

INSTRUCTION MANUAL

EDX—5000A

MEMORY RECORDER/ANALYZER

(FOR HARDWARE)

Thank you for purchasing KYOWA's product EDX-5000A 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-5000A. For Software operation, refer to the EDX-5000A Instruction Manual for Main Unit Software and Instruction Manual for EDX-3000B compatible software.

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STANDARD ACCESSORIES

The following accessories are packed with the EDX-5000A. After unpacking, check to be sure that they are included.

AC power cable: P-18	1
DC power cable: P-70	1
3P-2P conversion adapter: CM-331F19	1
Ground wire: P-72	1
AC fuse	1
DC fuse	1
Soldering plug for DIO	1
Shell case for DIO plug	1
Screw for mounting amplifier	16 (64CH) or 20 (80CH)
Accessory bag	1
Instruction Manual	1 (DVD)
Safety Precaution Manual	1
Product Warranty	1

OPTIONAL ACCESSORIES

• Conditioner cards:	Refer to Conditioner cards catalogs.
• Dummy panels:	EDX2000-DUMMY EDX1P-DUMMY
• Remote control unit:	RCU-42A
• Synchronous cable:	N-128 (2 m)
• Belt hook	
• Built-in Battery (Battery for instantaneous power failure)	
• GPS/Multi-channel CAN optional module:	EGPC-50A

SAFETY PRECAUTIONS (Do not forget to read the safety precautions prior to use.)

The EDX-5000A is designed in accordance with “13. HARDWARE SPECIFICATIONS” and “14. SOFTWARE SPECIFICATIONS”.

Do not use the EDX-5000A in an environment exceeding the specifications.

Or, it may result in failure of the EDX-5000A.

PRIOR TO USE

For safe use of the EDX-5000A do not forget to read the "Safety Precautions" prior to use.

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

For safety operation of the EDX-5000A, the following “GND” symbol is used in indicated on the EDX-5000A.

	This symbol indicates the protective ground terminal. Unless it is grounded using a 3-pin AC power cable, be sure to ground the terminal with this symbol on this instrument.
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SAFETY SYMBOLS

For safety operation of the EDX-5000A, the following “WARNING” and “CAUTION” symbols are used in SAFETY PRECAUTIONS of this manual and indicated on the EDX-5000A.

 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 local line voltage is within the range of power supply voltage specified for the EDX-5000A before connecting the instrument to the AC or DC power outlet.
- **Inflammable Environment**
To prevent the risk of fire and explosion, do not operate the EDX-5000A in area exposed to flammable gases, vapors, or dust.
- **Abnormal Condition**
To prevent fire hazards, if smoke is emerging from the EDX-5000A, immediately turn OFF the power switch and disconnect the power cable from the AC power outlet to terminate the system operation.
- **Protective Ground**
Unless the instrument is grounded using a 3-pin power cable, 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.

WARNING

- 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: EGPC-50A (Optional accessories, Optional module for GPS / Multi channel CAN)
Do not input to GPS / CAN port other than CAN data or GPS sensor signal attached to EGPC-50A.
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 in mind 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-5000A 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.

WARNING

- Do not raise the display in an environment subject to vibration.
If you use the display which raised in an environment subject to vibration, the indicator part will move, causing it to collide with people and things, or cause the system failure.
Be sure to flip down the display and use it in a fixed state.
- When using the display cover to protect the display, be sure that the display is in fix and lay-down position.
Do not raise the display when attached by the display cover.
Or, there is a possibility that the paint of the EDX-5000A will peel off.
- Use the EDX-5000A in the specified operating temperature range of 0 to 40 °C.
Use at temperature exceeding the specified range may cause low performance and system failure.
If using under direct sunlight or in a cold place is inevitable, prepare a sunscreen or take proper measures to keep it warm.
- Use the EDX-5000A in the specified operating humidity range of 20 to 80%RH.
Use in a humid place exceeding the specified range or expose to water may cause low performance and system failure.
- About cleaning
When the EDX-5000A is getting dirty, clean it with a dry soft cloth. If dust or the like is adhered inside the main body, clean it with air blow and do not touch the electronic parts.

CAUTION

- Do not use the EDX-5000A immediately after an abrupt change of environment.
Leave the EDX-5000A 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 low performance and system failure.
- Do not use the EDX-5000A where it is subject to significant vibration or impact.
 - The vibration resistance of the EDX-5000A -H(E) and EDX-5000A -S(E) is
 - When in operation: 29.42m/s^2 (3 G), 5 to 55 Hz,
 - When not in operation: 49.03m/s^2 (5 G), 5 to 55 Hz,
 - For the EDX-5000A -H(E) (with HDD)
 - When in operation: 9.8m/s^2 (1 G), 10 to 200 Hz
 - For the EDX-5000A -S(E) (with SSD)
 - When in operation: 19.6m/s^2 (2 G), 10 to 200 Hz
 - The impact resistance of the EDX-5000A-H(E) and EDX-5000A-S(E) is 196.1m/s^2 (20 G) / 11 ms

Use the EDX-5000A 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-5000A on a vibration-isolated platform to reduce the applied vibration and impact. Be sure to use the EDX-5000A-S(E) in an area where continuous vibration and impact occur, in a vehicle, etc., even if the vibration and impact are within the specified range.
- Do not use the EDX-5000A in strong electromagnetic field.
Use the EDX-5000A in an environment where a PC is usable.
Use the EDX-5000A near to telemetry system, microwave oven, electronic furnace or any other equipment which generating strong magnetic field may cause low performance, erroneous operation and system failure.
- Do not use the EDX-5000A under poor condition of power supply.
Operate the EDX-5000A within the range of 100 to 240 VAC (50/60 Hz) with power consumption of 300 VA or less, or the range of 10 to 30 VDC. Use the power supply without experiencing of instantaneous power failure and free from noise for EDX-5000A. Power fluctuations of the power supply to the instrument should not exceed $\pm 10\%$ of the normal voltage.
- Do not use incorrectly rated power cables.
- Do not turn ON the power immediately after turning it OFF.
When the power is turned OFF, do not turn ON the power until the power supply is automatically cut off. In addition, do not cut off the AC power supply or the DC power supply when operating. Or, it may damage the internal disk of the memory recorder/analyzer.
- Do not place the EDX-5000A where it is difficult to pull the power plug out.
- Do not pull the connecting cables.
Connect cables with a certain allowance of length to avoid any unwanted force at the connection parts.
Pulling connecting cables or applying unwanted force may cause system failure or interrupt 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 or PC card failure.
- Do not seal ventilation holes where a fan is located at the back and where two fans are located at the front. Do not seal ventilation holes located at the top and bottom too. Failure in heat radiation causes the increase of temperature inside the EDX-5000A which may lead to low performance and system failure.

CAUTION

- Use a shielded cable as an I/O cable.
- The built-in battery which acts as countermeasure against instantaneous power failure is Ni-MH battery. It is a battery pack with 12 batteries (type: HR-4/5 FAUP) connected in series. Recycle or discard your battery in a
- Charge the built-in battery which acts as countermeasure against instantaneous power failure under temperature range of 0 to 40°C or the battery may not be fully-charged and deterioration is accelerated.
- If the EDX-5000A is not being used for a long period, the built-in battery which acts as countermeasure against instantaneous power failure should first be fully-charged. The battery discharges gradually over time naturally even if the EDX-5000A is not being used. If the battery is left almost empty, long-term storage may accelerate self-discharge of battery and lead to over-discharging. The battery can no longer be used and have to be replaced if it had been over-discharged. In addition, if the EDX-5000A has to be stored for a long term 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.
- Use indoors.
- Use the EDX-5000A in area where elevation is 2000 m or below. (CE marking)
- The handle of the EDX-5000A is only for the purpose of support. When transporting, either picking up and carrying the case with both hands or carrying it on a trolley, etc is recommended.
- When carrying or transporting EDX-5000A, wear safety shoes.
- When the power is ON but no power is supplied to the EDX-5000A (the POWER LED is off), a fuse may have been blown. When replacing a fuse, use the fuse (rated according to current, voltage and type) provided with this product. Make sure to pull the power cable out before replacing a fuse.
- Avoid installing sensors and measuring using EDX-5000A near a welding machine. Failure to do so will pose the risk of error in data, erroneous operation and system failure.
- Do not disassemble or remodel the EDX-5000A. Failure to do so will pose the risk of electric shock and system failure. The warranty does not cover any damage or defective parts resulted from disassembling or remodeling.
- The EDX-5000A limits the number of mounting of CFV-40A.
 - The number of CFV-40A that able to be mounted is up to 2 units.
 - Or, may result in erroneous operation and system failure.
- USB ports on the EDX-5000A are to be used to connect generic external storage devices, such as USB memory sticks, etc.
 - When connecting external devices that are not external storage devices (USB mice, USB keyboards, etc.), devices that required to be installed with new driver software cannot be used. Furthermore, inserting or removing external storage devices and external input devices to the USB ports while conducting measurement will affect negatively on measurement, and hence should be avoided under any circumstances.
- When mounting the EDX-5000A in the vehicle, always set it on the car seat and securely fix it in position with a band or others. Do not directly mount it on the vehicle's chassis. Otherwise unexpected vibration or impact may be applied to the EDX-5000A. Under this circumstance, set it on a vibration isolation platform to reduce the applied vibration and impact. Be sure to use the EDX-5000A-S(E) in an area where continuous vibration and impact occur, such as in a vehicle, etc., even if the vibration and impact are within the specified range.

CAUTION

- Do not configure OS settings to values other than those indicated by Kyowa. Configuring settings to values other than those indicated by Kyowa may negatively affect measurement performed by the EDX-5000A. Refrain from heedlessly changing these settings.
- The operating system of the EDX-5000A is Windows Embedded 10 IoT Enterprise. KYOWA conducted virus scan by using the antivirus software published from Trend Micro Incorporated before shipment, and it is confirmed that the EDX-5000A is not infected with virus. However, anti-virus software is not installed to the EDX-5000A. Therefore, there is a chance that the EDX-5000A may be infected by a virus via memory devices such as USB memory stick or from network. Virus infection of EDX-5000A not only may cause erroneous operation of user's computer but also may infect others. Carefully read and fully understand the following precautions before using the EDX-5000A.

CAUTION

1. To prevent infection from computer virus

- Do not install the software other than specified to the EDX-5000A.
- Do not activate unrelated software other than EDX-5000A Software.
- Scan a target USB memory stick before using.
- Connect the EDX-5000A to a highly reliable network environment only.
- Do not connect a network cable unless it is necessary.
- Do not set folder as shared folder unless it is necessary.
- After using a USB memory or connecting the EDX-5000A to network, regularly run a virus scan on the EDX-5000A.

2. To detect computer virus

There are two methods of virus detecting.

◆ Use another PC.

1) Connect the EDX-5000A and a PC which had installed with anti-virus software with a network cable.

2) Set a drive or folder of the EDX-5000A as shared drive or folder before virus check.

Run a virus check for the EDX-5000A from the PC.

◆ Conduct virus check by the EDX-5000A.

1) Download a virus check program with another PC and copy the virus check program to a USB memory stick. It is recommended to use the USB memory stick with write-protected function. In addition, be sure to use the latest virus check program.

2) Connect a mouse, keyboard, and USB memory stick to the EDX-5000A.

Run a virus scan on the EDX-5000A by using the downloaded virus check program.

3. If infected by virus

Contact KYOWA or our representatives for system restoration and note that it is not a free service.

4. Security patches and service packs of Microsoft

If you connect the EDX-5000A to the internet, you can install the security patches and service packs of Microsoft by using the Windows Update. However, in case of this installation had caused the unstable of the operation of EDX-5000A, as the operating environment had changed, we shall not be liable for any erroneous operation of EDX-5000A. Therefore, installing the software at your own risk. In addition, if the operation of EDX-5000A becomes unstable after installing the software, restore the EDX-5000A as described in “3. INSTALLING EDX-5000A”.

CAUTION

5. Installing anti-virus software

Generally, antivirus software can cause a dramatic increase in CPU usage since it is loaded in memory at all time and it monitors the reading and writing of files and network. In addition, it is necessary to connect to the Internet all the time for updating the antivirus pattern file to the latest one. If such actions are taken during measurement, the EDX-5000A may not measure the data correctly. Therefore, we did not install the antivirus software on the EDX-5000A. However, if you really need to install antivirus software, fully understand the following items and install the anti-virus software at your own risk.

- If you have installed antivirus software, we shall not be liable for any erroneous operation of EDX-5000A. If the operation of EDX-5000A becomes unstable after installing the software, restore the EDX-5000A as described in “3. INSTALLING EDX-5000A”.
- Install the antivirus software compatible to the Windows Embedded 10 IoT Enterprise.
- It is recommended to turn OFF the features of anti-virus software such as real-time protection, auto-protect option during measurement. Or, the EDX-5000A may not measure data correctly.
- Quit the EDX-5000A software before updating a pattern file.
- If the EDX-5000A is send to KYOWA because of an internal driver failure or for periodic replacement, **customer installed software are all deleted** since we newly setup the EDX-5000A. If there is any necessary file in the EDX-5000A, you should backup the file before sending it to KYOWA.

It is recommended to conduct pretest based on the same measuring conditions before measurement

LIMITED LIFESPAN PARTS AND PREVENTIVE MAINTENANCE

The EDX-5000A consists of various electronic components and among those components, some of them have limited lifespan.

Using limited lifespan parts over times exceeding the lifespan specified or deterioration of them due to bad operating environment may result in low performance, erroneous operation and system failure of EDX-5000A.

It is necessary to replace the parts with a regular preventive maintenance.

Limited lifespan parts used in the EDX-5000A are as follows.

- Aluminum electrolytic capacitor
May decrease signal-to-noise ratio due to the change of capacity in capacitor, or cause emission of smoke from the battery due to leaking of electrolyte, which will result in erroneous operation of the EDX-5000A.
- Lithium battery for backup
The settings in the EDX-5000A and built-in clock will be reset.
- Built-in battery which acts as countermeasure against instantaneous power failure
The duration for power supply of EDX-5000A becomes less or not able to supply anymore.
- Hard Disk Drive (HDD) or Solid State Drive (SSD)
The EDX-5000A may not startup, load data and write data.
- Fan
May cause less cooling effect that will result in erroneous operation of EDX-5000A.
- Power unit
Heat and smoke may be emitted out, resulting in an unstable voltage output.

For a stable and long term utilization of the EDX-5000A, regular preventive maintenance and replacement of parts are necessary. Any inquiry about these services, contact KYOWA or our representatives.

* Main limited lifespan parts: Aluminum electrolytic capacitor, lithium battery, built-in battery, HDD or SSD, fan and power unit

* All other components or parts may suffer deterioration over times and may cause system failure of EDX-5000A.

EDX-5000A 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-5000A.

Regardless of the replacement parts, the EDX-5000A itself gradually deteriorates with age.

Before the expected service life is reached, consider to replace the EDX-5000A with a new one or the latest series one.

NOTATIONS USED IN THE INSTRUCTION MANUAL

Important notes

Certain notations are used to urge attention about important items or events for handling the EDX-5000A, and for the purpose of reference.

Example of notations

NOTE

Essential precautions when handling the EDX-5000A.

MEMO

Reference items when handling the EDX-5000A.

1. OUTLINE OF PRODUCT

1-1 OUTLINE

The EDX-5000A is an all-in-one measuring instrument that is capable of measuring, displaying, recording, and analyzing data through connections with a variety of sensors. It features excellent level of general utility and expandability.

With different number of insertion slots of conditioner cards, 2 models which are EDX-5000A-80 (10 slot-80 channels) and EDX-5000A-64 (8 slot-64 channels) are prepared. Also, there are two types of built-in data storage device (internal disk) which are hard disk drive (HDD) and solid state drive (SSD), and two types of display language which are Japanese version and English version. Each of the model is shown as follows.

In addition, the EDX-5000A can deal with various kind of measurements since the EDX-5000A has many external I/O functions. The EDX-5000A is able to record in synchronization the data of image or animation, together with the data from the sensor by using these external I/O functions and high-speed camera.

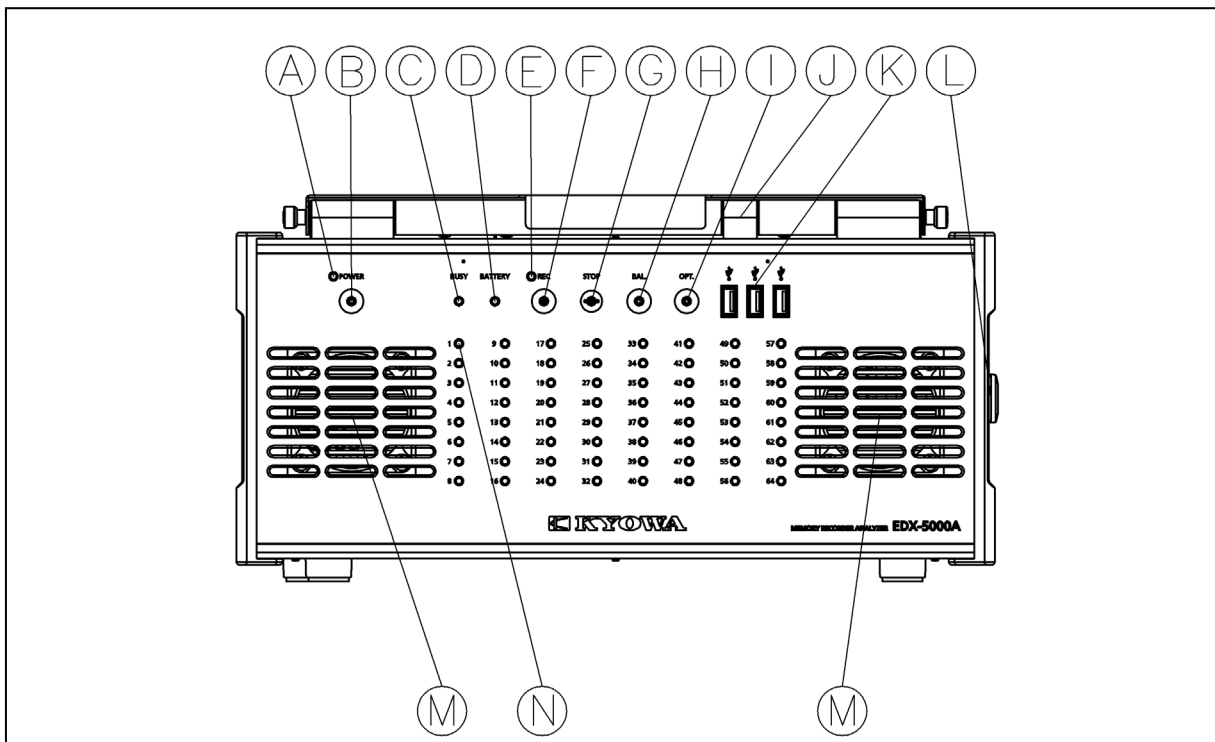
Model	Max Number of Analog Input Channels	Max Number of Slots	Data Storage Device (Internal Disk)	Data Storage Capacity	Language
EDX-5000A-64-H	64	8	HDD	300 GB or more	Japanese
EDX-5000A-64-HE	64	8	HDD	300 GB or more	English
EDX-5000A-64-S	64	8	SSD	30 GB or more	Japanese
EDX-5000A-64-SE	64	8	SSD	30 GB or more	English
EDX-5000A-80-H	80	10	HDD	300 GB or more	Japanese
EDX-5000A-80-HE	80	10	HDD	300 GB or more	English
EDX-5000A-80-S	80	10	SSD	30 GB or more	Japanese
EDX-5000A-80-SE	80	10	SSD	30 GB or more	English

1-2 FEATURES

- With Windows Embedded 10 IoT Enterprise operating system.
- An all-in-one measuring instrument to be installed with conditioner cards (optional goods).
- With 12.1-inch wide touch panel.
- With built-in battery which acts as countermeasure against instantaneous power failure (hereinafter referred to as built-in battery).
- With internal disk, long-term data recording is possible.
 - EDX-5000A-H (with Hard Disk Drive): storage capacity: 300 GB or more
 - EDX-5000A-S (with Solid State Drive): storage capacity: 30 GB or more
- Voice memo can be recorded simultaneously with data recording.
- 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.
- With two types of control software for EDX-5000A which are software for touch panels with an intuitive interface (ETA-55A) and software that has the same functionality as Kyowa's Dynamic Data Recording Software, DCS-100A (ELA-55A).
- With DAS-200A for regenerating and analyzing data after recording.
- On-line control of the EDX-5000A is possible with LAN connection to a PC installed with DCS-100A.
- Synchronization measurement with the high-speed camera, etc. is possible by using the external trigger output and external clock output.
- CAN data can be recorded using a multi-channel CAN card. (Optional)
- Synchronizes the start time of recording with other EDX-5000A at different location by using the time data received from satellites. (Optional)

2. CONTROLS AND INDICATORS

2-1 FRONT



A: POWER LED

Lights up in green after turning ON the power. The POWER LED lights out after turning OFF the power. In addition, the POWER LED blinks in orange alternately during discharging of built-in battery (during instantaneous power failure or blackout). Refer to table 1-1.

B: POWER switch

Press and hold this switch for more than 1 second to turn on the power. If you press the “POWER” switch for 2 seconds or longer under power on state of EDX-5000A, the internal setting information is stored before the EDX-5000A is turned off.

MEMO

A short buzzer sound rings two times when the power is turned on. Also, a long buzzer sound rings three times when the power is turned off, and POWER LED blinks green.

NOTE

When the built-in battery is fully discharged, do not disconnect the power plug from the power outlet when the POWER is on or during shutting down. Failure to do so may destroy the internal disk and disable the EDX-5000A from starting up again.

C: BUSY LED

Lights up in green while accessing the internal disk. Refer to table 1-1.

D: BATTERY LED

Lights up in green while charging the built-in battery. It is lighted out when the built-in battery is fully charged. Refer to table 1-1.

E: REC LED

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

F: REC switch

Starts or stops the recording.

G: STOP switch	Stops the monitoring or recording.
H: BAL. switch	<u>Press the BAL switch for 1 second or longer to conduct balance adjustment.</u>
I: OPT. switch	Can set the function of the “OPT. switch” with the ETA-55A.
J: Display	Touch panel compatible display.
K: USB connector	USB2.0 connector. However, this front panel USB connector is restricted to a supplyable current of approximately 100 mA.

