) × 186 (H) × 341 (D) (excluding LCD and protrusions)
21) Weight	EDX-3000A: Approx. 13.8 kg Approx. 15.4 kg (CDV-40B × 8)

10-2 INTERNAL CONDITIONER SPECIFICATIONS

Strain/voltage measuring card: CDV-40B, CDV-40B-F

Item	Strain	Item
Number of input channels	8 (centralized connector)	
Input type	Balanced differential input	Unbalance input
Input resistance	Approx. (10 Mohm+10 Mohm)	Approx. 1 Mohm
Coupling	DC/AC (DC cut)	
Applicable gage factor	2.00	—
Bridge Excitation	2.00 VDC $\pm$ 2% (120 ohm to 1 Kohm)	—
Balance range	Resistance $\pm$ 2.4% ($\pm$ 12000 μ m/m)	—
Measuring range	8 steps of 500 , 1 k, 2 k, 5 k, 10 k, 20 k, 50 k μ m/m and OFF	8 steps of 0.1 , 0.2 , 0.5 , 1 , 2 , 5, 10 V and OFF
Frequency response range	DC coupling AC coupling (DC cut)	DC to 50 kHz, +1 dB and –3 dB deviations 0.2 or 1 Hz to 50 kHz (see the high-pass filter)
Low pass filter	Transfer characteristics Cutoff frequency: Amplitude ratio at cutoff point Attenuation	2nd order Butterworth 8 steps of 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz and F (Flat) -3 dB $\pm$ 1 dB -12 dB/oct. $\pm$ 1 dB/oct.
Antialiasing Filter (CDV-40B-F only)	8th order Butterworth Cutoff frequency: Automatically set at sampling frequency $\times$ 0.25 Attenuation: -48 dB $\pm$ 5 dB (with sampling frequency $\times$ 0.5) *With low-pass filter set to [AUTO] on the mainframe	
High pass filter (DC cut)	Cutoff frequency Attenuation	0.2 Hz and 1 Hz -6 dB/oct.
Resousion	16 bits	
TEDS function	Reading information from TEDS-installed sensor	

10-3 REMOTE CONTROL UNIT SPECIFICATIONS

- | | |
|----------------------|---|
| 1) Model | RCU-42A |
| 2) Control functions | 1.“REC”: Start data recording.
2.“PAUSE”: Pause data recording.
3.“STOP”: Stop data recording.
4.“BAL.”: Conduct balance adjustment.
5.“OPT.”: Arbitrary function
Arbitrary assign functions such as “Start monitoring”, “Input CAL”, etc. with the EDX-3000A Control Software.
6.“VOICE MEMO”: Used for recording voice. |
| 3) Display | The LED display allows the user to distinguish whether the data recording is in progress, data recording is paused, voice is being recorded or data recording has been stopped.
Indicates balance adjusting LED. |
| 4) Alarm | Same with the EDX-3000A-*-DC |
| 5) Cable length | Approx. 1.5 m |
| 6) Dimensions | 35 (W) $\times$ 125 (H) $\times$ 22 (D) [mm]
[Note] Not including protrusions. |
| 7) Weight | Approx. 220 g |