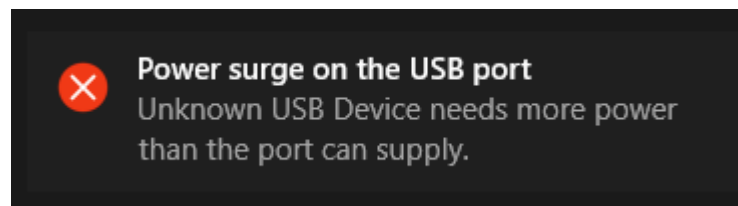
NOTE

Some commercially available mice, keyboards, and USB memory require currents of 100 mA or more. If you turn on the power with these devices connected, the power will not be supplied to the front USB connector and it will be unusable. In such case, connect to the back USB connector.

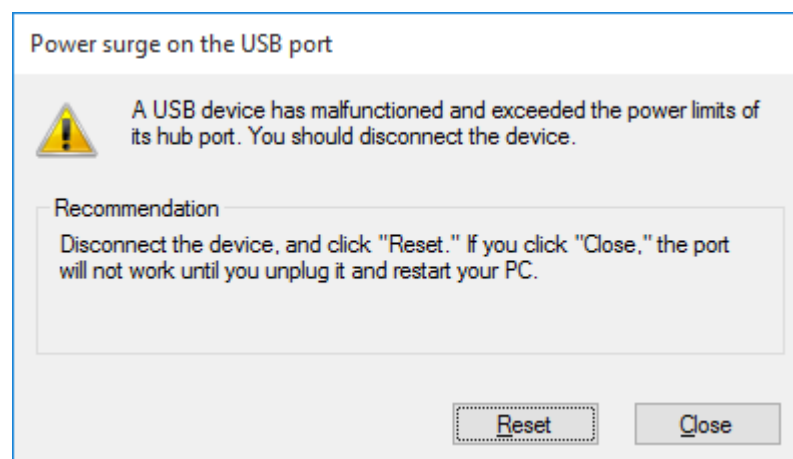
MEMO

If you have connected external HDDs and other devices that requires a current of 100 mA or more to the USB connector on the front panel, follow the steps described below to reset the USB connector. Without resetting the USB port, you will not be able to use the USB connector on the front panel until the EDX-5000A has been restarted.

- 1) Click the “Power surge on the USB port” warning when it appears in the bottom right of the screen.



- 2) Remove the connected device, and then click Reset.



- 3) After resetting, connect the removed device to the back USB connector.

L: Handle
M: Front fan
N: CH LED

Handle.
Ventilating suction fan on the front panel.
Indicates the status of channels. Refer to table 1-2.

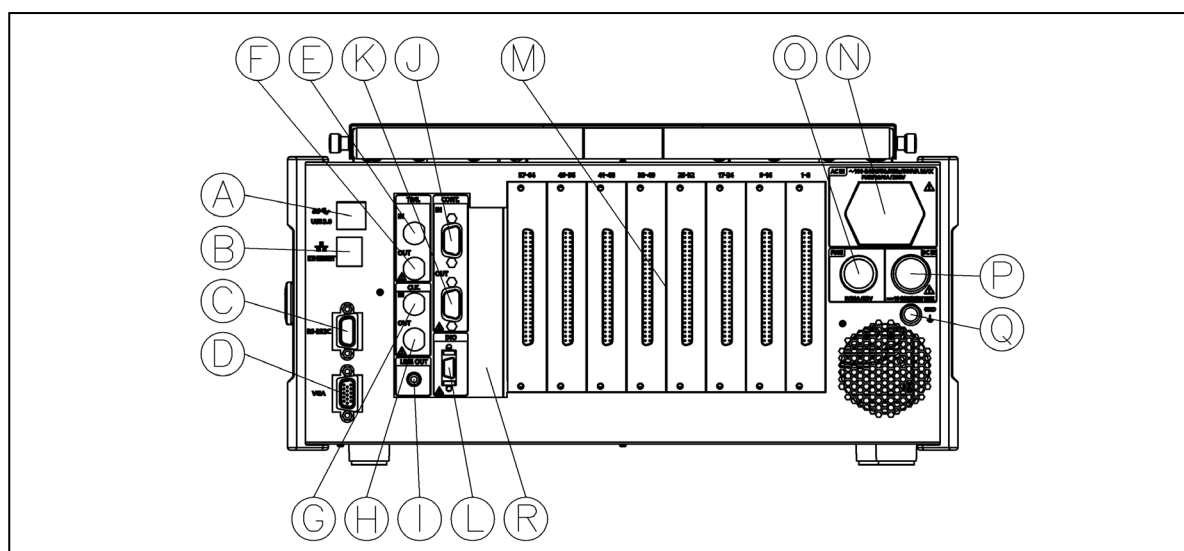
Table 1-1 LEDs status part 1

LED Status		A : POWER LED	D : BATTERY LED	C : BUSY LED
Green	ON	Power ON state.	Charging the built-in battery.	Accessing to the internal disk.
	Blinks	Power OFF is being prepared.	Discharging the built-in battery. (During refresh)	
Orange	ON			
	Blinks	Discharging the built-in battery. (During power failure)		
Red	ON			
	Blinks	Voltage drop in the DC power supply (At less than approx. 11 V)		
OFF		Power OFF state.	The built-in battery is fully charged.	

Table 1-2 LEDs status part 2

LED Status		E : REC LED	N : CH LED
Green	ON		Normal (Measurement OK)
	Blinks	Monitoring	Calibration output in progress
Orange	ON		Null balancing in progress
	Blinks		Null balancing not successful
Red	ON	Recording	Sensor input overflow
	Blinks	Pausing Trigger waiting Interval waiting	The sensor input overflow is solved. Signal within range is entered.
OFF			Measurement OFF Without conditioner card installed

2-2 REAR



A: USB connector

B: LAN connector

C: RS-232C connector

D: VGA connector

E: TRG IN connector

F: TRG OUT connector

G: CLK IN connector

H: CLK OUT connector

I: LINE OUT connector

J: CONT IN connector

K: CONT OUT connector

L: DIO connector

M: Conditioner slots

N: AC inlet socket

O: Fuse

P: DC power supply connector

USB3.0 connector.

LAN connector

For the serial communication.

This serial communication port is for use for adjustment and maintenance, and it cannot be used for other purposes.

Used for connecting the external display.

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)

Outputs trigger signal when triggered. (H: 5 V, L: 0 V)

Used for operating the EDX-5000A with the external clock signal.

(H: 2.0 to 5.0 V, L: 0 to 0.8 V)

Sampling clock is divided and output. (H: 5.0 V, L: 0 V)

External speaker connector

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

Used for synchronized operation of multiple systems.

Connector for digital input/output.

8 bits and TTL level input/output is possible.

Slots for conditioner cards. There are 8 slots for the 64 CH model and 10 slots for the 80 CH model.

This AC power supply connector should be connected to the AC power outlet with the AC power cable supplied with the EDX-5000A.

Fuse for DC power.

DC power supply connector. Voltage range of the input of power supply is 10 to 30 VDC.

Q: GND terminal

R: Optional slot

Always ground the GND terminal of the EDX-5000A.

Slot for adding the EGPC-50A

Regarding to installation of the EGPC-50A, contact the KYOWA or our representatives.

For details, refer to "6. GPS/MULTI-CHANNEL CAN OPTIONAL MODULE: EGPC-50A".

MEMO

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

MEMO

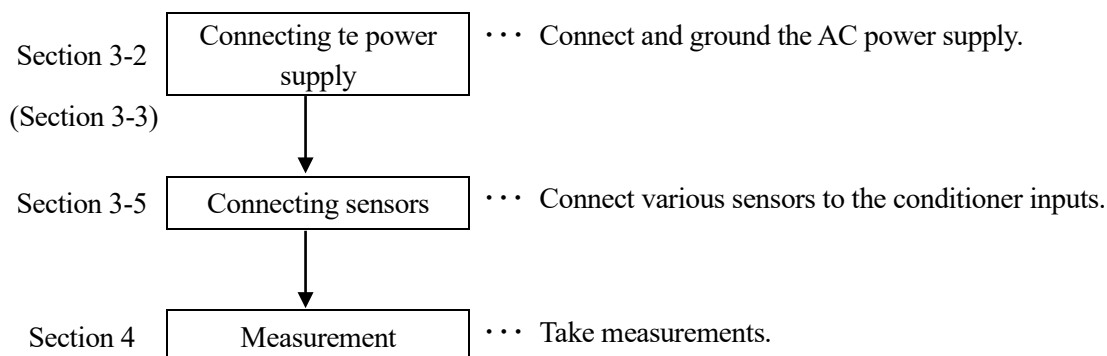
The channel No. is determined by the position where the conditioner cards is inserted.

The channel numbers are assigned from right to left as seen from the rear.

3. INSTALLING EDX-5000A

3-1 INSTALLATION PROCEDURE

This section describes required procedures for installing the EDX-5000A and preparing for measurements. Use the following procedures to complete the installation.



NOTE

Installation: Fix the EDX-5000A with band, etc. when install it at the place where minor vibration is applied. If EDX-5000A is expected to be applied by major vibration and impact, place it on an appropriate vibration-isolated platform to reduce the applied vibration and impact.

3-2 CONNECTING TO THE AC POWER SUPPLY

Supply AC power to the EDX-5000A with the attached AC power cable.

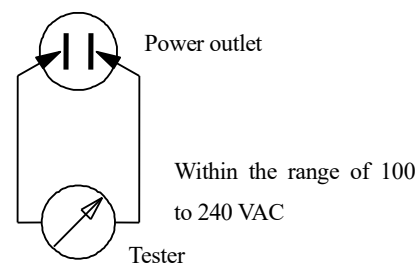
Check the power supply voltage before connecting the power cable to the AC power outlet.

The operating power supply voltage range of the EDX-5000A is 100 to 240 VAC or 10 to 30 VDC. Always operate the EDX-5000A within the specified voltage range.

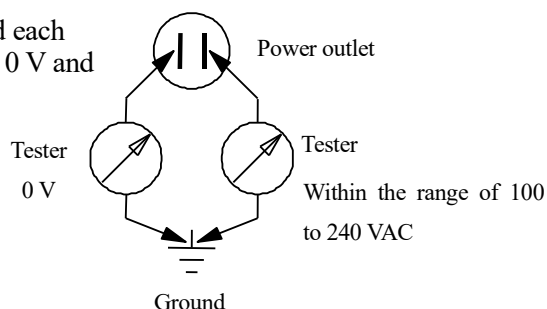
The EDX-5000A should never be connected to the power supply with voltage outside the above specified voltage range or electric potential of the terminals exceeds the level of power supply voltage relative to the ground.

Doing so will cause system failure and accidents. The power supply voltage should be checked according to the procedure described below.

- 1) Use the tester to measure the voltage between the AC power outlet terminals and ensure that the voltage is within the range of 100 to 240 VAC.



- 2) Use the tester to measure the voltage levels between the ground and each of the AC power outlet terminals to ensure that one voltage level is 0 V and the other is within the range of 100 V to 240 VAC.



- 3) If the EDX-5000A is used on-site where induction motors, electric welder and other devices that generate noise are used, power supply is expected to be in bad condition due to noise. It is recommended to use KYOWA's insulation transformer (optional goods: UPT-300B) or commercially available noise cut transformer.

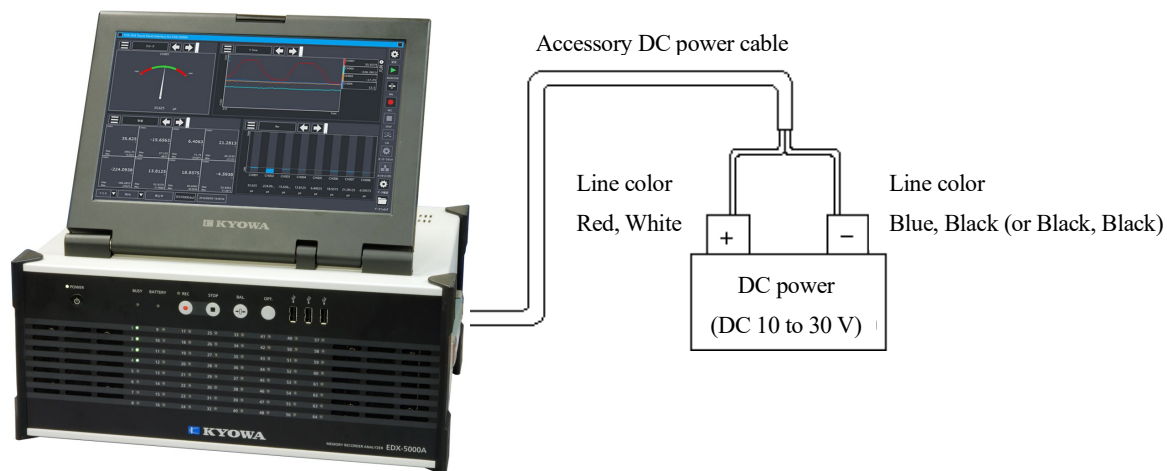
3-3 CONNECTING TO THE DC POWER SUPPLY

Supply power to the EDX-5000A using the DC power cable provided.

Check the power supply voltage before connecting the DC power.

The power supply voltage range for the EDX-5000A is 10 to 30 VDC. Always operate the EDX-5000A within the specified voltage range.

Do not connect the EDX-5000A to the power voltage that is out of range or it may lead to system failure and accidents.



DC power supply connection diagram

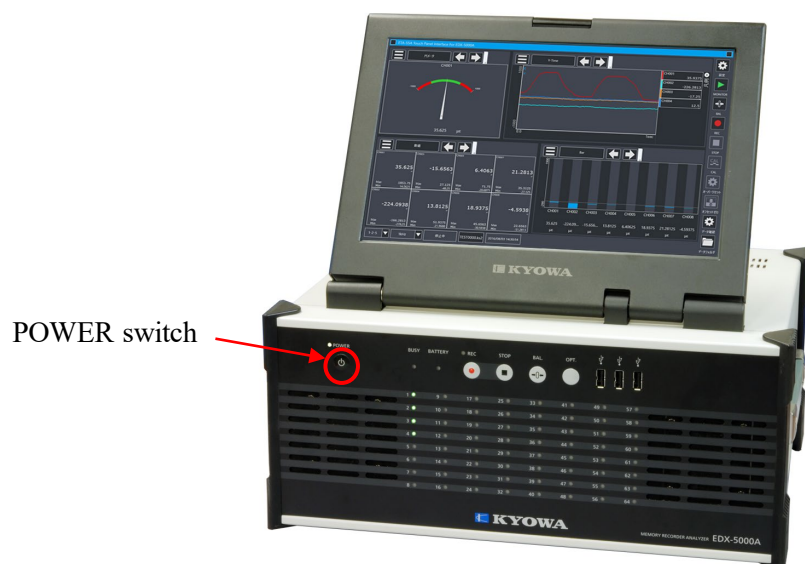
NOTE

- The chassis of EDX-5000A (GND terminal) is not connected to the “-” side of the DC power supply. However, if they are connected for measuring the voltage of DC power supply, make sure that the “+” side of the power supply does not in contact with the chassis of EDX-5000A or have connection with the “-” side of the input of conditioner cards. Otherwise, system failure may occur.
- When using a car battery with the “+” side is connected with the car body, make sure that the car body does not in contact with the chassis of the EDX-5000A. Or, use a different battery instead.

MEMO

When using a car battery as a DC power supply, in case of temporary decrease in power voltage supply due to the use of self-starter, etc., the voltage is retained by the built-in battery of EDX-5000A and hence it is able to continue to control the EDX-5000A without the occurrence of cutting off of the power supply.

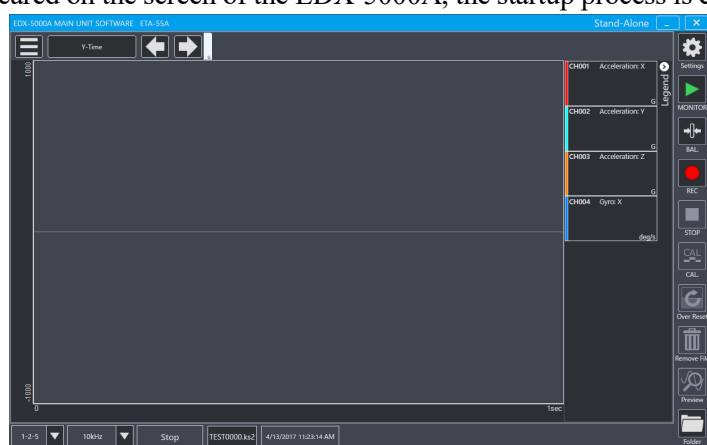
3-4 STARTING UP AND SHUTTING DOWN



<EDX-5000A-64's appearance>

■Startup

Hold down the POWER switch on the front of the EDX-5000A for one second or more to startup the EDX-5000A. When the ETA-55A is appeared on the screen of the EDX-5000A, the startup process is complete.



<Example of the startup screen>

■Shut down

Hold down the POWER switch on the front of the EDX-5000A for two seconds or more while the EDX-5000A is running without conducting measurement to shut down the EDX-5000A.

When starting up the EDX-5000A, the measuring conditions and window display will be retained as they were in the previous shut down.

NOTE

- Ensure that measurement is not being performed before cutting the power supply of the EDX-5000A.
- Do not pull the power plug out of its outlet while the EDX-5000A is shutting down. Doing so might damage the contents of the internal disk and disable the EDX-5000A from starting up again.

MEMO

Leave the AC power cable connected to the outlet after shutting down to charge the built-in battery. (The BATTERY LED will light up in green when charging.)

Charging will stop automatically when the battery is fully charged. (The BATTERY LED will light out when it is no longer being charged.)

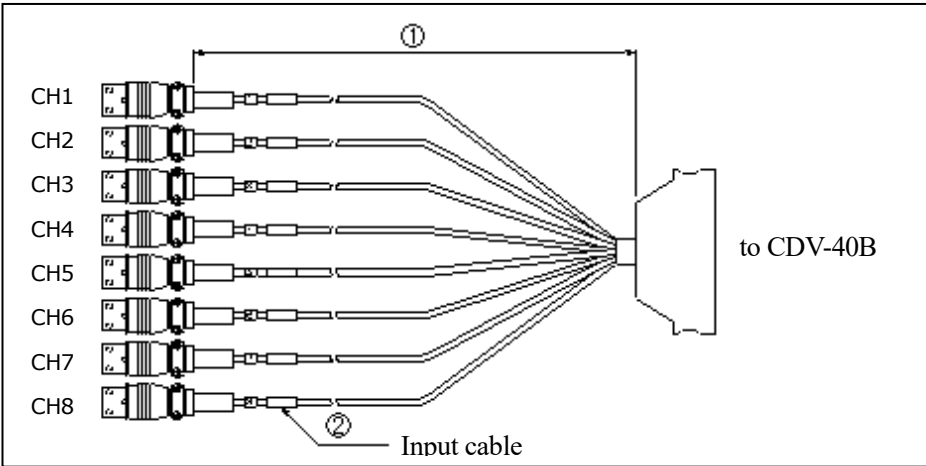
3-5 CONNECTING SENSOR

Before connecting sensors, do not forget to turn OFF the power of EDX-5000A.
When connecting conditioner cards, refer to the Instruction Manual for Applicable Sensors.

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

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

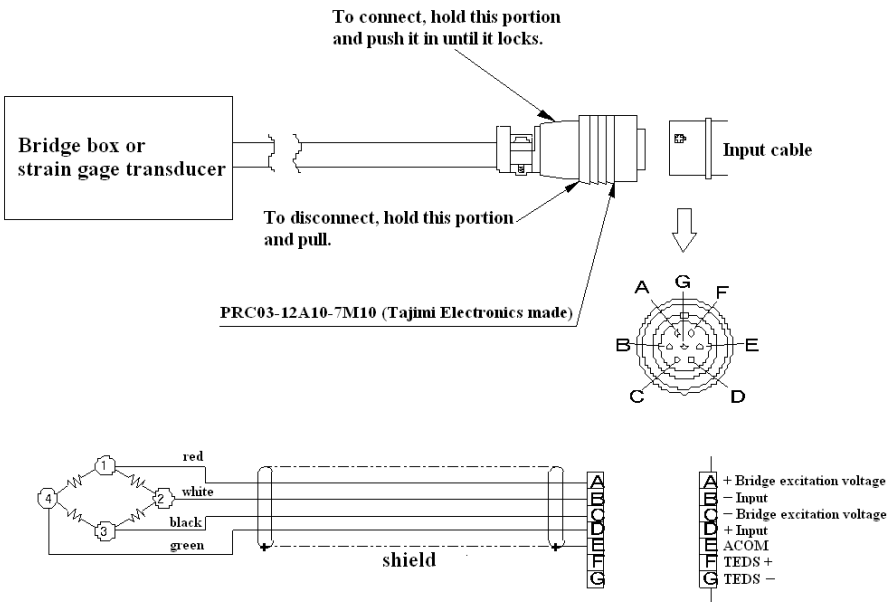
Item	Model	Cable length (Figure ①)	Color of heat shrinkable tube (Figure ②)	Item	Model	Cable length (Figure ①)	Color of heat shrinkable tube (Figure ②)
Input cable	U-40	50cm	None	Input cable	U-46	50cm	Blue
	U-41		Brown		U-47		Purple
	U-42		Red		U-48		Gray
	U-43		Orange				
	U-44		Yellow		U-38	1.5m	None
	U-45		Green		U-39	1.0m	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-5000A. Use either of the grounding method which results in less noise.



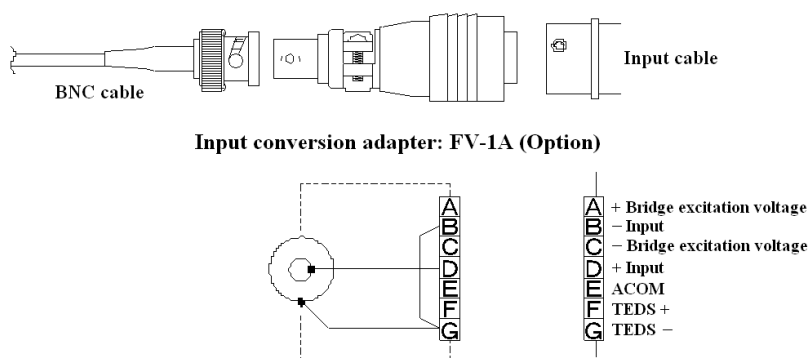
MEMO

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

NOTE

- The F terminal (channel input) of the CDV-40B is specific for sensor ID signals (TEDS). Connecting any other signal to this terminal may cause the EDX-5000A unrecognized all other conditioner cards installed in the EDX-5000A. When the EDX-5000A does not recognize the conditioner card installed, the startup screen will display “UNKOWN” instead of the name of the conditioner card (e.g. CDV-40B), resulting in incapable of measurement.
- Strain generator: CAB-120D, 350D, and WDS-10 are not able to be used because the F and A terminals are short-circuited. Also, when using transducer with remote sensing function, connect the transducer and input cable of CDV-40B with connection cable (N81 to N85).
- 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.
- Set the cable length in use to allow compensation for sensitivity changes due to the length of the input cable used. (Refer to cable settings in the Instruction Manual (EDX-5000A Instruction Manual for Main Unit Software)).
- Set internal sensitivity compensation prior to performing measurements to allow compensation for sensitivity changes caused due to bridge resistance in the strain gage. (Refer to cable settings in the EDX-5000A Instruction Manual for Main Unit Software).
- A coefficient where a bridge resistance of 350 ohm and an input cable length of 1.0 m are used as reference values is applied internally as internal sensitivity compensation.

2) When applying an input voltage



ACOM and TEDS- are common potential.

When measuring the voltage, connect an input conversion adapter (optional goods: FV-1A) to a quick fitting connector by using the BNC connector. Select the voltage mode to perform monitoring. In case of the occurrence of excessive noise, connect the negative side of the voltage signal source to the GND terminal of the EDX-5000A.

WARNING

● Maximum Input Voltage Range for Measurement

Strain/voltage measurement card: 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-5000A 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 take the precautions above will result in a short circuit of the signal source (e. g. DC power supply) of the measuring target in the CDV-40B card, thus causing system failure and a fire hazard.

NOTE

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

[The worst case]

With the following conditions, a crosstalk of $120 \mu\text{m}/\text{m}_{\text{p-p}}$ may be generated at the strain sensor input channel.

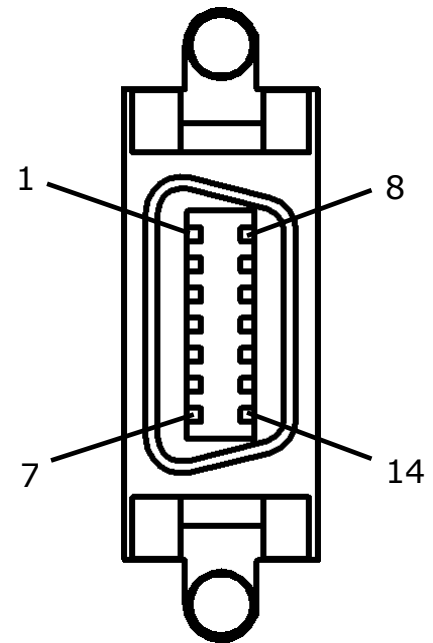
(Condition) Voltage input channel	{ • Mode Voltage • Range 10 V • LPF FLAT • Input Square-wave of $20 \text{ V}_{\text{p-p}} (\pm 10 \text{ V})$, 50 kHz }
Strain sensor input channel	{ • Mode Strain • Range $500 \mu\text{m}/\text{m}$ • LPF FLAT • Input Arbitrary }

If so, set the LPF of the strain sensor input channel to 10 kHz or less to eliminate the crosstalk.

3-6 DIGITAL INPUT / OUTPUT (DIO) PORT

The pin assignment of the DIO port is as shown in the following.
Up to 8 TTL levels can be input and output. (TTL 5 V)

Pin No.	Name	Description
1	I + 5 V	5 V power supply for external pull-up
2	DIO_1	Digital input/output, first bit
3	DIO_2	Digital input/output, second bit
4	DIO_3	Digital input/output, third bit
5	DIO_4	Digital input/output, forth bit
6	DIO_5	Digital input/output, fifth bit
7	DIO_6	Digital input/output, sixth bit
8	Reserve	Connect nothing.
9	Reserve	Connect nothing.
10	nEXT_PW_SW	External power switch
11	SCOM	COM for external power switch
12	DIO_7	Digital input/output, seventh bit
13	DIO_8	Digital input/output, eighth bit
14	ICOM	COM for external inputs



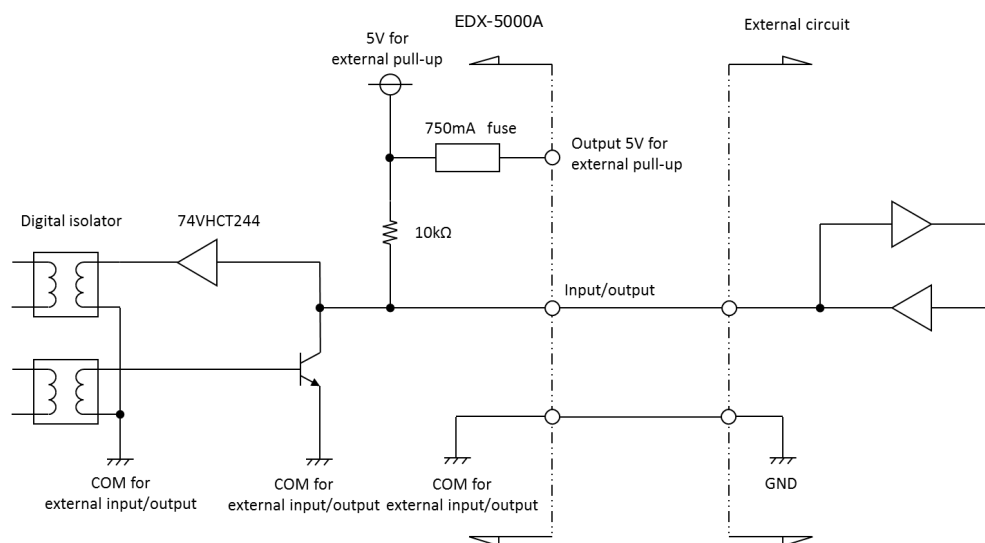
Model: 10214-52A2PL
Manufacture: 3M

3-6-1 External Input / Output Circuit

The interface of input/output circuit of the digital input/output port is described as follows.

Input/output signal: TTL level, low active

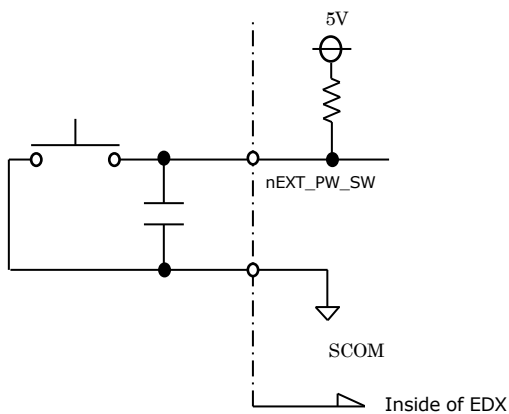
Note that every signal is pulled up to 5 V power supply through the built-in pull-up resistor (10 k-ohm).



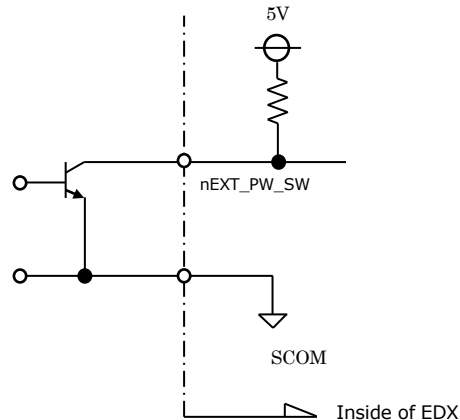
3-6-2 Circuit of External Power Switch

With the external power switch of the DIO port, you can turn on / off the EDX - 5000A power supply and realize the same function as the POWER switch on the front of the EDX-5000A. The circuit is as follows.

Input no-voltage contact signal, open collector signal and TTL level (H: 2.0 to 5.0 V, L: 0 to 0.8 V) signal.



For the contact signal



For the open collector signal

3-6-3 Setting Digital Input/Output (DIO) Conditions

Configure digital input / output.

For details, refer to the EDX-5000A Instruction Manual for Main Unit Software.

With digital input/output conditions' setting window, the following items can be set.

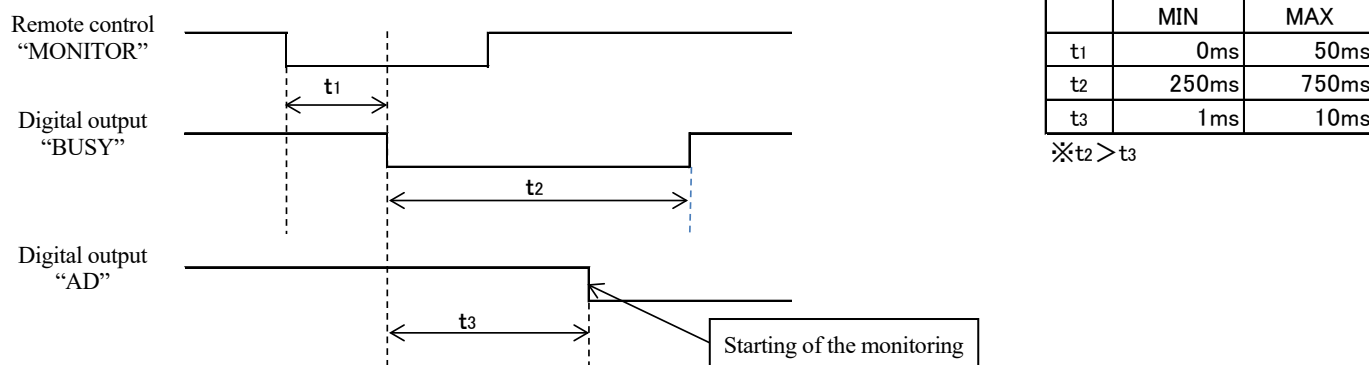
Digital input/output (DIO) conditions can be set for every bit.

“Mode”	Set the mode of the selected bit. *** (unused)/input/remote control (input)/output can be selected. ※Remote control (input) can start/stop measurement, execute BAL. ※When setting input, with digital signal at high level as “1” and digital signal at low level as “0”, digital CH data can be recorded.
“Function“	In remote control (input) mode, set the assignment of function. (Monitor/Stop/Record/Balance/OPT. Switch) In output mode, set the output signal. (Recording/Trigger Signal/BUSY/AD in progress/Overflowing of Analog-CH/ Overflowed of Analog-CH)

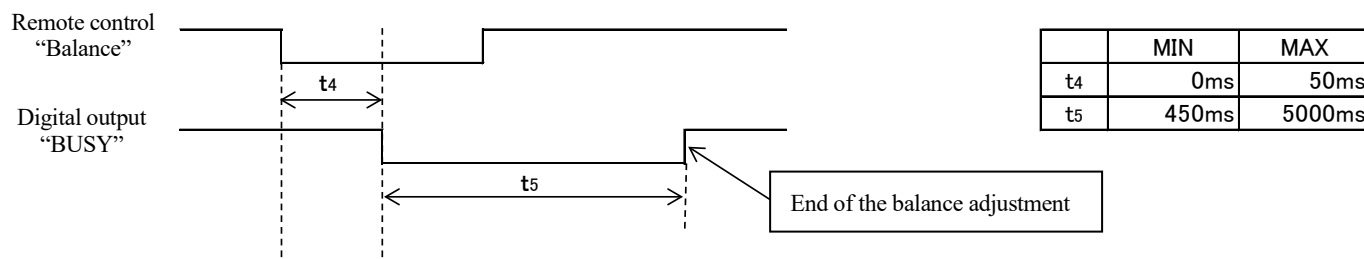
3-6-4-2 Digital output timing during the remote control mode

This section describes from the input of the remote control signal to the output of the digital output signal during remote control mode. Note that the signal is low active.

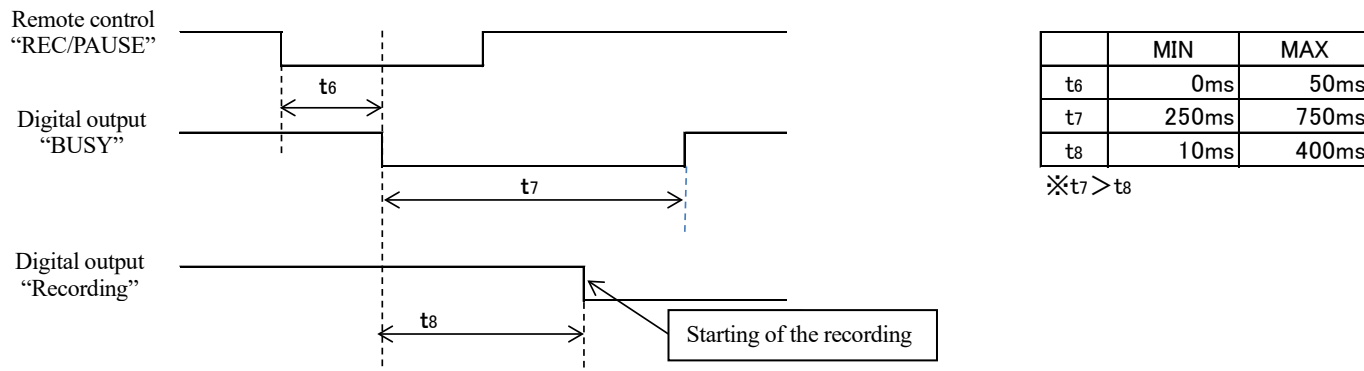
1) Start monitoring data.



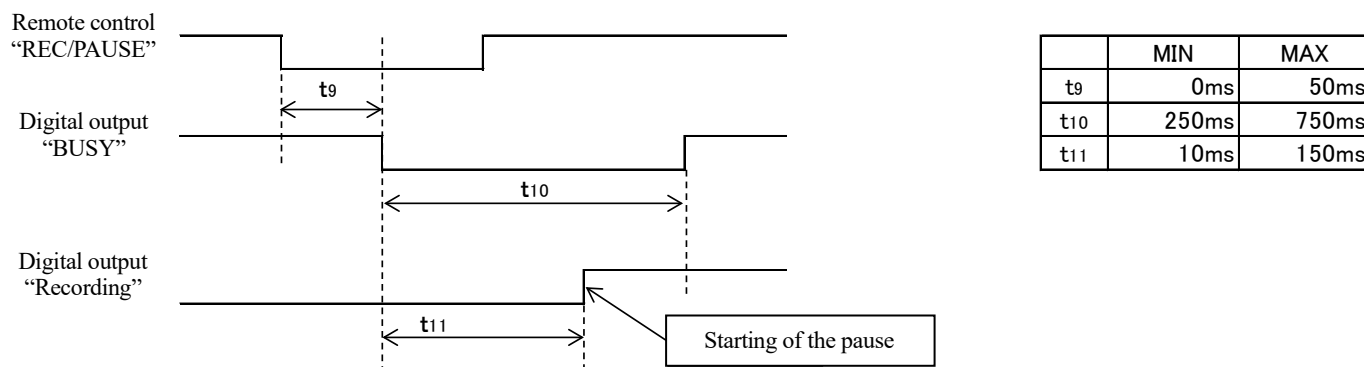
2) Execute the balance adjustment.



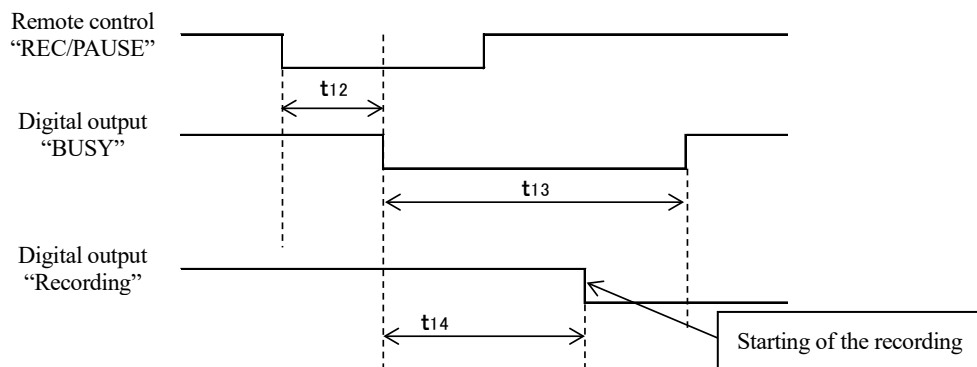
3) Start recording data during monitoring.



4) Pausing



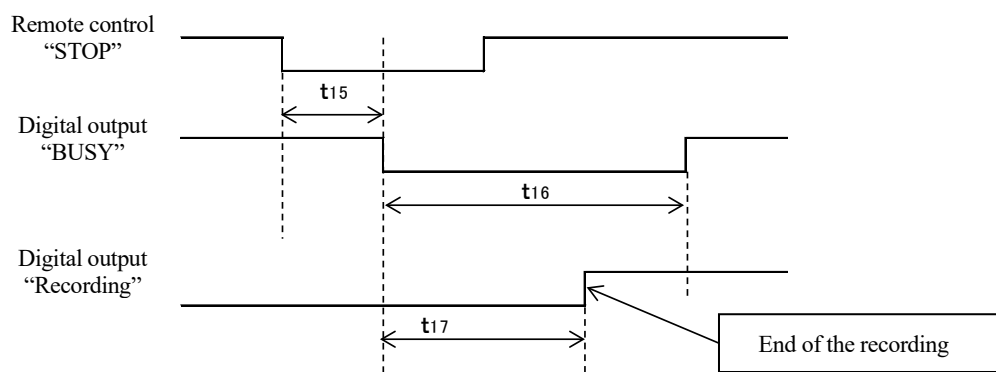
5) Resume recording of data (unpause).



	MIN	MAX
t_{12}	0ms	50ms
t_{13}	250ms	1500ms
t_{14}	10ms	1500ms

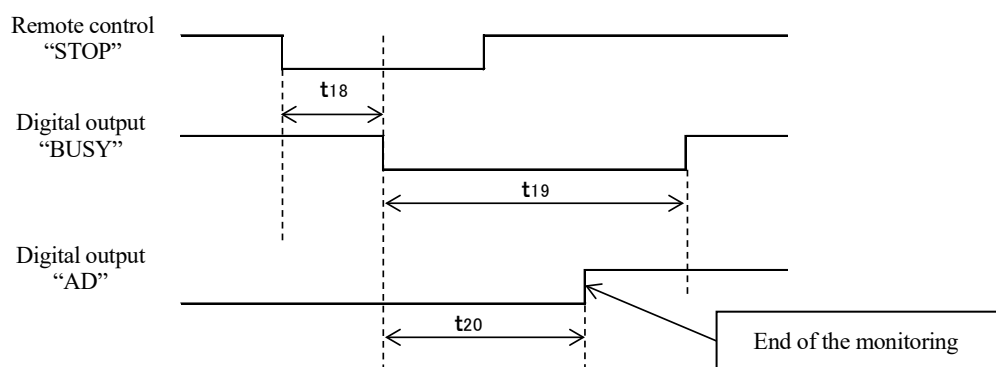
※ $t_{13} > t_{14}$

6) Stop recording data.



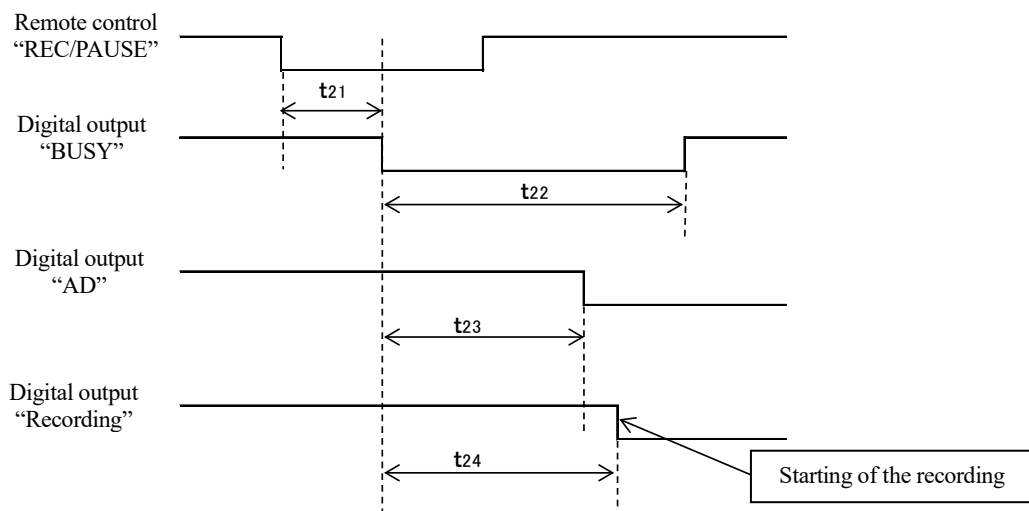
	MIN	MAX
t_{15}	0ms	50ms
t_{16}	250ms	750ms
t_{17}	0ms	350ms

7) Stop monitoring data.



	MIN	MAX
t_{18}	0ms	50ms
t_{19}	250ms	1500ms
t_{20}	0ms	1500ms

8) Start recording data after stopped recording.



	MIN	MAX
t21	0ms	50ms
t22	250ms	750ms
t23	10ms	400ms
t24	50ms	700ms

※ $t_{22} > t_{24} > t_{23}$

MEMO

The digital output timing, excluding the trigger signal, is controlled by software.
Therefore, digital output timing as described above may vary.

4. MEASURING

4-1 MEASURING

After connecting the sensor, press and hold the POWER switch on the front for about 1 second or longer to start up. Refer to the EDX-5000A Instruction Manual for Main Unit Software for each conditioner card's setting (CH condition) and measurement condition's setting.

4-2 FOR EXTERNAL INPUT/OUTPUT

The EDX-5000A is equipped with the following BNC connector for external input/output on the rear panel.

TRG IN connector	Used for external trigger measurement. Starts recording by inputting the trigger signal. (H: 2.0 to 5.0 V, L: 0 to 0.8 V) Refer to “4-2-1 External Trigger.”
TRG OUT connector	Outputs trigger signal when triggered. (H: 5 V, L: 0 V) Refer to “4-2-1 External Trigger.”
CLK IN connector	Used for operating the EDX-5000A with the external clock signal. (H: 2.0 to 5.0 V, L: 0 to 0.8 V) Refer to “4-2-2 External Clock.”
CLK OUT connector	Divides and outputs the sampling clock. (H: 5 V, L: 0 V) Refer to “4-2-2 External Clock.”