11. SOFTWARE SPECIFICATIONS

11-1 MEASURING CONDITIONS

1) Channel conditions	Measuring ON/OFF, measuring mode, 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, display digit (any display items can be selected)																								
2) Number of recordable data items	Up to remaining disk space of built-in memory: (sampling frequency 1 to 10 kHz) A/D data format: 16 bits 2 to 2,000,000,000 data items: (sampling frequency 10,001 Hz to 200 kHz) A/D data format: 24 bits 2 to 1,000,000,000 data items: (sampling frequency 10,001 Hz to 200 kHz)																								
3) Manual measurement	Recording from REC to STOP, or preset number of data from REC																								
4) Interval measurement	Automatic recording according to the preset starting time and recording interval																								
5) Trigger measurement	Recording starts and stops according to the preset trigger conditions. • Common trigger conditions <table> <tr> <td>End trigger</td><td>Settable</td></tr> <tr> <td>Delay:</td><td>A/D data format: 16 bits MAX 4,194,304 data/channel for both start and end A/D data format: 24 bits MAX 2,097,152 data/channel for both start and end</td></tr> </table> *Delay amount depends on the sampling frequency and number of measuring channels. • Analog trigger conditions <table> <tr> <td>Trigger channel</td><td>Any 1 channel</td></tr> <tr> <td>Trigger level</td><td>An engineering value</td></tr> <tr> <td>Trigger slope</td><td>Up/Down</td></tr> </table> • Digital trigger conditions <table> <tr> <td>Trigger bit</td><td>Any 1 bit</td></tr> <tr> <td>Trigger level</td><td>0 or 1</td></tr> </table> • External trigger conditions <table> <tr> <td>Trigger slope</td><td>Up/Down</td></tr> </table> • Complex trigger conditions <table> <tr> <td>Trigger source</td><td>Any 4 analog/digital channels, an external trigger channel, or a manual trigger channel</td></tr> <tr> <td>AND/OR</td><td>AND/OR can be used for analog trigger, digital trigger and external trigger.</td></tr> <tr> <td>Trigger level</td><td>An engineering value is set for the analog channel, and 0 or 1 for the digital channel.</td></tr> <tr> <td>Trigger slope</td><td>Up/Down</td></tr> </table>	End trigger	Settable	Delay:	A/D data format: 16 bits MAX 4,194,304 data/channel for both start and end A/D data format: 24 bits MAX 2,097,152 data/channel for both start and end	Trigger channel	Any 1 channel	Trigger level	An engineering value	Trigger slope	Up/Down	Trigger bit	Any 1 bit	Trigger level	0 or 1	Trigger slope	Up/Down	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
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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																								
6) TEDS information	TEDS information is read and channel conditions are set according to the read conditions automatically.																								

11-2 MEASURING OPERATION

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

11-2-1 Real-Time Processing

Monitoring and recording of data can be done simultaneously.

The sampling frequency up to 10 kHz is available.

1) Moving image data acquisition with Web camera

Camera	DirectX compatible Web camera (recognized by the OS as an image device)
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Number of cameras	1
-------------------	---

Resolution	MAX. 640×480
------------	-----------------------

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

Measuring mode	Manual, Manual (Set Record Data)
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2) Arithmetic Processing

High-pass/low-pass filter

Cut off frequency	One-half of the sampling frequency or less
-------------------	--

Order	2th to 4th
-------	------------

Differential/integration

Times	1 or 2
-------	--------

Moving average

The number of data 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, arc sine, 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

Measurement mode	Manual mode, Manual mode (Set Record Data), Interval mode
------------------	---

3) FFT analysis

Analysis Type	Linear spectrum, power spectrum, cross spectrum, auto-correlation, cross-correlation
---------------	---

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

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

Number of analysis windows	MAX. 8
----------------------------	--------

Measuring conditions

Measurement modes	Manual mode, Manual mode (Set Record Data), Interval mode, Analog trigger mode
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11-2-2 Saving file formats

KYOWA standard file format (KS2)

KS2 file version: 01.04

11-3 MONITOR

- | | |
|--------------------------------|--|
| 1) 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. |
| 2) Y-Time (DIV) graph | X-axis indicates the time, and Y-axis the physical amount of measurement for a maximum of 16 channels.
Unlike the time-series graph above, the zero point of the channel can be placed at any place on the Y-axis scales. |
| 3) Y-Time (all channels) graph | 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. |
| 4) X-Y graph | Any combination of 8 channels can be plotted on X- and Y-axis. |
| 5) 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 |
| 6) Digital graph | X-axis indicates the time, and Y-axis bit data of a digital channel (up to 16 bits).
1 to 4 graphs can be displayed on a window. |
| 7) Circle meter | Any one channel is displayed in a circle meter. |
| 8) Bar meter | Any one channel is displayed in a horizontal or vertical bar meter. |
| 9) Numeric window | Any one channel, 16 channels or all channels are listed. |
| 10) Display color | Any color can be selected. |
| 11) Title, labels | Any title or X- and Y-axis labels can be specified. |
| 12) No. of windows | 8 numeric windows, 8 graph windows
Numeric windows and graph windows 16 in total. |
| 13) Information | Various information can be appended to the title or status bar. |