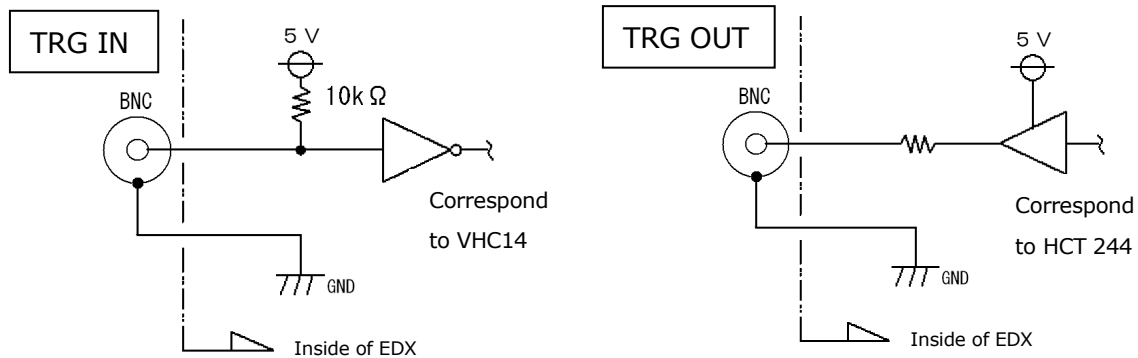
NOTE

The input voltage range of the TRG IN connector and CLK IN connector is 0 to 5.5 V.
If input voltage is out of range, it may cause system failure of EDX-5000A.

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

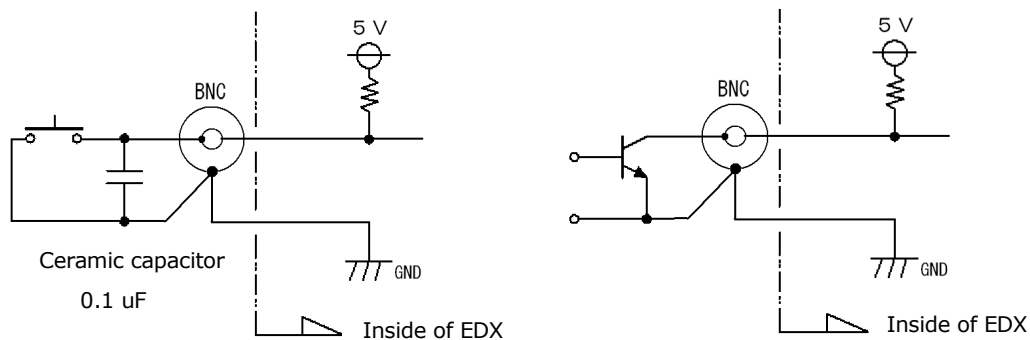
The EDX-5000A starts recording by inputting the external trigger input signal to the “TRG IN.” Also, the external device can be supplied with external output signal from “TRG OUT”.

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



1) Input signal of the “TRG IN”

Input 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 ETA-55A.

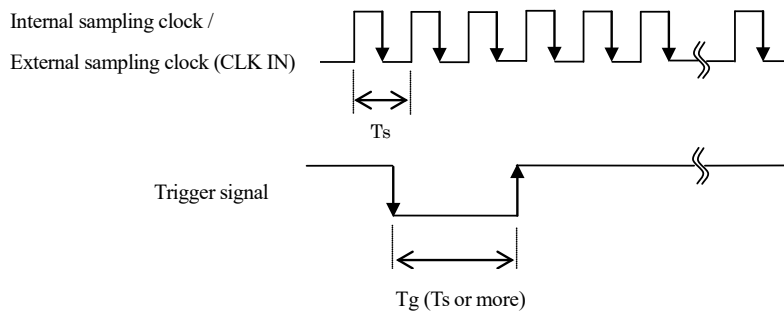


For the contact signal

For the open collector

NOTE

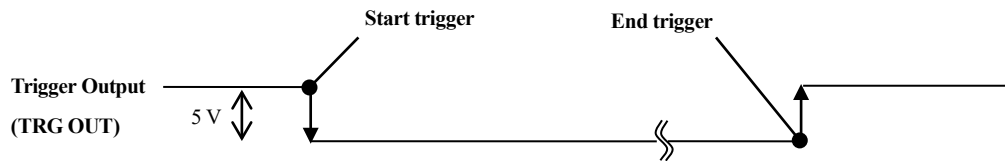
- Avoid noise such as chattering, etc. in the trigger input signal.
- It is recommended to use the open collector signal as the trigger input to prevent external noise and an insulation element such as photocoupler, etc.
- The trigger signal is issued for one or more cycle (T_s) of the predetermined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



- The input threshold value is 2.0 to 5.0 V (HIGH level) and 0 to 0.8 V (LOW level). In addition, maximum input voltage range is 0 to 5.5 V. Or, the EDX-5000A may end up in system failure.
- Pre-test and check if the EDX-5000A is correctly triggered before the main-test.

2) Output signal of the “TRG OUT”

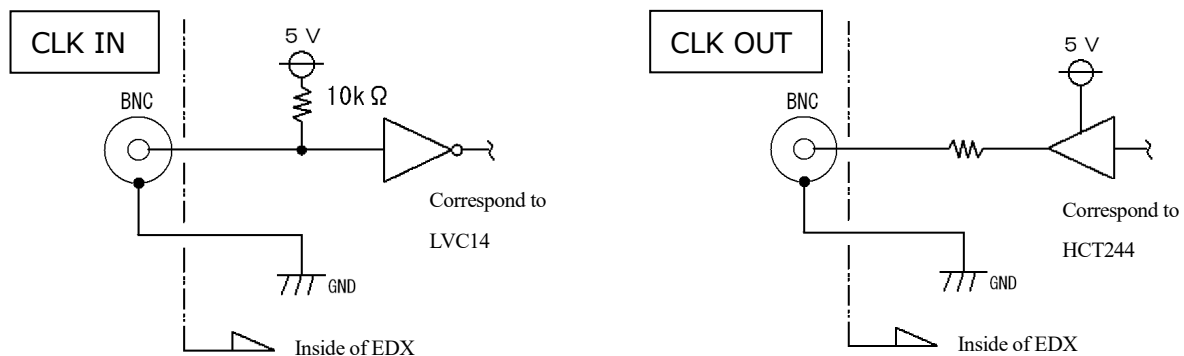
The voltage level of the output signal is 5 V in HIGH level and 0 V in LOW level. When the voltage level is moved from HIGH level to LOW level, it is called the “start trigger” and when the voltage level is moved from LOW level to HIGH level, it is called the “end trigger.”



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

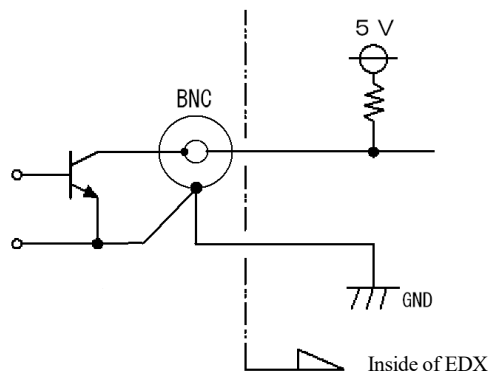
If a pulse signal supplied from the external device such as oscillator is input as the external clock input signal to the “CLK IN,” the pulse signal can be used as the sampling clock of the EDX-5000A. In addition, the EDX-5000A can supply the sampling clock of the EDX-5000A as the external clock output signal from the “CLK OUT” to the external device. This makes the clock synchronized data recording available between the EDX-5000A and external devices such as data loggers, high-speed camera, etc.

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



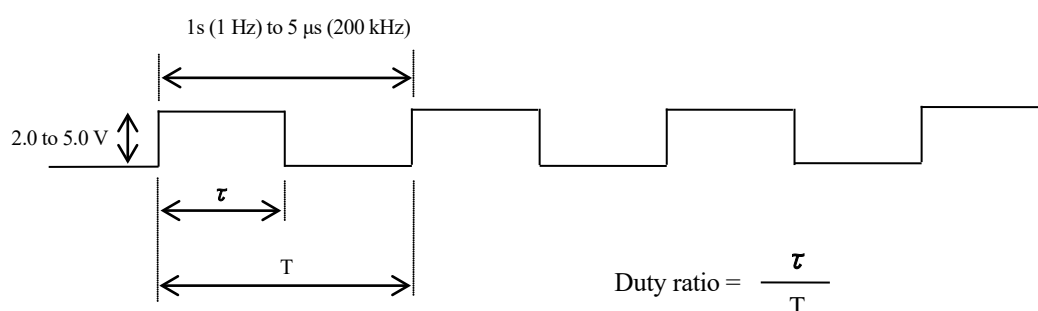
1) Input signal of the “CLK IN”

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



For the open collector

Also, the target input pulse signal must be 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) signal as the external clock supplying to the EDX.
- It is necessary to supply the external clock while the EDX-5000A is measuring data. The EDX-5000A cannot measure data if the external clock is not supplied.

Also, external clock error will occur and the EDX-5000A will stop 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 and the range of clock signal supply is 7,600 to 8,400 Hz, in order to avoid the interruption or error in analysis process after recording the data, it is preferable to supply the clock signal which is having the same frequency value with the reference frequency.

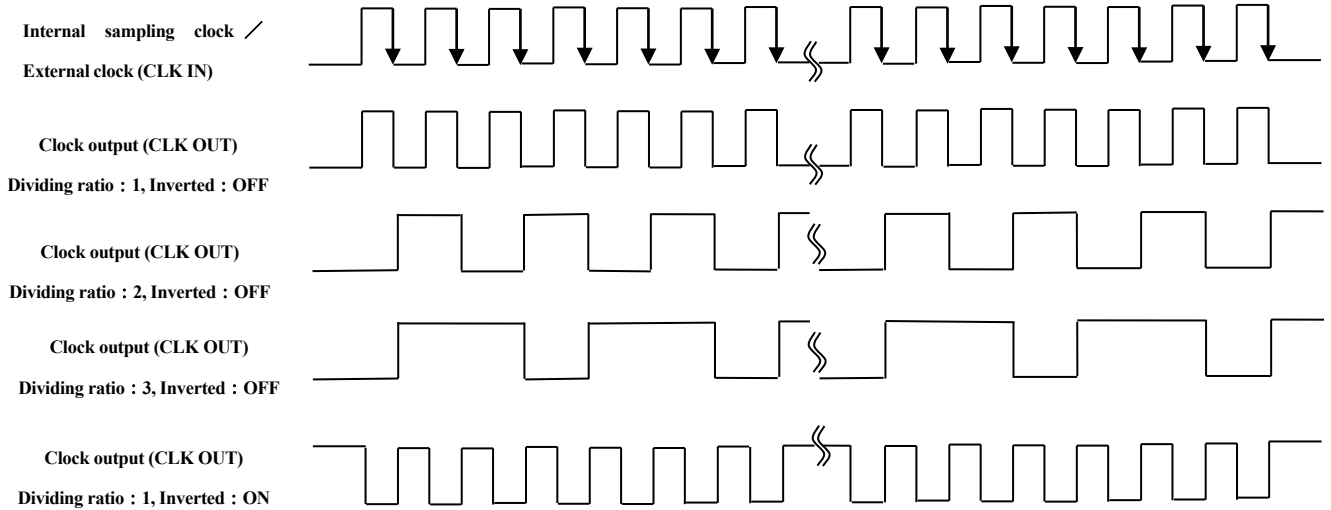
- If an error happens at the external clock during recording, the measurement is stopped, the recorded data, REC/PAUSE information, and voice data from the recording start point to the error recognized point are automatically saved.

- The frequency range of usable external clock is from 1 to 200,000 Hz and settable in 1 Hz unit. However, the settable external clock frequency is restricted by the number of measuring channels and with or without AUTO assign of the low-pass filter. Restrictions are same during the operation of the internal clock.
- When starting measurement, 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 set frequency for checking. Therefore, the starting of the measurement (starting of the monitor) is delayed compared to the operation of the internal clock. Note that the case especially when using low frequency which is 5 Hz or below.

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 the square wave which is divided based on the arbitrary setting of the dividing ratio (1 to 65534) of the internal sampling clock or external clock. Furthermore, by setting “Output Clock Inverted”, the polarity inverted clock is output. However, when clock is not output, the output is a LOW level regardless of the setting.



NOTE

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

4) Output Clock Mode

The clock output can be selected from two type according to the “Output Clock Mode” setting.

Always: The clock is always output, when the power supply of the EDX-5000A is ON.

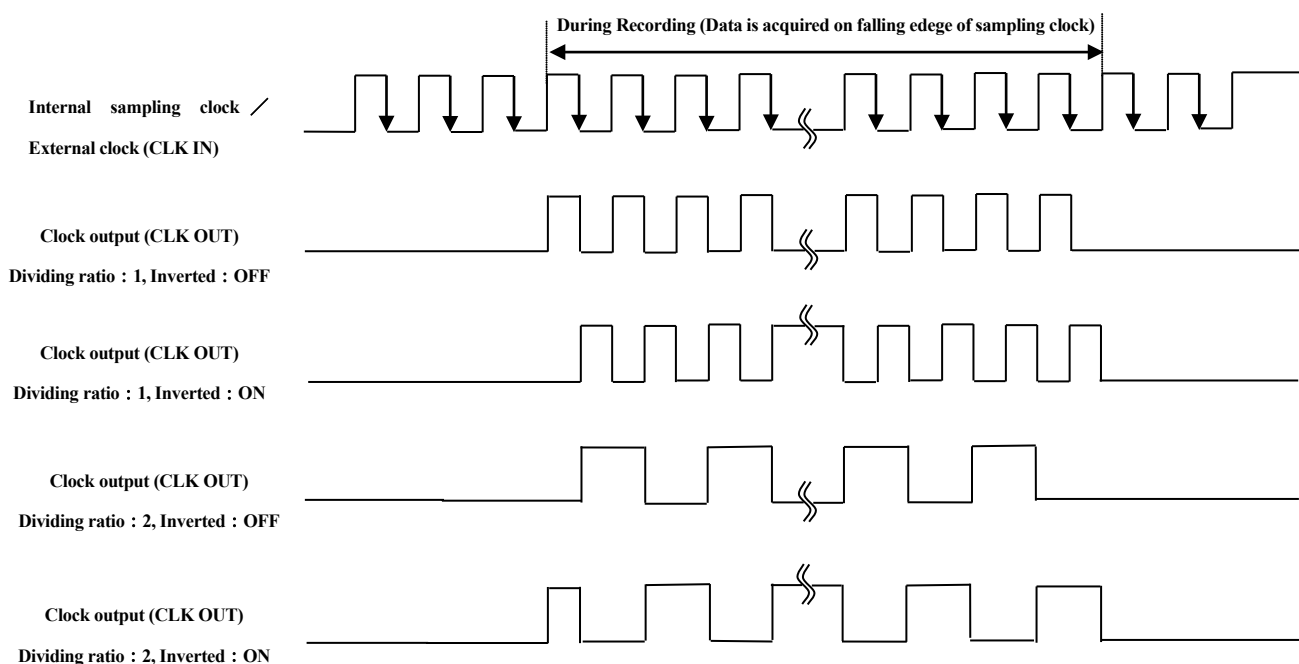
During Recording: The clock is output only during recording.

Refer to the following figure for details of clock output timing.

NOTE

When “Mode of Recording” is set to “Manual” and “Number of Recording” is set to 2 or more, it is not possible to set the “Output Clock Mode” to “During Recording”.

Example of clock output timing when “Output Clock Mode” is set to “During Recording”



NOTE

Depending on the setting of “Dividing ratio” or “Output Clock Inverted”, the rise of the output clock may occur before the first falling edge of the sampling clock.

When “Output Clock Mode” is set to “During Recording” and “Mode of Recording” is set to “Trigger”, clock is output only while TRG OUT is low level. Note that the start and end of clock output is delayed from the trigger point. The delay time depends on the sampling frequency setting. Refer to 4-2-3 for details of the timing.

4-2-3 Input/Output Timing of Signals

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

Table 4-2: Output timing of TRG OUT signal

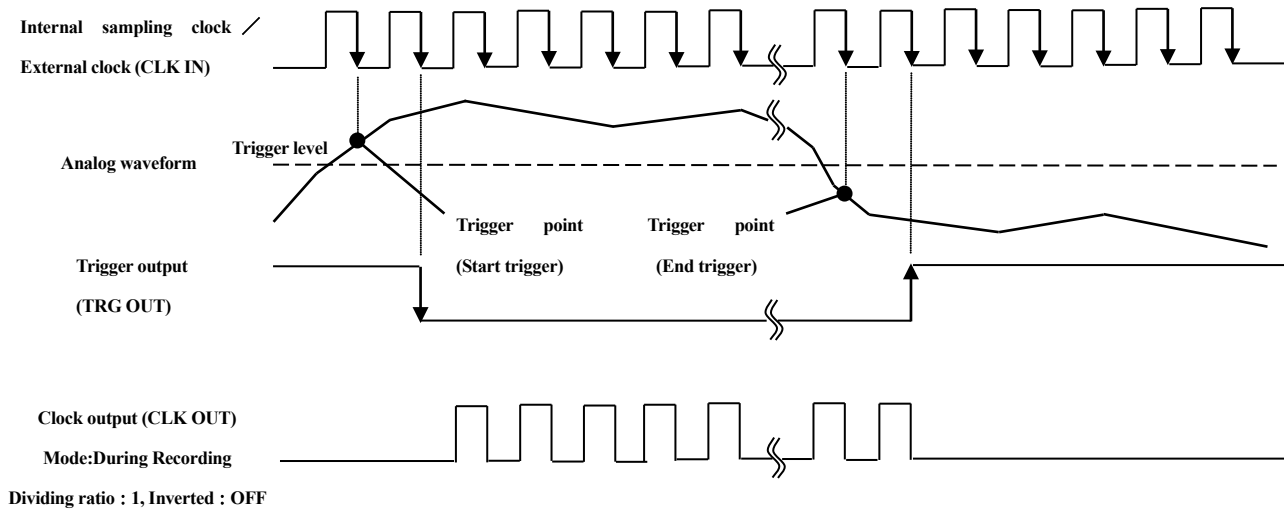
Type of start trigger	Sampling frequency	Output timing of the TRG OUT signal from the trigger point (Note 2)	Reference
Analog trigger (Note 1)	Less than 100 Hz	1 clock worth of sampling clock	Ex. 1
	100 Hz or more	4 clock worth of sampling clock	Ex. 2
Digital trigger (Note 1)	Less than 100 Hz	1 clock worth of sampling clock	Ex. 3
	100 Hz or more	4 clock worth of sampling clock	Ex. 4
Extenal trigger (TRG IN)	Less than 100 Hz	1 clock worth of sampling clock	Ex. 5
	100 Hz or more		

Note 1: Including start trigger of the complex trigger.

Note 2: TRG OUT is output after the trigger condition is satisfied (after the trigger point).

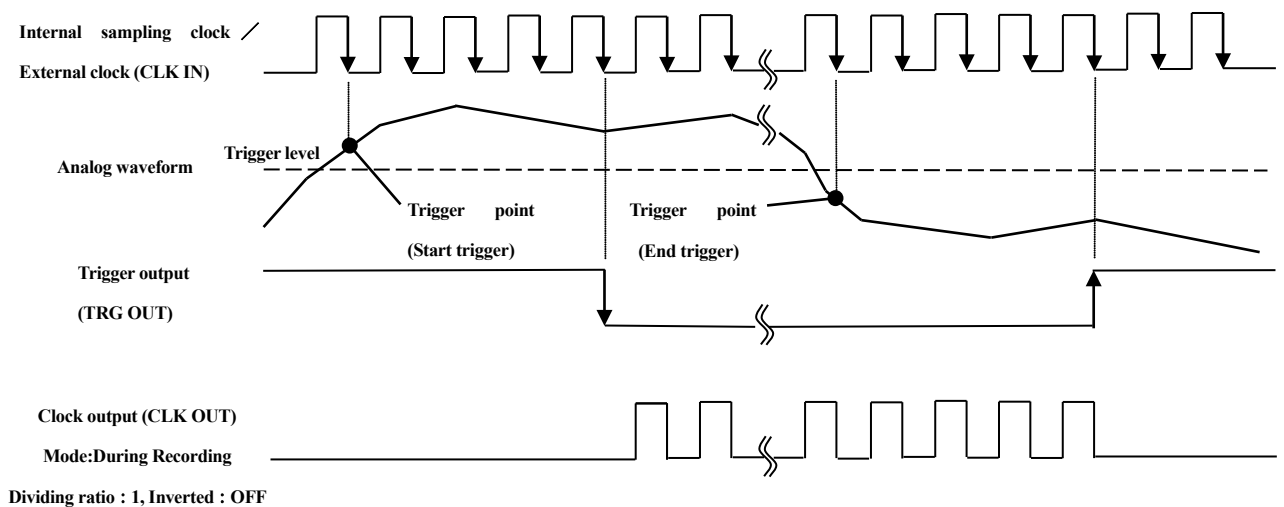
Ex. 1

Trigger mode: Analog trigger (start trigger: Slope (positive), end trigger: Slope (negative))
 Sampling frequency: Less than 100 Hz
 TRG OUT: Output 1 clock after trigger point



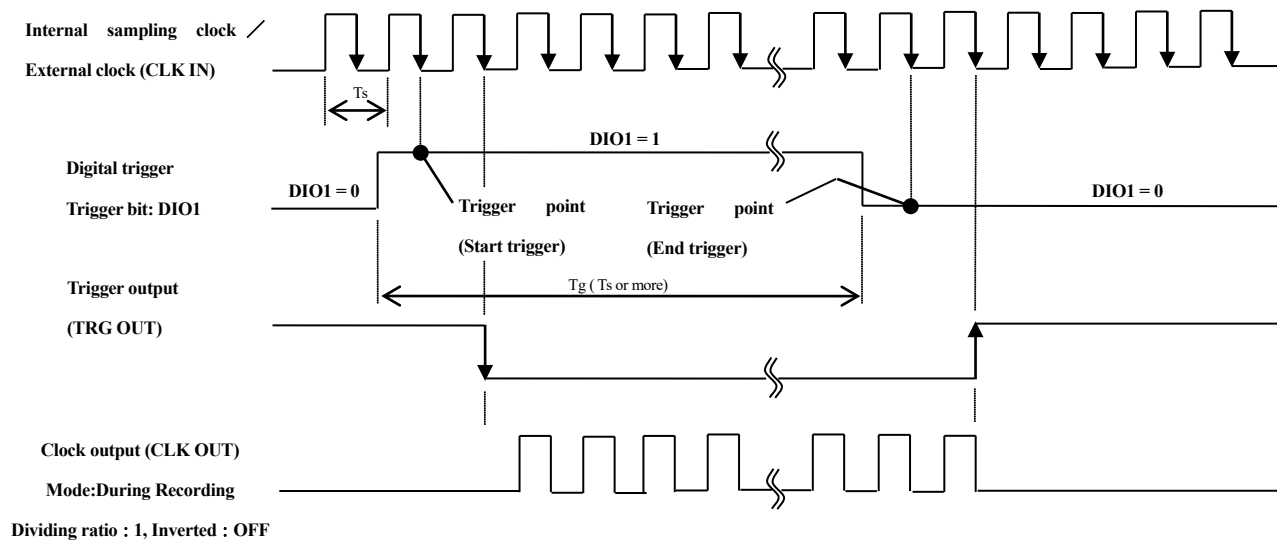
Ex. 2

Trigger mode: Analog trigger (start trigger: Slope (positive), end trigger: Slope (negative))
 Sampling frequency: 100 Hz or more
 TRG OUT: Output 4 clock after trigger point



Ex. 3

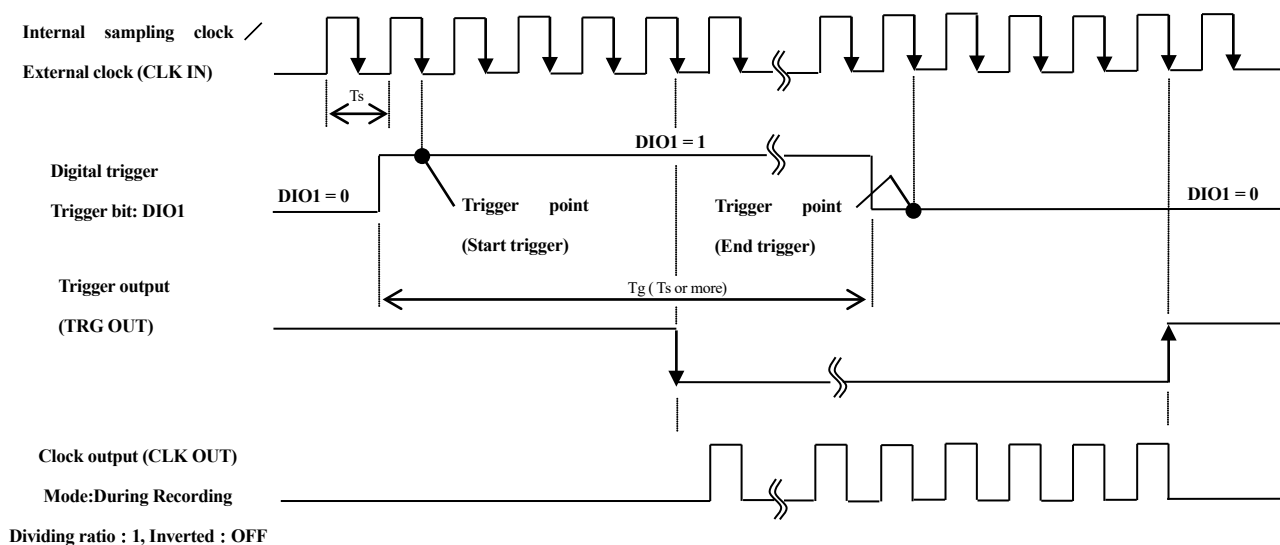
Trigger mode: Digital trigger (Start trigger D1 = "1", End trigger D1 = "0")
 Sampling frequency: Less than 100 Hz
 TRG OUT: Output 1 clock after trigger point



[Note] Time T_g (time from the start trigger to end trigger) requires 1 or more than 1 cycle (T_s) of the sampling clock.

Ex. 4

Trigger mode: Digital trigger (Start trigger D1 = "1", End trigger D1 = "0")
 Sampling frequency: 100 Hz or more
 TRG OUT: Output 4 clock after trigger point

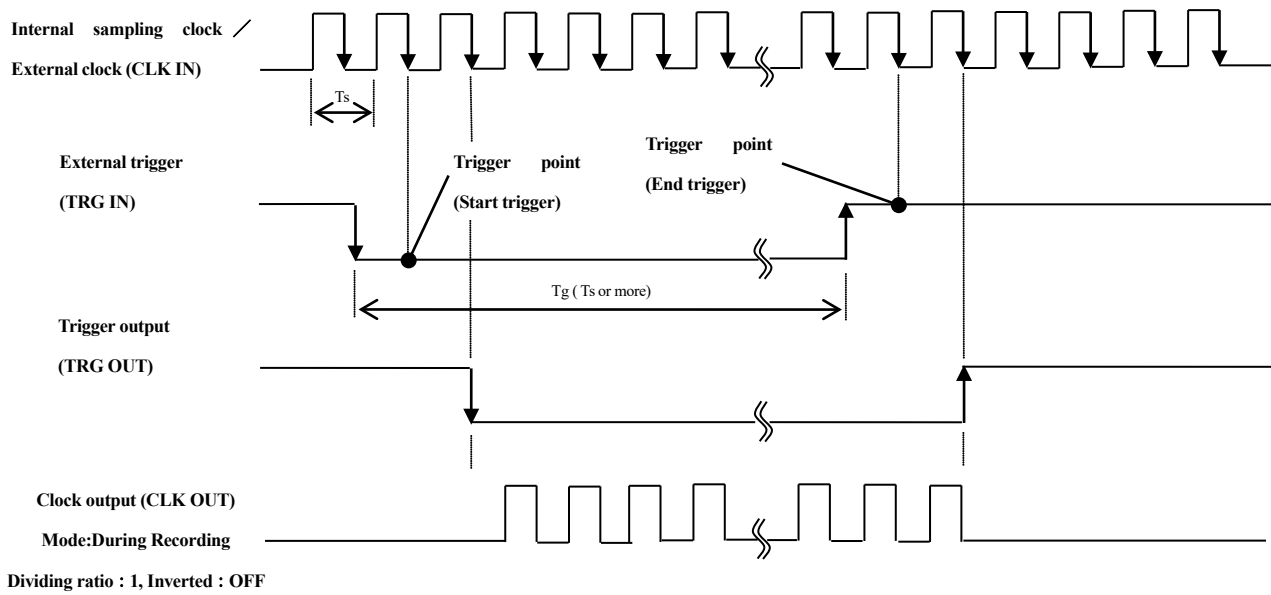


[Note] Time T_g (time from the start trigger to end trigger) requires 1 or more than 1 cycle (T_s) of the sampling clock.

Ex. 5

Trigger mode:
TRG OUT:

External trigger (start trigger: HIGH → LOW, end trigger: LOW → HIGH)
Output 1 clock after trigger point



[Note] Time T_g (time from the start trigger to end trigger) requires 1 or more than 1 cycle (T_s) of the sampling clock.

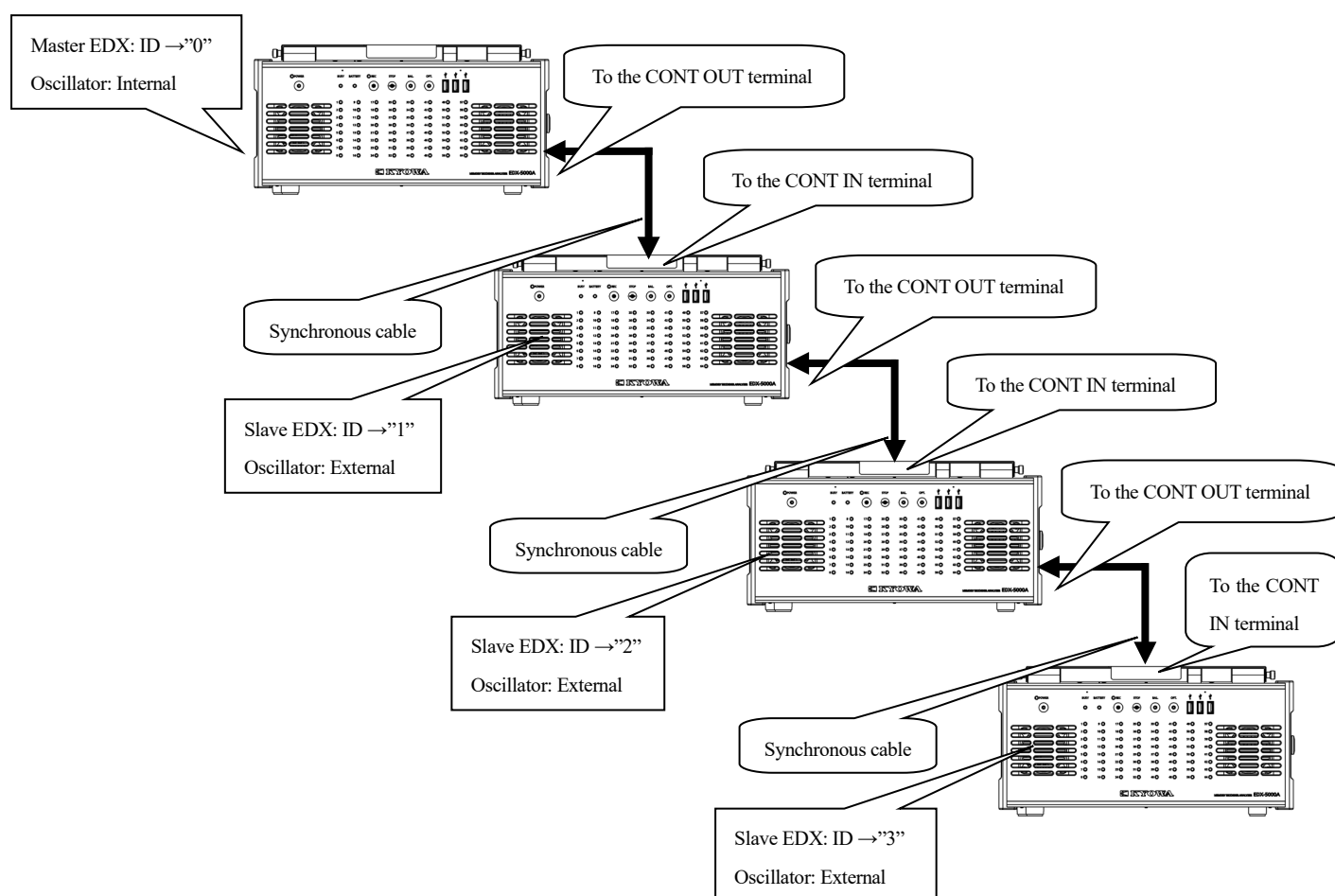
4-3 SYNCHRONOUS OPERATION

The synchronous operation is a feature to measure data of multiple units of EDX-5000A with a maximum of 800 channels' data (10 units' connection with 80 channels/unit) to be recorded at the same time (or at the same sampling clock). The synchronous operation is valid for recording data which is more than 80 channels.

4-3-1 Connectings and Settings for Synchronous Operation

1) Connecting the synchronous cables and turning ON/OFF the EDX-5000A

For synchronous operating the multiple units of EDX-5000A, connect the EDX-5000A units as follows with the optional goods, synchronous cables (N-128, 2 m).



NOTE**Precautions when turning ON and OFF the EDX-5000A**

For synchronous operating of the multiple units of EDX-5000A, turn ON/OFF the EDX-5000A as follows.

For turning ON the power, turn ON the EDX-5000A from the unit with large ID No. to the unit with small ID No. (turn ON the master EDX-5000A [ID No. 0] lastly). In the figure above, turn ON the power as follows.
Slave EDX-5000A (ID No. 3) → Slave EDX-5000A (ID No. 2) → Slave EDX-5000A (ID No. 1) → Master EDX-5000A (ID No. 0)

For turning OFF the power, turn OFF the EDX-5000A from the unit with small ID No. to the unit with large ID No. (turn ON the master EDX-5000A [ID No. 0] firstly). In the figure above, turn OFF the power as follows.
Master EDX-5000A (ID No. 0) → Slave EDX-5000A (ID No. 1) → Slave EDX-5000A (ID No. 2) → Slave EDX-5000A (ID No. 3)

2) Setting of ID number

Set the ID using ETA-55A of each of the EDX-5000A. Be sure to set the first EDX-5000A as the “synchronous master” (ID No. 0) and set the remaining EDX-5000A units as the “synchronous slave” (ID No. 1 to 9). Avoid to set the same ID numbers among the EDX-5000A units. In addition, be sure to assign the ID numbers accordingly starting from 0 as shown in the figure of the previous page.

3) Setting of the switchover of oscillator

Set either Internal or External of the oscillator when using the DPM card (DPM-42B/A (-F), DPM-42B-I (-F)).

For settings, refer to the EDX-5000A Instruction Manual for Main Unit Software or Instruction Manual for EDX-3000B compatible software.

For the master EDX-5000A, select the Internal and for all the slave EDX-5000A units, select the External.

4) Setting of CH conditions

Set the CH condition for each EDX-5000A.

For settings, refer to the EDX-5000A Instruction Manual for Main Unit Software or Instruction Manual for EDX-3000B compatible software.

5) Setting of measuring conditions

Set the measuring conditions on the master EDX-5000A (ID No. 0).

For settings, refer to the EDX-5000A Instruction Manual for Main Unit Software or Instruction Manual for EDX-3000B compatible software.

MEMO

Precautions when setting the conditions of the synchronous operation

- 1) The maximum connectable units of EDX-5000A for synchronous operation is 10 units in total (master unit: 1, slave units: 9).
- 2) During synchronous operation, based on the setting conditions of all of the EDX which are connected in between by the synchronous cables, the recordable setting can be determined. Sampling frequency cannot be set below 100 Hz when the setting of low-pass filter is set to “AUTO” while using the conditioner cards with anti-aliasing filter. If you wish to set the sampling frequency for less than 100 Hz, set the low-pass filter other than “AUTO”.
- 3) The settings of trigger and interval measurement can only be set in the master EDX (ID No. 0) and cannot be set in the slave EDX.
Furthermore, when inputting external trigger signals to the master EDX (ID No. 0) during synchronous operation, only inputs from “TRG.IN” on the BNC connector will be accepted. External trigger recording will not be possible even by the inputting of external trigger signals from the “CONT.IN” connector to the master EDX (ID No. 0).
- 4) The sampling clock is supplied from the master EDX-5000A to the slave EDX-5000A.
- 5) Be sure to set the switchover of the oscillator of the master EDX-5000A unit to Internal and that of the slave EDX-5000A units to External when synchronous operating the EDX-5000A units connecting with synchronous cables (N-128). In this case, carrier wave signal for the DPM-42B/A(-F), DPM-42B-I(-F) is supplied from the master EDX-5000A unit to the slave EDX-5000A units.
- 6) When conducting the synchronous operation by using ESYN-30A for extension, set the master EDX-5000A unit and every slave EDX-5000A unit to Internal.

NOTE

When conducting the synchronous operation, never turn OFF the power of the EDX-5000A units connected with synchronous cables or it will cause error in recording operation.

4-3-2 Precautions when synchronizing different models

The EDX-5000A can be combined with other EDX models and operated in synchronization. Applicable models are the EDX-3000B(A) and EDX-200A (excluding EDX-200A1). When combining, it must be noted that the following limitations are applicable:

(1) Other EDX models that can be synchronized

Other EDX models that can be synchronized with the EDX-5000A are the EDX-3000B(A) and EDX-200A. However, the EDX-3000B(A) and EDX-200A cannot be used at the same time.

(2) Number of connected units

Maximum number of units in synchronous operation: up to 10 units when the EDX-5000A and EDX-3000B(A) are synchronized, or up to 8 units when the EDX-5000A and EDX-200A are synchronized.

(3) Order of connection

Other EDX units must be connected after the EDX-5000A. In addition, the ID No. of other EDX units must be assigned in the order following the ID No. assigned to the last EDX-5000A in the connection chain.

Example: When there are three EDX-5000A and two EDX-3000B:

Assign ID No. 0, 1 and 2 to the EDX-5000A and assign ID No. 3 and 4 to the EDX-3000B.

(4) Setting the length of synchronous cable

If the other EDX units act as slave units and without using DCS-100A, set the length of synchronous cable of the other EDX units to [1000m or less].

(5) Synchronous operation using LAN cable

The EDX-5000A does not support synchronous operation using a LAN cable. Thus, synchronous cable (N-128) must be used when operating in synchronization with an EDX-200A.

(6) About CAN-40/41A

When using a DCS-100A, a CAN-40A/41A installed in other EDX models is disabled. A CAN-40A/41A can be used when using an original control program but the sampling frequency range setting is limited as shown below:

EDX-3000B(A): 1/2/5 system 1 Hz - 10 kHz
2n system 2 Hz - 8192 Hz

EDX-200A: 1/2/5 system 1 Hz - 2 kHz
2n system 2 Hz - 2048 Hz

(7) About external trigger

When synchronizing with other EDX model, following external trigger signal does not work normally.

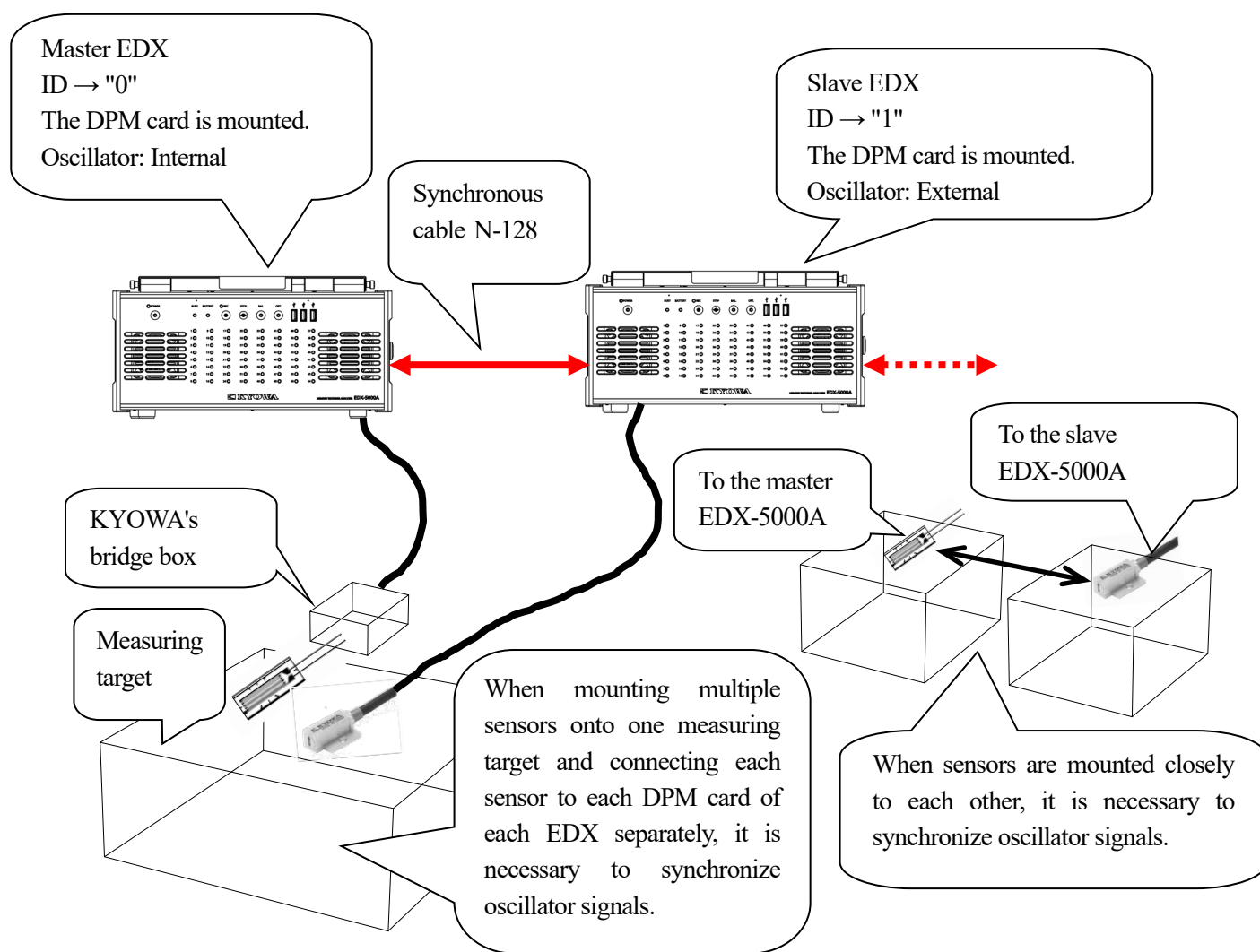
- External trigger signal which is input within 1 sampling after changing to waiting trigger state.
- Cyclic external trigger signal faster than half of sampling frequency.

4-3-3 Precautions for Synchronous Operation by Using DPM-42B/A (-F), DPM-42B-I (-F)

When conducting the synchronous operation with more units of EDX and DPM cards, the necessity of synchronization of oscillator signals is varied under different circumstances.

- Case 1: Synchronization of oscillator signals is necessary.

When mounting multiple of strain gages or sensors of strain gage transducers, etc. onto one measuring target as the figure below or when mounting the sensors close to each other, with connecting each sensor to each DPM card of each EDX separately, the synchronization of oscillator signal for DPM cards is necessary. Set the oscillator setting of master EDX-5000A unit to “Internal” and slave EDX-5000A units to “External”. Connect the EDX-5000A units by using synchronous cables N-128. If you do not synchronize the oscillator signals, beat phenomenon might occur (refer to MEMO in the next page) which may lead to error in output data and waveform of DPM cards.



MEMO

- Oscillator signals

When the master EDX-5000A unit is set to “Internal” and slave EDX-5000A units are set to “External”, the oscillator signal generated from the master EDX-5000A unit is sent to every slave EDX-5000A unit through synchronous cable (N-128).