11-4 DATA REPRODUCTION

11-4-1 Recorded Data Display

- | | |
|------------------------------|---|
| 1) 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. |
| X-Y graph | 1 to 4 graphs can be displayed on a window.
Any 4 graphs can be plotted on X- and Y-axis. |
| 2) All data display | All data can be displayed on a window at an interval of 4 channels. |
| 3) 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. |
| 4) Cursors | Numeric display of the engineering value of cursor position.
Enlarged display of two cursors
Scroll |
| 5) Header information | Display and editing of titles and channel conditions (calibration coefficient, offset, engineering unit, etc.) |
| 6) KS2 file | MAX./MIN. data display, voice data list and reproduction |
| 7) Moving image reproduction | |
| Reproducible file format | AVI |
| Operations | Play, stop, pause, frame-by-frame forward, frame-by-frame backward, zoom, changing reproduction speed |
| Synchronous display | Playback of moving image data coupled with the cursor for graph waveform. |

11-4-2 Data Analysis

- | | |
|---------------------------|--|
| 1) 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. |
| 2) Arithmetical operation | Internal-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) |

3) FFT Analysis

Analysis type:	Linear spectrum, power spectrum, cross spectrum, auto-correlation, cross-correlation, coherence, transfer function
Window functions:	OFF, hanning, hamming, fejer, blackman, gaussian
Number 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, 2000 Hz and FLAT
No. of integrations	0 to 2
Average No. of times	1 to more (0: Whole waveform)
No. of shifts	2 or more

Analyzed Results

Analysis Type	Y-Time Graph	Analysis Graph 1	Analysis Graph 2
Linear spectrum	●	Amplitude (linear) Amplitude(logarithm)	Phase
Power spectrum	●	Amplitude(linear) Amplitude(logarithm)	
Cross spectrum	●	Amplitude(linear) Amplitude(logarithm)	Phase
Auto-correlation	●	Correlation	
Cross-correlation	●	Correlation	
Coherence	●	Coherence	
Transfer function	●	Amplitude (linear) Amplitude (logarithm)	Phase

Analysis results are saved in CSV files.

4) Histogram analysis

No. of channels	All channels
Algorithm	Peak/valley, maxima/minima, 1-dim rainflow, amplitude, 1-dim time at level, 1-dim rainflow + peak/valley, 1-dim rainflow + maxima/minima, 2-dim 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	Table or drawing display (3D display for 2D rainflow)

5) Filtering

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

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

6) Differentiation/Integration

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

11-4-3 Utility

1) Multiple file conversion

Conversion to CSV, XLS, or RPCIII format

2) File coupling

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

3) Reverse file conversion

Data files converted by this software into CSV format can be converted into KS2 format.

4) Multiple file analysis

Analysis of multiple files under same conditions.

Histogram analysis, filtering and differentiation/integration are available.

5) Other

Overwriting of multiple files

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

11-5 CONFIGURATION

1) Synchronous operation setting

Standalone, synchronous master, synchronism slave

2) Recording setting

Storage of data files

3) Automatic file conversion

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

4) Engineering unit specification

Up to three user specified engineering units can be registered.