- Beat phenomenon

A DPM card is operated by an oscillator signal generated from an EDX-5000A. When mounting multiple sensors onto one measuring target and connecting each sensor to each DPM card of each EDX-5000A separately for the synchronous operation, it is necessary to send the oscillator signal generated from the master EDX-5000A unit (ID No. 0) to all slave EDX-5000A units and operate all the DPM cards with the same oscillator signal. The operation of all the DPM cards with the same oscillator signal is called “synchronization of oscillator signals”.

If measuring without synchronizing oscillator signals, the beat phenomenon as described in the figure 1 occurs. Figure 1 shows the incorrect waveform, which has a clear beat phenomenon. If measuring with synchronizing oscillator signals, the correct output waveform as described in the Figure 2 can be obtained.

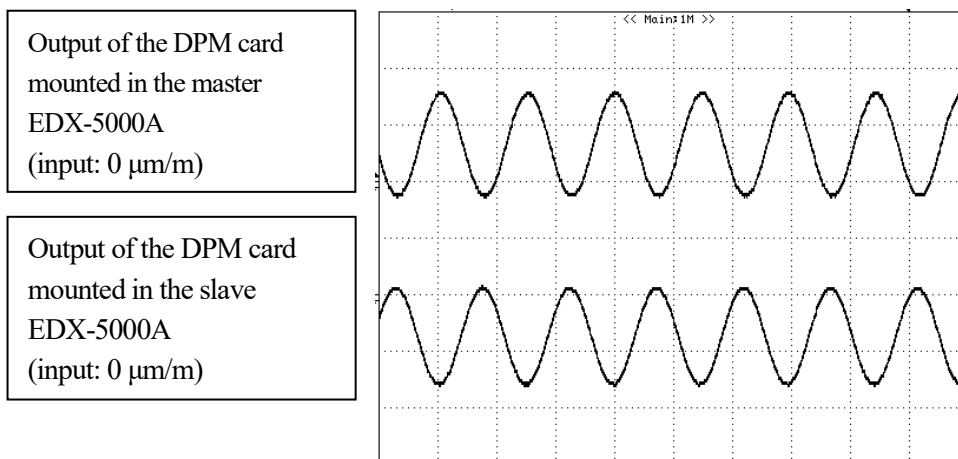


Figure 1 Resulted waveform with occurrence of beat phenomenon. (Incorrect measured data)

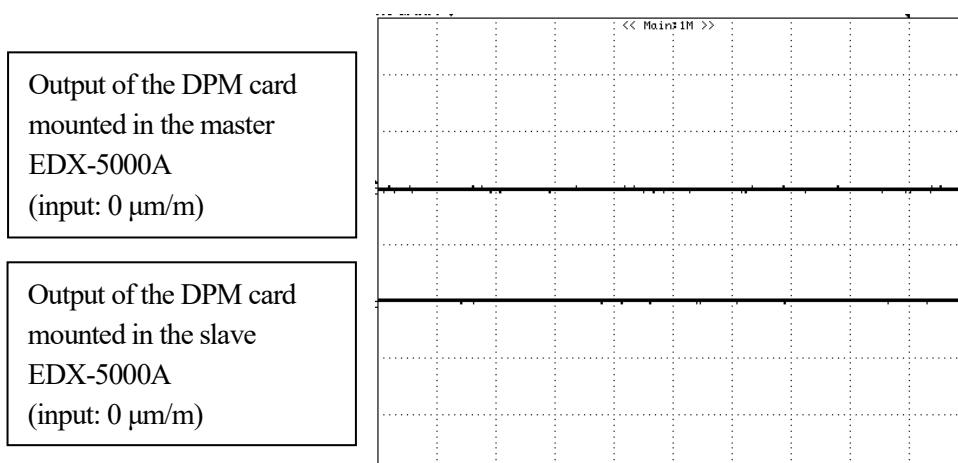
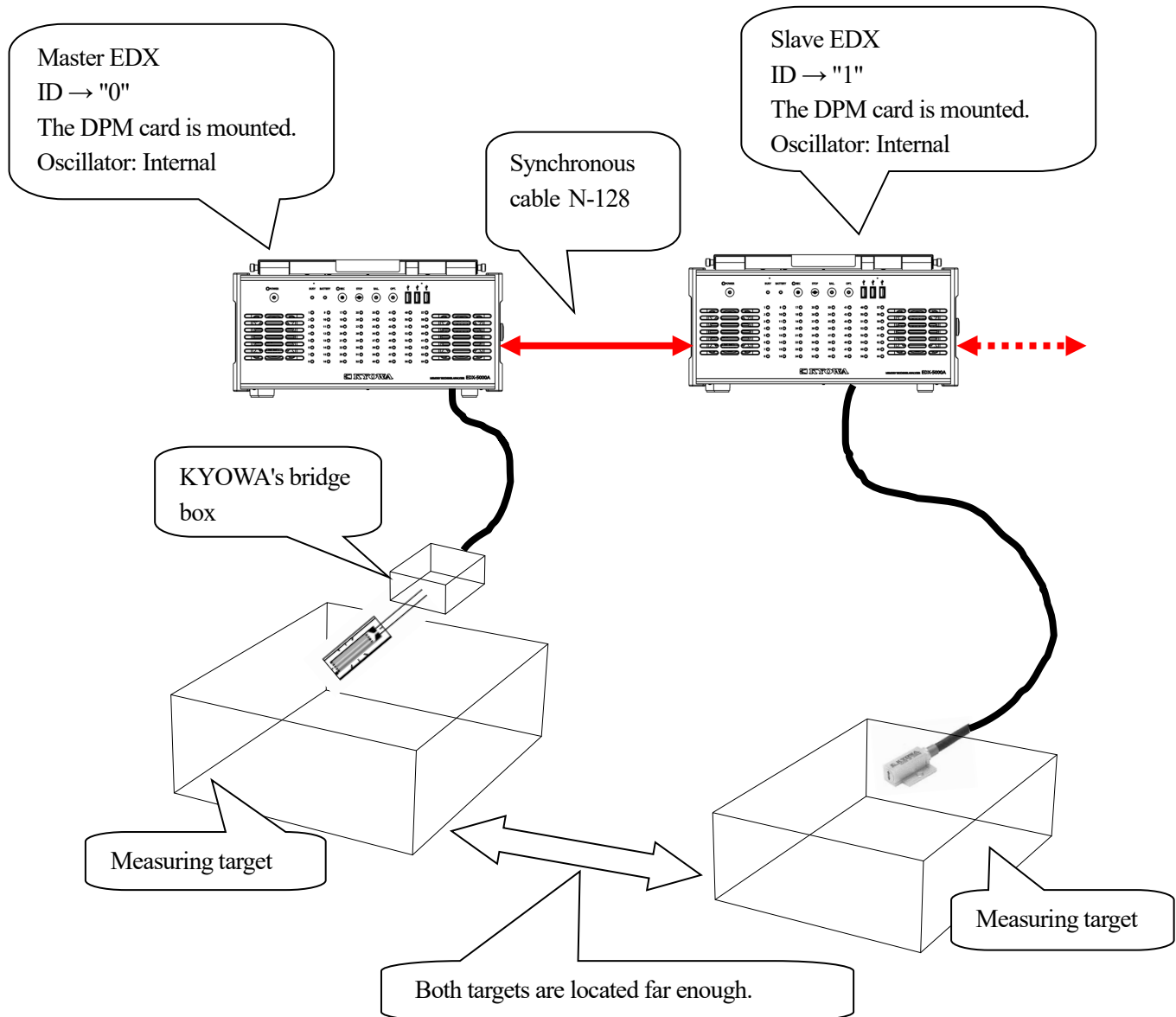


Figure 2 Resulted waveform with synchronizing of oscillator signals (Correct measured data)

○ Case 2: Synchronization of oscillator signals is NOT necessary.

When mounting one sensor, such as a strain gage or sensor of strain gage transducer, onto one target to be measured and connecting each sensor to each DPM card in each EDX-5000A as described as follows, synchronization of oscillator signals is not necessary. Set the master EDX-5000A unit and slave EDX-5000A units to “Internal”. However, when measuring targets are located close to each other, the beat phenomenon (refer to MEMO in the previous page) may occur. Therefore, it is recommended to synchronize oscillator signals before measuring.



MEMO

Synchronize oscillator signals is not necessary under the following situations.

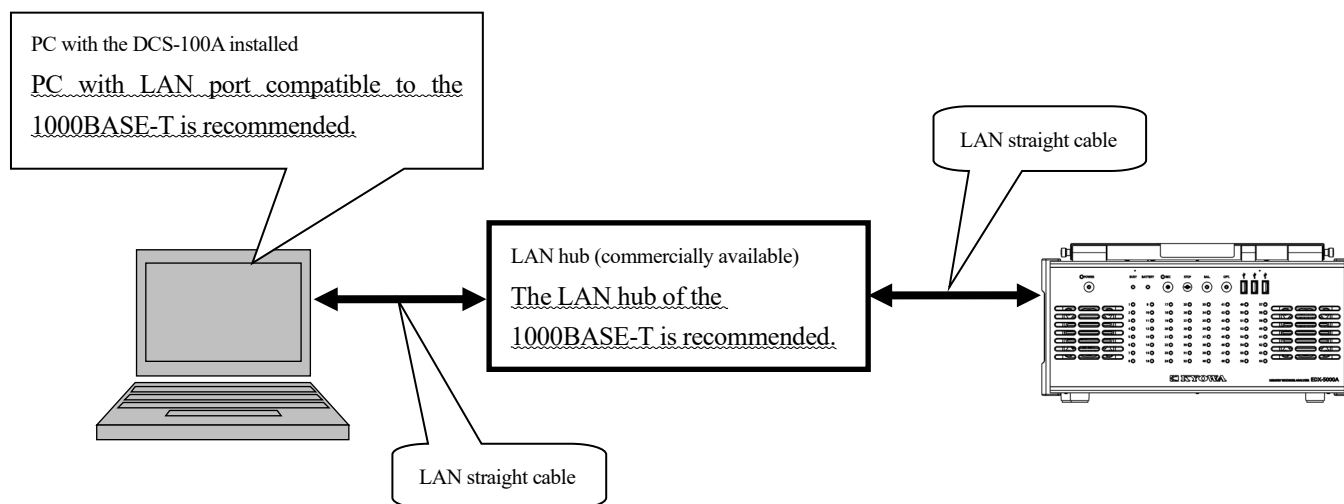
- A DPM card is not being used.
- A DPM card is not mounted.
- Only one DPM-mounted EDX unit is used.

4-4 ONLINE CONTROL

Online control is a feature for controlling the EDX-5000A via the LAN interface by the control software DCS-100A that is installed in the external PC.

Connection diagram is shown as follows.

Online control, stand alone type (EDX-5000A: 1 unit)

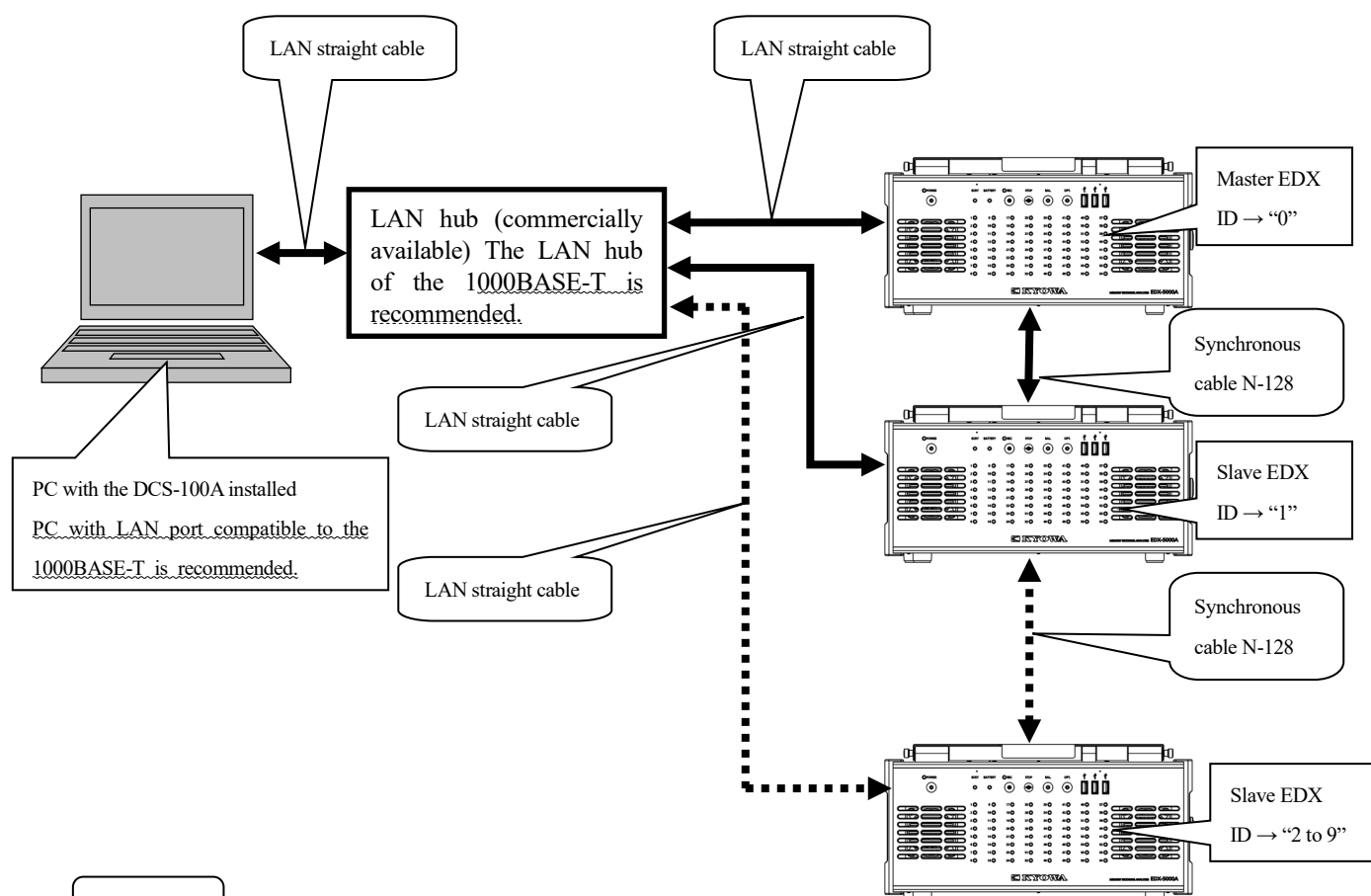


NOTE

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

Connection diagram is shown as follows.

Online control, synchronous operation (EDX-5000A: 2 to 10 units)



NOTE

Precautions when turning ON and OFF the EDX-5000A

For synchronous operating of the multiple units of EDX-5000A, turn ON/OFF the EDX-5000A as follows.

For turning ON the power, turn ON the EDX-5000A from the unit with large ID No. to the unit with small ID No. (turn ON the master EDX-5000A [ID No. 0] lastly). In the figure above, turn ON the power as follows.
Slave EDX-5000A (ID No. 9 to 2) → Slave EDX-5000A (ID No. 1) → Master EDX-5000A (ID No. 0)

For turning OFF the power, turn OFF the EDX-5000A from the unit with small ID No. to the unit with large ID No. (turn ON the master EDX-5000A [ID No. 0] firstly). In the figure above, turn OFF the power as follows.

Master EDX-5000A (ID No. 0) → Slave EDX-5000A (ID No. 1) → Slave EDX-5000A (ID No. 2 to 9)

NOTE

If using the DPM card (DPM-42B/A (-F), DPM-42B-I (-F)), set the switchover of oscillator of the master EDX-5000A to Internal and that of the slave EDX-5000A units to External when synchronously operating the EDX-5000A units with synchronous cables (N-128). In this case, carrier wave signal for the DPM-42B/A (-F), DPM-42B-I (-F)) is supplied from the master EDX-5000A unit to the slave EDX-5000A units.

4-5 ABOUT KS2 FILE THAT IS CREATED WHEN USING FOUR ARITHMETIC OPERATIONS

When using four arithmetic operations, the EDX-5000A's method of saving data to KS2 file is different from EDX-3000A/B or DCS-100A (When the Save Data Folder is set "PC data file folder").

However, the result to calculate physical quantity using by both KS2 file is same.

In case of KS2 file created by EDX-5000A, the Engineering unit conversion coefficient A (hereinafter called "Coeff. A") is value of CAL coefficient, the Engineering unit conversion coefficient B (hereinafter called "Coeff. B") is value of Offset. They are included in "INDIVIDUAL INFORMATION OF VARIABLE HEADER SECTION" of KS2 file.

And range converted values are saved in "RECORDED DATA SECTION" (For details, refer to "IM-A-815 INSTRUCTION MANUAL KYOWA STANDARD FORMAT KS2 FILE FORMAT" that is in the DVD of DCS-100A).

In case of KS2 file created by EDX-3000A/B or DCS-100A, the Coeff. A is 1, the Coeff. B is 0 and physical quantities are saved in "RECORDED DATA SECTION".

Item of KS2 file	EDX-5000A	EDX-3000A/B, DCS-100A
Coeff. A	CAL coefficient	1 fixed
Coeff. B	Offset	0 fixed
Recorded data	Range converted value	Physical quantity

The physical quantity is calculated as follows by all of EDX-5000A, EDX-3000A/B and DCS-100A. And their results are same.

$$\text{Physical quantity} = \text{Coeff. A} \times \text{Recorded data} + \text{Coeff. B}$$

5. FOR BUILT-IN BATTERY WITH COUNTERMEASURE AGAINST INSTANTANEOUS POWER FAILURE

EDX-5000A has a built-in battery (NI-MH) with countermeasure against instantaneous power failure. When the power cable is accidentally disconnected from the EDX-5000A or when the power supply is suddenly cut off,

- 1) The buzzer is activated and the POWER LED blinks in orange.
- 2) If the built-in battery is fully charged, it may supply power for approximately two minutes.

Within two minutes, the internal information data and the measured data are saved. The ETA-55A or the ELA-55A is closed and the Windows will be automatically shut down.

If the power supply is recovered within two minutes, steps 1) and 2) above are automatically deactivated.

After two minutes or more, confirm that the EDX-5000A is turned off, supply the AC or DC power back normally and turn on the POWER switch.

NOTE

Noise may be generated along the conditioner's waveform (measured data) due to the occurrence frequency of the instantaneous power failure, variable value of the dropped voltage during instantaneous power failure, and duration of instantaneous power failure if the instantaneous power failure occurs during monitoring or recording.

Before using the built-in battery with countermeasure against instantaneous power failure, fully charge it. For details of charging, refer to "5-1 HOW TO CHARGE".

NOTE

EDX-5000A has a built-in battery with countermeasure against instantaneous power failure, however, it can only act as a backup battery which temporarily supplies the power in short period. The backup power supply maybe less than two minutes if the built-in battery ages or is not fully charged. Therefore, avoid using the EDX-5000A with unstable power supply. Contact KYOWA or our representatives when the built-in battery is expired. The built-in battery's expiration date is indicated at the rear of the EDX-5000A.

MEMO

As a measure of maintainence for battery, it is recommended to refresh the battery roughly once a month. Refreshing is possible by following the procedure below.

Initial screen → Settings (in a toolbar) → Instrument → Battery → Execute

For the handling method, refer to the EDX-5000A Instruction Manual for Main Unit Software.

Note that this refreshing will take a maximum of 5 hours.

In addition, conduct the refreshing of battery in an environment of at least 10°C.

5-1 HOW TO CHARGE

The built-in battery is charged automatically when the power is supplied to EDX-5000A with the power cable connected to the AC outlet.

Even if the EDX-5000A is turned off, under the above condition, the built-in battery will also be charged automatically and the BATTERY LED will light in green. If it is fully charged, charging will end automatically and the BATTERY LED will light out.

Charging time varies depending on the remaining capacity of the built-in battery. If the remaining capacity is "0", it will take about two hours until it is fully charged.

5-2 STORING PRECAUTIONS

If the EDX-5000A is not being used for a while, fully charge the built-in battery before storing. If storing the built-in battery with small remaining capacity, it may accelerate the self-discharge of built-in battery and lead to over-discharging. The built-in battery can no longer be charged anymore if it has been over-discharged. Be sure to fully charge the built-in battery every five months. If the built-in battery is charged after six months or longer, the capacity may not be fully recovered. Also, if over-discharged, it is necessary to replace the built-in battery. For the battery replacement method, refer to "10-2 REPLACING THE INTERNAL BATTERY".

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.
- When charging the built-in battery, charge under operating temperature range of 0 to 40 °C.

6. GPS/MULTI-CHANNEL CAN OPTIONAL MODULE: EGPC-50A

The EGPC-50A is an optional module for the EDX-5000A. (OPTIONAL ACCESSORIES)

The EGPC-50A is designed to install on an optional slot on the EDX-5000A-64 and EDX-5000A-80.

Regarding to installation of the EGPC-50A, contact KYOWA or our representatives.

- Features

- Capable of recording CAN data and GPS data at the same time. (up to 512 channels)
- Applicable to the CANdb.
- Records GPS data. (latitude, longitude, elevation, course over ground, speed, time, receiving conditions, the number of satellites in use, etc.)
- Synchronizes the start time of recording of multiple EDX-5000A units by using the time data received from GPS satellites. (With the use of EGPC-50A's accessory, GPS sensor)

MEMO

Time synchronization function

The "Time synchronization function" starts recording data with the EGPC-50A, by using the time data received from GPS satellites.

The following measurements use the time synchronization function.

- Point ZERO (Manual) measurements
- Interval (GPS synchronization) measurements

MEMO

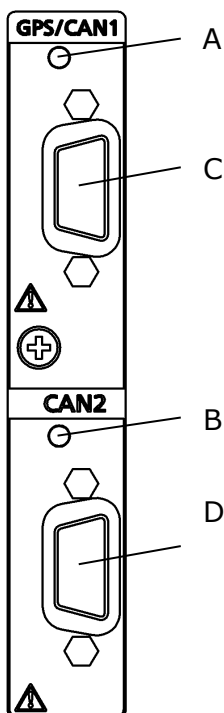
To capture more GPS satellite signals, be sure to mount GPS sensors in areas which are away from tall buildings or trees, where no obstructions exists around the GPS sensors.

Note that low receiving sensitivity of the GPS satellite may occur during cloudy or rainy days.

NOTE

When using the time synchronization function or when recording GPS data, as the GPS sensor is connected to the GPS/CAN-1 port, only CAN-2 port can be used for recording CAN data.

6-1 CONTROLS AND INDICATORS



- A) Status LED for GPS/CAN-1 port
Status LED for indicating the status of GPS/CAN-1 port.
For details, refer to table 6-1.
- B) Status LED for CAN-2 port
Status LED for indicating the status of CAN-2 port
For details, refer to table 6-1.
- C) GPS/CAN-1 port
Input/output port for GPS sensor/CAN data
To connect the GPS sensor, connect the accessory, GPS sensor.
For the assignment of the pins of the connector, refer to “11-4 EGPC-50A: GPS/CAN1 PORT CONNECTOR”.
- D) CAN-2 port
Input/output port of the CAN data
For the assignment of the pins of the connector, refer to “11-5 EGPC-50A: GPS/CAN2 PORT CONNECTOR”.

Table 6-1: Status of LED for GPS/CAN port status

Measuring target	Color of LED	Description
GPS	Green	GPS sensor: Connected GPS status: OK Blinks while receiving data.
	Orange	GPS sensor: Connected GPS status: Error Blinks while receiving data.
	Red	GPS sensor: Not connected Blinks when a communication error occurs.
	OFF	Not using the time synchronization function and recording GPS data function.
CAN	Green	High-speed CAN Blinks while receiving data.
	Orange	Low-speed CAN Blinks while receiving data.
	Red	Lights up in red when a communication error occurs.

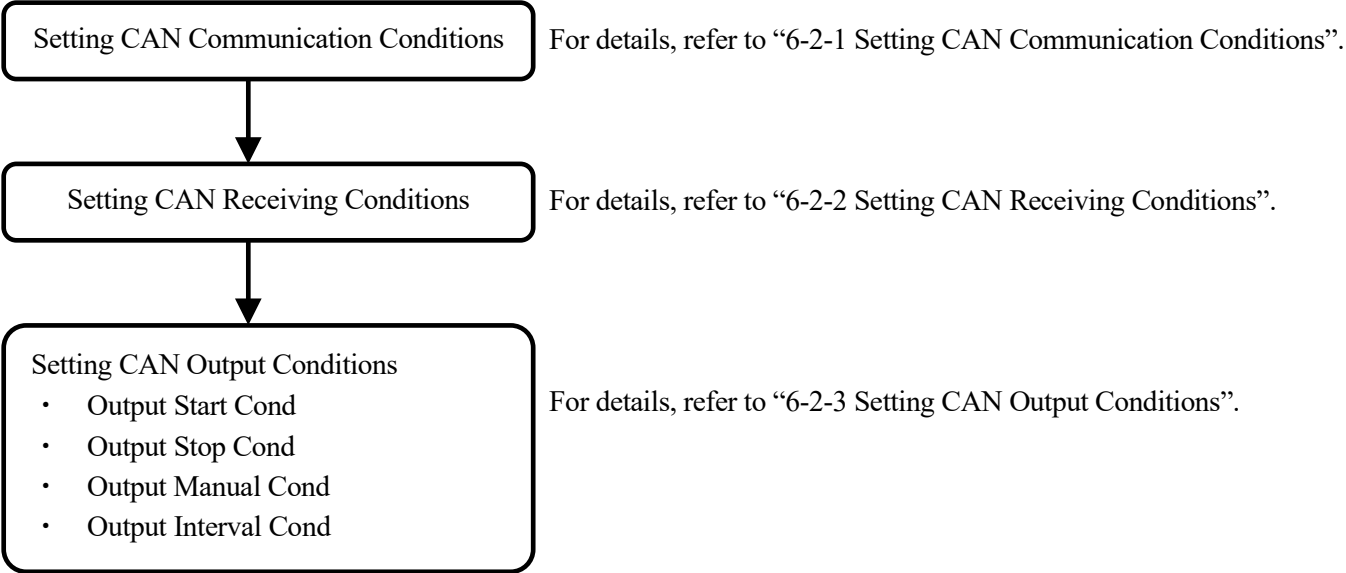
6-2 SETTING WHEN RECORDING CAN DATA

For this setting, use the ELA-55A.
For details, refer to Instruction Manual for EDX-3000B compatible software.

The following items can be set on the “ECAN Condition Setting”.

"Receiving Cond"	Set the receiving conditions of the CAN message.
"Output Start Cond"	For outputting CAN message when starting the A/D conversion.
"Output Stop Cond"	For outputting CAN message when the A/D conversion is stopped.
"Output Interval Cond"	For outputting CAN message at the pre-set constant frequency.
"Output Manual Cond"	For outputting CAN message at arbitrary timing.
"Comm Cond"	Set the CAN communication conditions.

Operation procedures for monitoring and recording the CAN data are described as follows.



MEMO

- CAN message: Indicates data of each CAN frame.
- CAN data: Indicates the data recorded by the EGPC-50A.

6-2-1 Setting CAN Communication Conditions

Set the CAN communication conditions.

For details, refer to Instruction Manual for EDX-3000B compatible software.

On the window of this setting, set the following items.

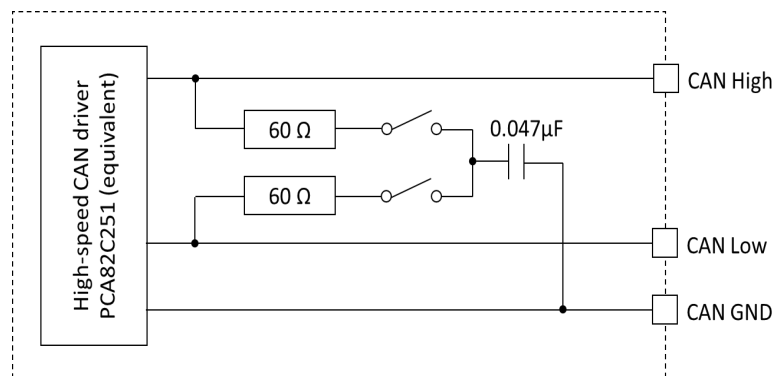
Communication conditions can be set for each port.

"CAN Comm Std"	Set the CAN communication standard. High Speed CAN or Low Speed CAN
"Comm Speed"	Set the communication speed. Based on the CAN communication standard, communication speeds are available as follows. High Speed CAN :1000/800/500/250/125/100/83.3/62.5/50/33.3/25/20/10 [kbps] Low Speed CAN :125/100/83.3/62.5/50/33.3/25/20/10 [kbps]
"Term Resist"	Set the termination resistor. Based on the CAN communication standard, a termination resistor operates as follows.

- High Speed CAN

ON: Connect the 120 ohm termination resistor.

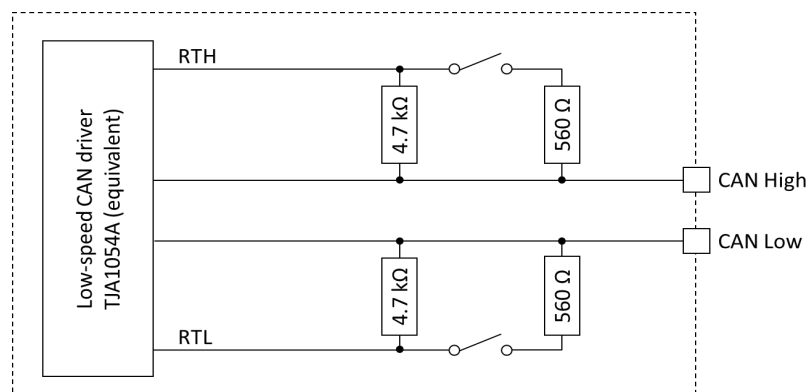
OFF: Termination resistor is not connected.



- Low Speed CAN

ON: Reduce termination resistor value to 500 ohm using 560 ohm and 4.7 k-ohm resistors.
(Parallel connection)

OFF: Connect the 4.7 k-ohm termination resistor.



6-2-2 Setting CAN Receiving Conditions

Set the CAN receiving conditions.

For details, refer to Instruction Manual for EDX-3000B compatible software.

On the window of this setting, set the following items.

"Measurement"	Set the measurement ON/OFF. Measurement ON/OFF can be set for each channel.
"CAN-ID Name (Message)"	Input the name of the CAN data frame to be received.
"Port No."	Set the CAN port.
"Format"	Select the CAN data frame format to be received. (Standard or Extended)
"Frame ID"	Set the frame ID of the CAN data frame to be received.
"Data Length (Byte)"	Set the data length of the CAN data frame to be received.
"CAN-CH Name (Signal)"	Set the name of channel to be measured.
"Start Bit"	For extracting an individual CAN data in the CAN data frame received, set the first bit of the data to be extracted.
"Bit Length"	For extracting an individual CAN data in the CAN data frame received, set the number of bits to be extracted, counted from the start bit.
"Data type"	Set the channel data type to be measured. Signed/Unsigned/Float/Double
"Endian"	Set the endian of channel to be measured.
"Calibr. const."	Set the calibration constant as required.
"Unit"	Set the unit of channel to be measured.
"Maximum/Minimum"	Set the threshold value when the digital output function is "ECAN-CH exceeded" or "While exceeding (ECAN-CH)". If the CAN data is higher than or equal to a maximum threshold, or lower than or equal to a minimum threshold value, low signal (0) is output from the digital input/output (DIO) bit, where the above function is assigned.

NOTE

If the number of CAN messages to be received per second is abundant, the "ECAN overflow" may occur.
For details, refer to "6-2-4 The Number of CAN Messages that can be Received Per Second".

6-2-3 Setting CAN Output Conditions

Set the CAN output conditions.

For details, refer to Instruction Manual for EDX-3000B compatible software.

On the window of this setting, set the following items.

"Output"	Set the CAN output ON/OFF.
"CAN-ID Name (Message)"	Input the name of the CAN data frame to be sent.
"Port No."	Set the CAN port.
"Format"	Select the CAN data frame format to be sent. (Standard or extended)
"Frame ID"	Set the frame ID of the CAN data frame to be sent.
"Data length"	Set the data length of the CAN data frame to be sent.
"B0 to B7"	Set the data of the CAN data frame to be sent. Data of the CAN data frame can be set for each byte.
"Confirmation"	Set the response confirmation function to the CAN data frame to be sent.
"Rx Frame ID"	Set the frame ID of the response CAN data frame to be received corresponding to the CAN data frame to be sent.
"Time out [msec]"	Set the timeout period [msec]: from the moment when the CAN data frame is sent, to the moment when the response CAN data frame is received.
"Result"	Result of the response confirmation appears. (OK or Error)

MEMO

After the CAN data frame (with the "Confirmation" ON) is sent, the response of the CAN data frame ID which is pre-set in the "Rx Frame ID" will be waited.

At this time, the results are as follows.

OK: Received the frame ID response within the specified "Time out (msec)" time.

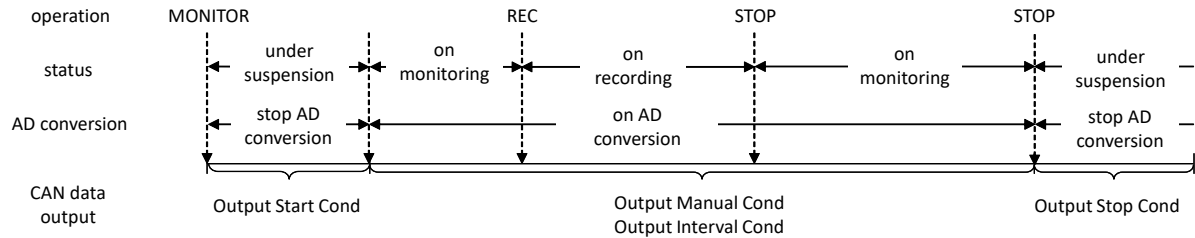
Error: Did not receive the frame ID response within the specified "Time out (msec)" time.

MEMO

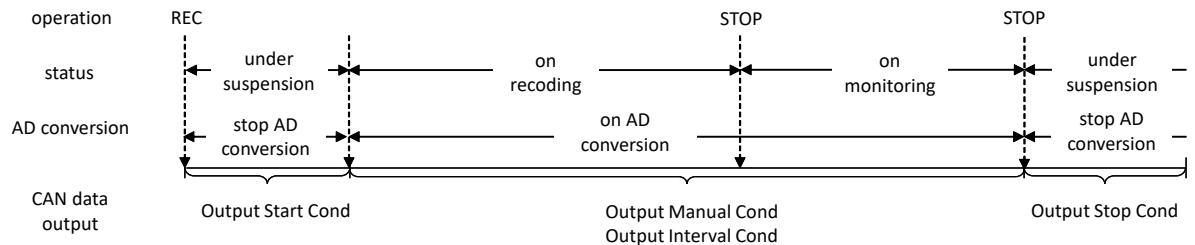
Operation timings of every CAN output are described as follows.

【Manual mode】

- **MONITOR** button → **REC** button → **STOP** button

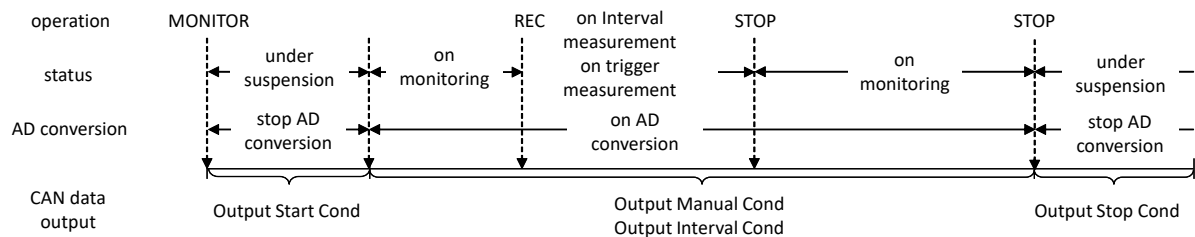


- **REC** button → **STOP** button

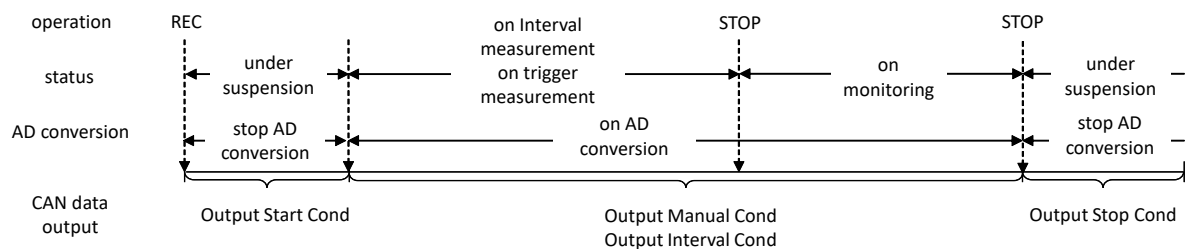


【Interval mode or Trigger mode】

- **MONITOR** button → **REC** button → **STOP** button



- **REC** button → **STOP** button



6-2-4 The Number of CAN Messages that can be Received Per Second

When setting the number of analog measuring channels according to the maximum number of recordable channels based on each sampling frequency (refer to the item (7) in the “13-1 OVERALL SPECIFICATIONS”) , the maximum number of CAN messages per second that can be received by the EGPC-50A is 1000 per port.

If CAN messages are over-input, the EDX-5000A may stop recording the CAN message temporarily in which it is known as "ECAN overflow".

After the occurrence of "ECAN overflow", recording of the analog data will be resumed but note that the CAN messages might have lost. If the "ECAN overflow" occurs, check whether the number of CAN messages to be received by the EGPC-50A has exceeded or not the maximum number of CAN messages that is allowed to be input as stated above.

You can check the number of lost CAN messages as follows.

- Check the number of messages displayed due to "ECAN overflow" in the ETA-55A or ELA-55A.
- Check the number of messages displayed due to "ECAN overflow" in the DAS-200A within the recorded time. The number of "ECAN overflow" messages is also saved in the recorded data file (file extension: E4A).

MEMO

- Operation during the "ECAN overflow"

The receiving of overabundance of CAN messages will cause the overloading of the internal processing of the EDX-5000A and may lead to error of the recording operation. When the overloading is detected, the EDX-5000A automatically stops recording the CAN messages temporarily in order to stop the overloading for a stable internal operation. After the internal operation had become stable, the EDX-5000A will start recording the CAN messages again. (Note that the EDX-5000A put a high priority on recording the analog data.)

- When the "ECAN overflow" occurs, do as follows.

- Reduce the sampling frequency.
- Reduce the number of analog channels to be recorded.
- Set the AD data format to 16 bit.

With the setting as above, the occurrence of "ECAN overflow" might be able to be prevented while recording the CAN messages.

Examples are described as follows.

[Example] Reduction of the number of analog channels. (32 channels → 16 channels)

Sampling frequency: 10 kHz, the number of analog channels: 16

The maximum number of CAN messages per second that is allowed to be input will become 2000 per port.

[Example] Reduction of the number of analog channels. (32 channels → 8 channels)

Sampling frequency: 10 kHz, the number of analog channels: 8

The maximum number of CAN messages per second that is allowed to be input will become 4000 per port.

[Example] Reduction of sampling frequency. (10 kHz → 1 kHz)

Sampling frequency: 1 kHz, the number of analog channels: 32

The maximum number of CAN messages per second that is allowed to be input will become 10000 per port.

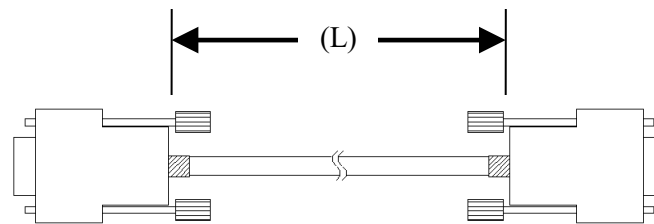
6-2-5 Connecting to CAN Bus

This section describes how to connect to the CAN bus of EDX-5000A with the EGPC-50A.

For details, refer to “11-4 EGPC-50A: GPS/CAN1 PORT CONNECTOR” and “11-5 EGPC-50A: GPS/CAN2 PORT CONNECTOR”.

The following communication cable are optional accessories.

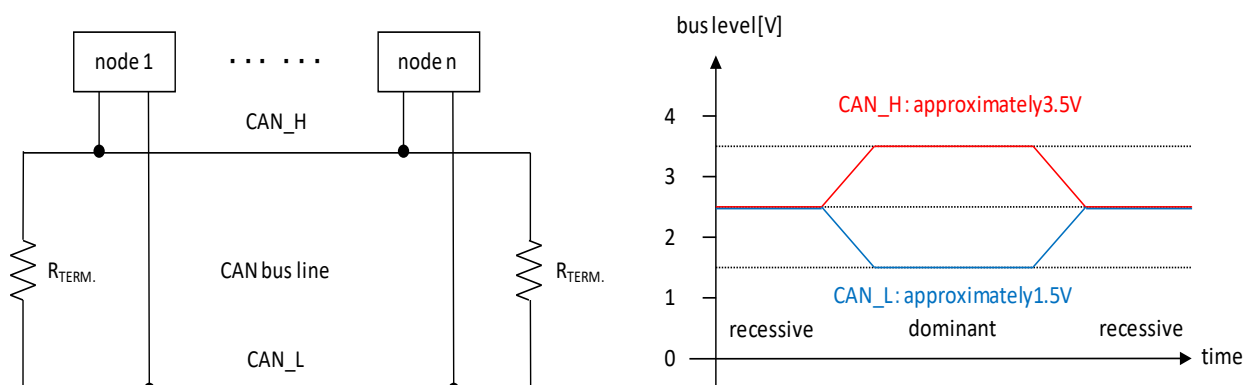
Name	Model	Cable length (L)
Communication cable	N-102	1.0 m
	H-11681	3.0 m
	H-11682	5.0 m
	H-11683	10.0 m



Communication cable

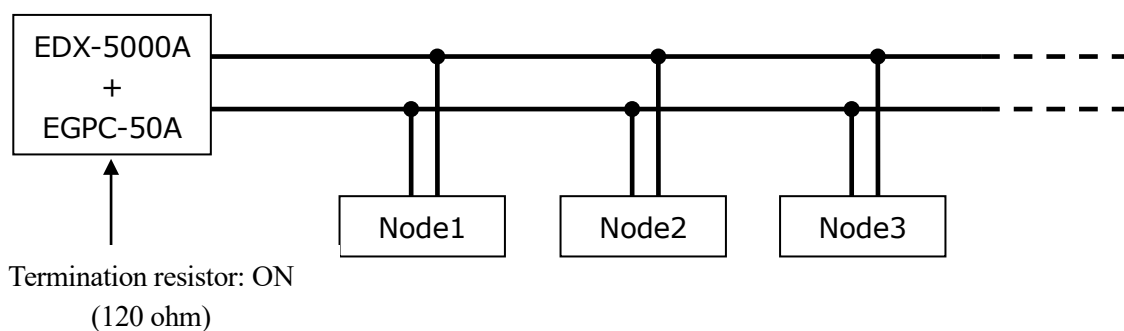
6-2-5-1 Connecting high speed CAN

The bus configuration and bus level of the high Speed CAN are as follows.

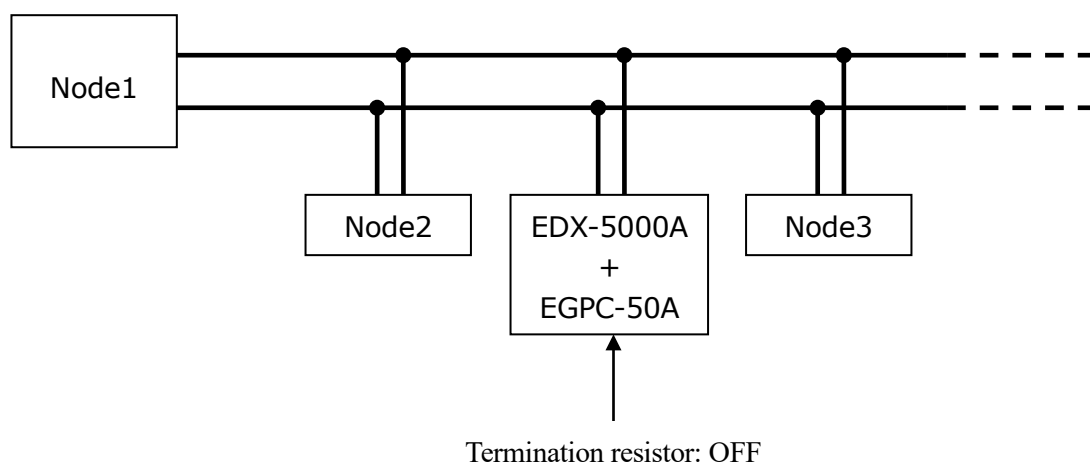


For the high speed CAN, it is necessary to connect termination resistors on both sides of the CAN bus.