5) Other

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

11-6 PRINT

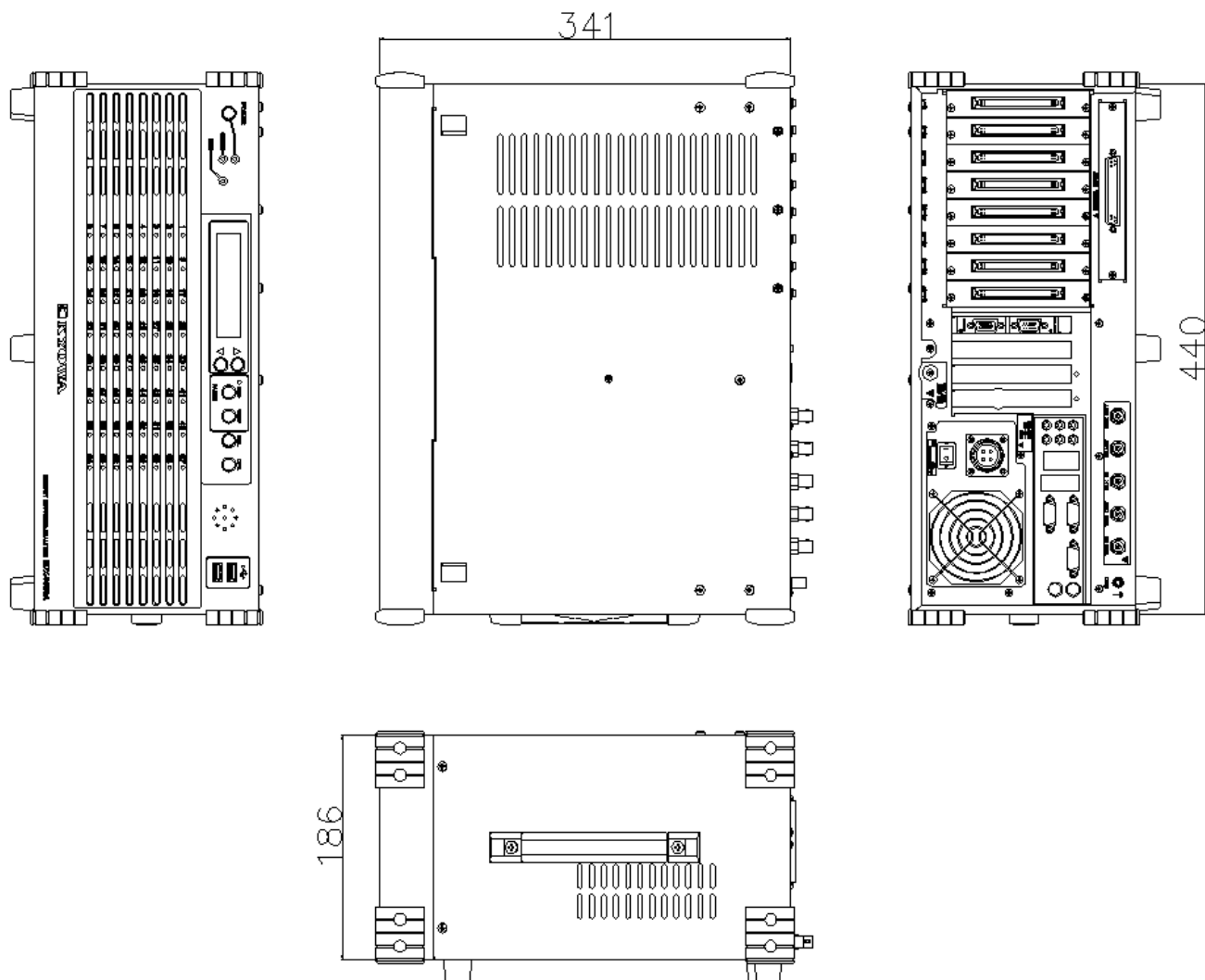
Capable of printing setting conditions, numeric data, and graphs.

(Optional printer driver is required.)

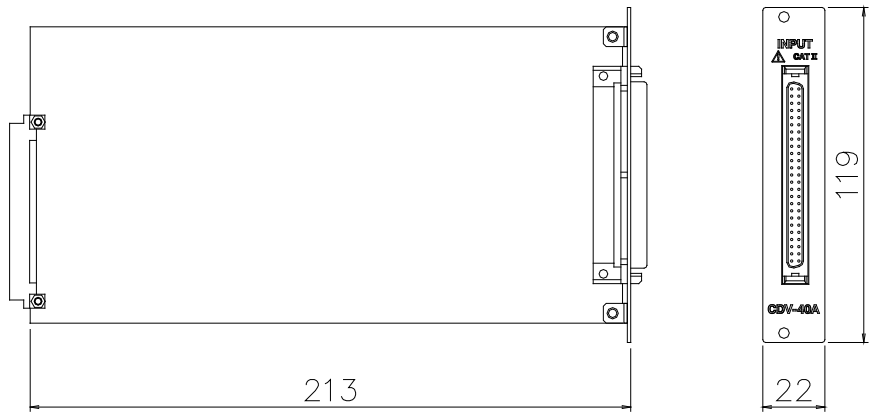
12. EXTERNAL VIEWS

12-1 MEMORY RECORDER/ANALYZER: EDX-3000A-*-DC

(EDX-3000A that is operated with the DC power source)



12-2 STRAIN/VOLTAGE MEASUREMENT CARD: CDV-40B



12-3 REMOTE CONTROL UNIT: RCU-42A