When connecting the EDX-5000A to the end of the CAN bus, turn ON the termination resistor setting by the ETA-55A or the ELA-55A.

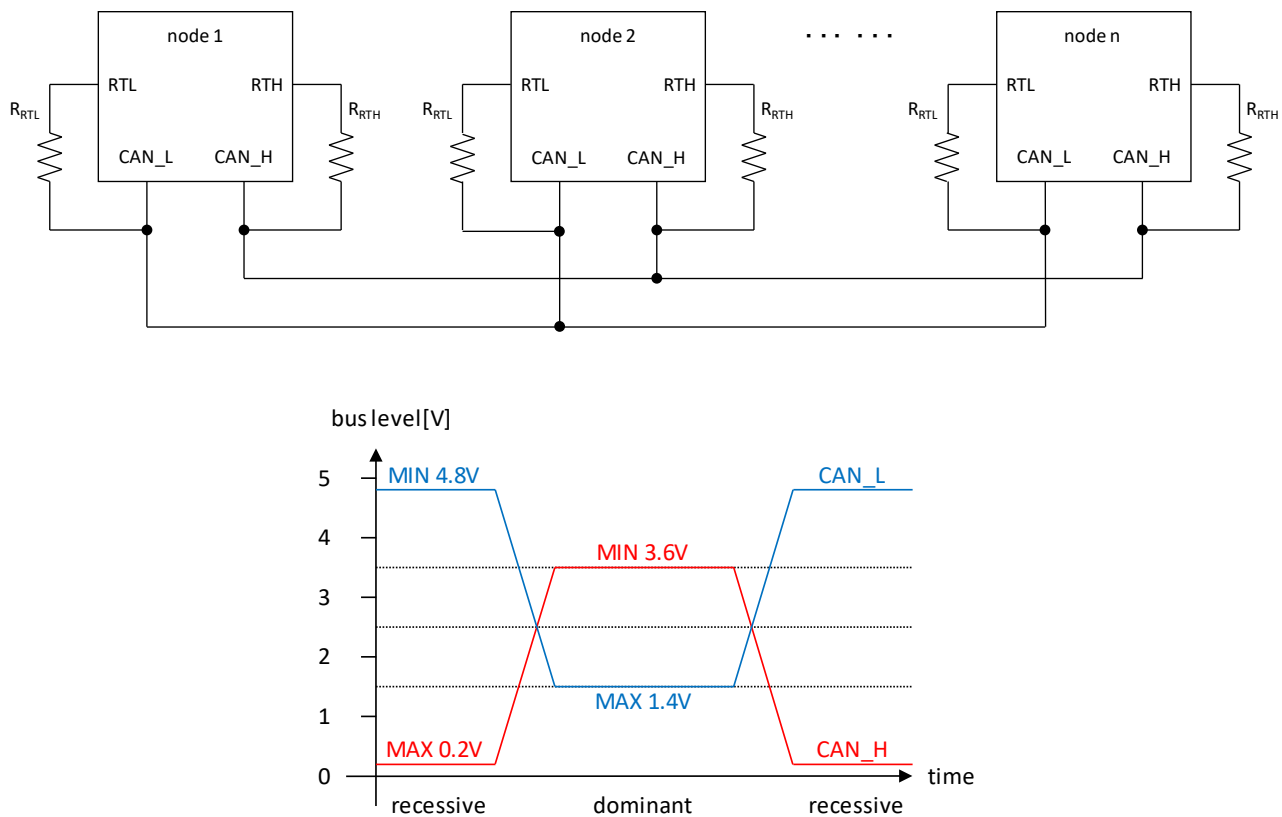


When connecting the EDX-5000A in the middle of the CAN bus, turn OFF the termination resistor setting by the ETA-55A or the ELA-55A.



6-2-5-2 Connecting low speed CAN

The bus configuration and bus level of the low speed CAN are as follows.



For the low speed CAN, it is necessary to connect termination resistors (R_{RTH} , R_{RTL}) at every node. Also, the combined resistance of the whole system must be within 100 to 500 ohm. (*Close to 100 ohm is better)

It is possible to set the termination resistor (R_{RTH} , R_{RTL}) as follows using the EGPC-50A.

- Termination resistor OFF: Connect the 4.7 k-ohm termination resistor to every R_{RTH} and R_{RTL} .
- Termination resistor ON: Connect the 560 ohm termination resistor to the 4.7 k-ohm termination resistor in parallel. (Combined resistance = Approx. 500 ohm)

Example of termination resistors is described as follows.

[Example]

Suppose that there are 5 nodes and one EDX-5000A in the system with every node is connected to the 2.2 k-ohm termination resistor at the CAN bus.

The combined resistance of 5 nodes is 440 ohm.

When connecting the EDX-5000A by using the EGPC-50A,

- Termination resistor: ON → The combined resistance of the whole system = Approx. 234 ohm
- Termination resistor: OFF → The combined resistance of the whole system = Approx. 402 ohm

Since the combined resistance of the whole system is "close to 100 ohm is better", set the termination resistor ON.

6-3 SETTING THE TIME SYNCHRONIZATION FUNCTION

This setting is described using the ETA-55A.

For details, refer to the EDX-5000A Instruction Manual for Main Unit Software.

This section describes the measurement using Time Synchronization Function.

- Point ZERO measurements

Recording is able to be started at the moment of zero millisecond (hh:mm:ss.000 ms) by using the time data received from GPS satellites.

The recording is started at the moment of "000" for ms value (hh:mm:ss.000 ms) in approx. 2 seconds after the execution of starting recording by pushing the REC button, etc.. (Synchronous operation: After approx. 5 seconds)

- Interval (GPS synchronization) measurements

Multiple of EDX-5000A(s) are able to be started for recording synchronous data at the same time by using the time data received from GPS satellites.

MEMO

- Interval (GPS synchronization) measurements

Based on own system clock, the normal interval measurement starts the measurement at the EDX-5000A's timing saved in the software. Consequently, when multiple of EDX(s) at different location start the interval measurement separately, the measurement cannot be started at the same time.

Interval measuring using time synchronization function will start the measurement at the GPS time of EDX(s) which matches to each of the EDX(s) in terms of hardware by using the synchronous pulse signals and the correct information of current time received from GPS satellites. (Do not rely on the EDX-5000A(s)' system clock or EDX-5000A(s)' software.)

Shortly, the Interval (GPS synchronization) measurements are able to match the start timing of recording among the EDX-5000A.

- Point ZERO (Manual) measurements

The Point ZERO (Manual) measurements enables the measuring and recording of data to be started at the moment of zero millisecond (hh:mm:ss.000 ms) after the matching of GPS time of each EDX(s) in terms of hardware by using the synchronous pulse signals and the correct information of current time received from GPS satellites.

- Time synchronization function and synchronous sampling clock

The time synchronization function synchronizes the sampling clock by using the correct pulse signals which is output from the GPS sensor. When the recording start time has come, the time synchronization function corrects the sampling clock, falls the sampling clock edge within 3 microseconds and starts the A/D conversion.

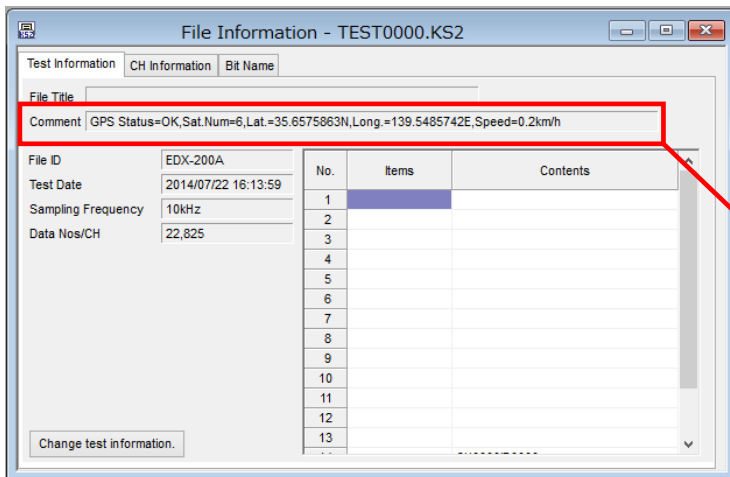
- During the Point ZERO (Manual) measurements or Interval (GPS synchronization) measurements, if the GPS status is "Error" or "NONE" at the recording start time, the EDX-5000A starts recording data in 2 seconds after the true recording start time based on the internal clock. (For details, refer to "6-3-4 Recording Operation when the GPS Status is "Error" or "NONE")

MEMO

- You cannot identify whether the recorded data file is saved from the Point ZERO (Manual) measurements or is saved from the normal manual measurements by file names. Similarly, you cannot identify whether the recorded data file is saved from the Interval (GPS synchronization) measurements or is saved from the normal interval measurements by file names.

In this case, open the data file (KS2 file) with DAS-200A. When the GPS information appears on the test information comment (as follows), the recorded data file is saved from the Point ZERO (Manual) measurements or Interval (GPS synchronization) measurements.

*For the DAS-200A operations, refer to DAS-200A INSTRUCTION MANUAL.



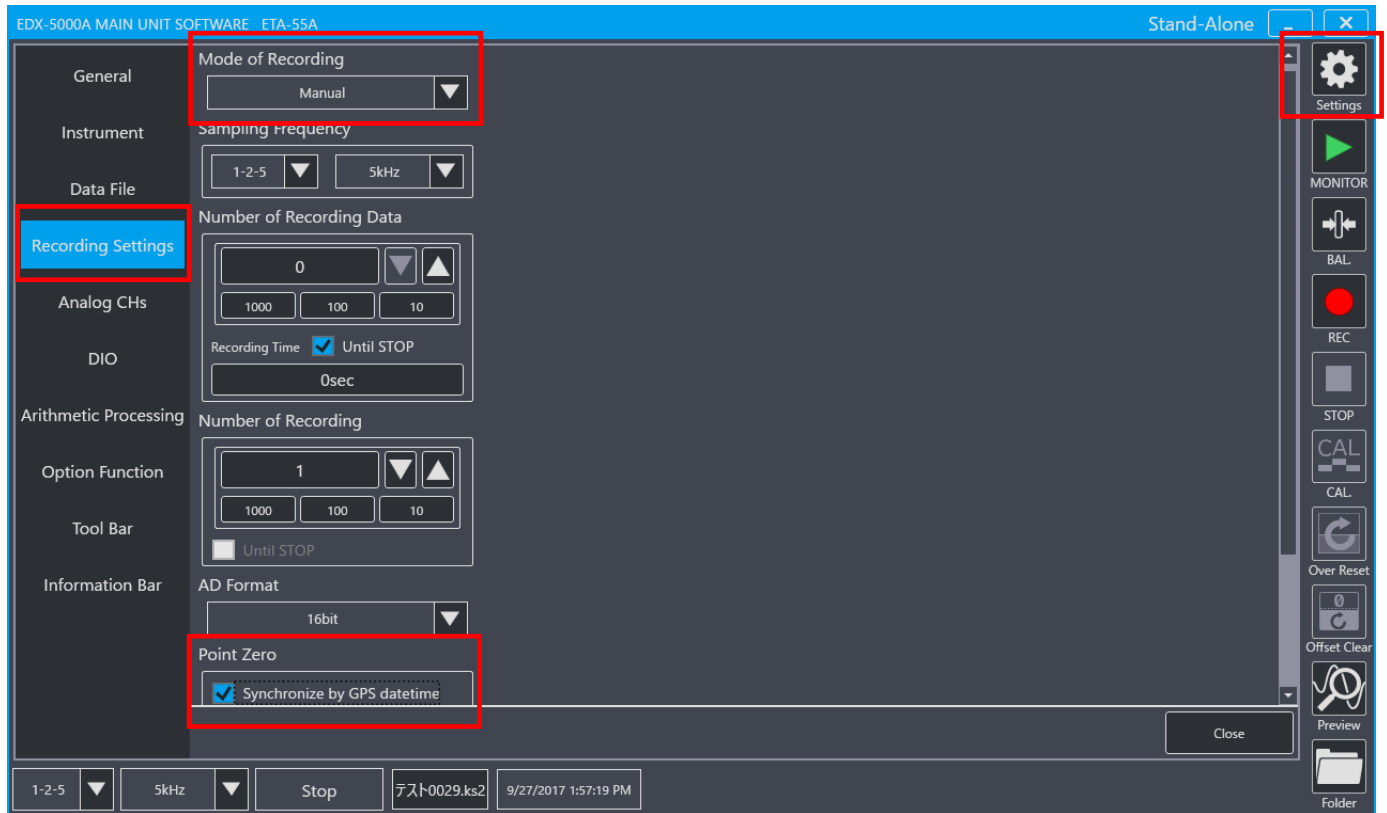
When the recorded data file is saved from the Point ZERO (Manual) measurements or Interval (GPS synchronization) measurements, GPS information appears.

6-3-1 Setting ETA-55A for Point ZERO Measurements

Before executing the Point ZERO measurements, set the measuring mode to the "Manual."

With the properly mounted EGPC-50A, point to **Settings** – **Recording Settings** menu to set the measuring mode to the "Manual".

After that, insert a check mark for “Synchronize by GPS datetime” of “Point ZERO”.



NOTE

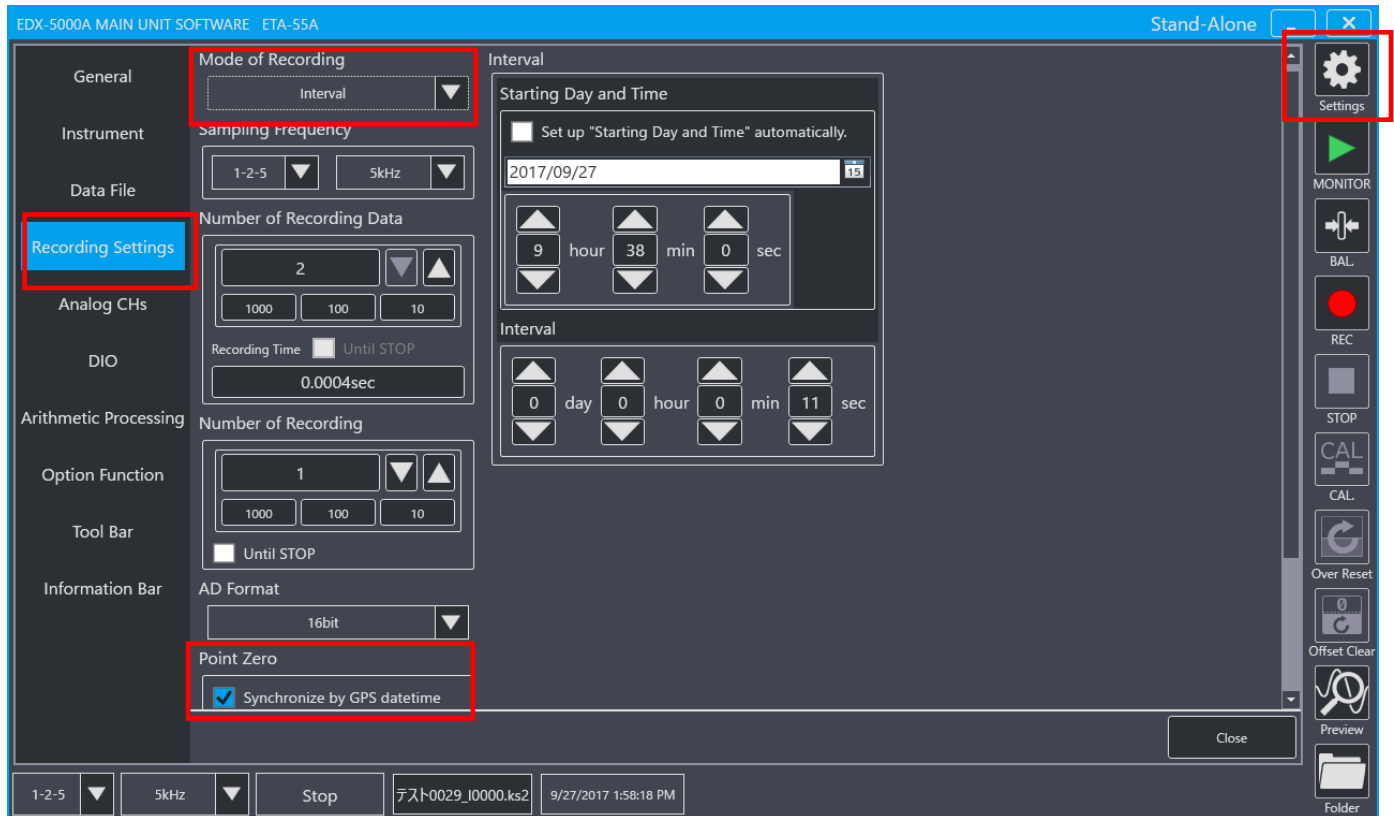
During the Point ZERO measurements, the number of repeat times is "1 (fixed)".

6-3-2 Setting ETA-55A for Interval (GPS Synchronization) Measurements

Before executing the Interval (GPS synchronization) measurement, set the measuring mode to the "Interval."

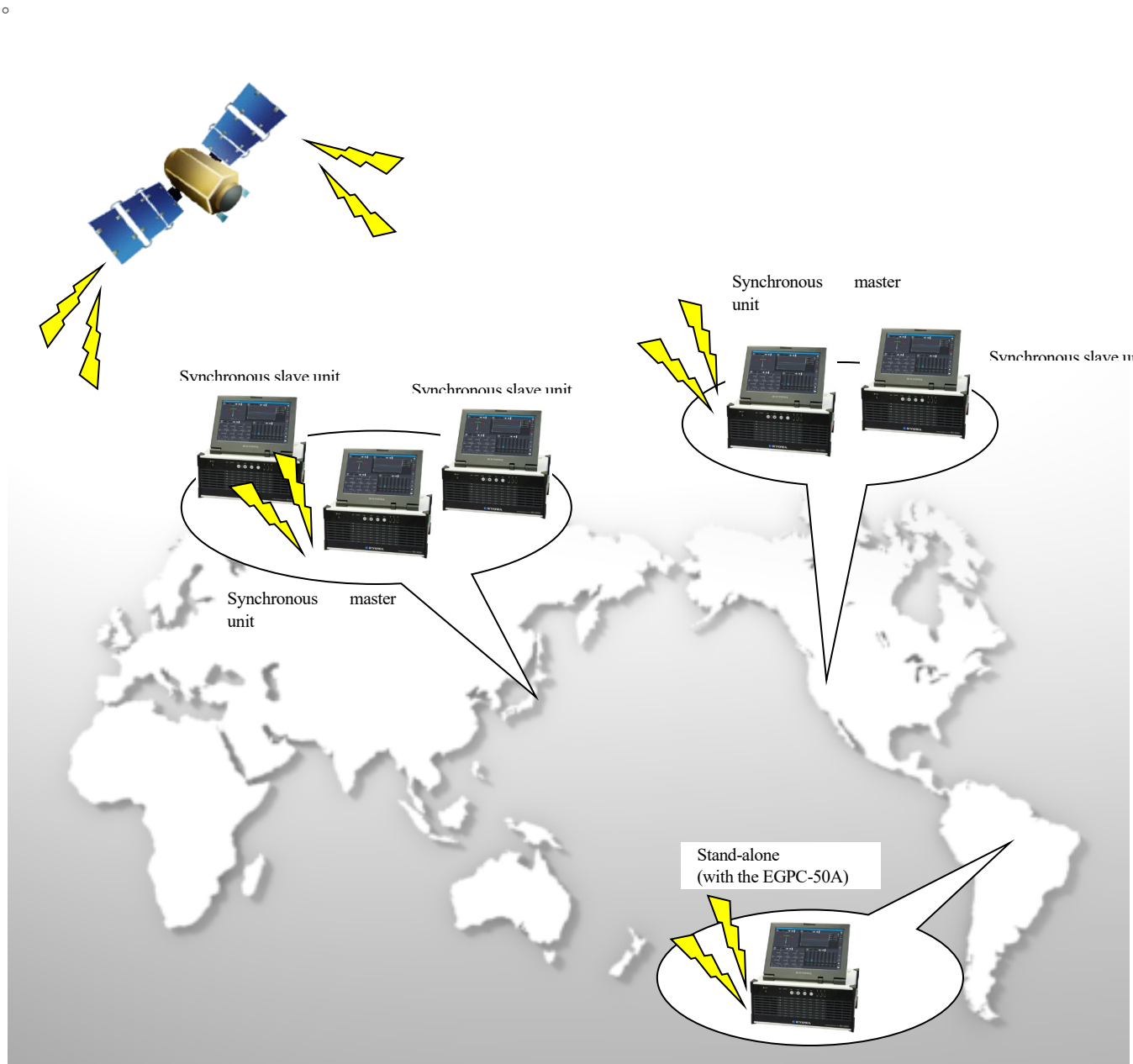
With the properly mounted EGPC-50A, point to **Settings** – **Recording Settings** menu to set the measuring mode to the "Interval".

After that, insert a check mark for “Synchronize by GPS datetime” of “Point ZERO”.



6-3-3 Setting EDX-5000A

This section describes how to install EDX-5000A units for using the time synchronization function with the EGPC-50A.



The time synchronization function does not limit the total number of EDX-5000A units. (Note that the number of EDX-5000A units in one synchronous group is up to 10 units).

NOTE

When executing the synchronous operation, mount the EGPC-50A into the synchronous master unit. The time synchronization function is not available when mounting the EGPC-50A into the synchronous slave unit.

6-3-4 Recording Operation when the GPS Status is “Error” or “NONE”

When the GPS status is “Error” or “NONE” at the recording start time, the EDX-5000A starts recording data in 2 seconds after the recording start time set based on the internal clock. At that time, “GPS FAILED” is displayed in the title bar of the ETA-55A.

Note that the file created by this action has "\$_" at the head of the file name.

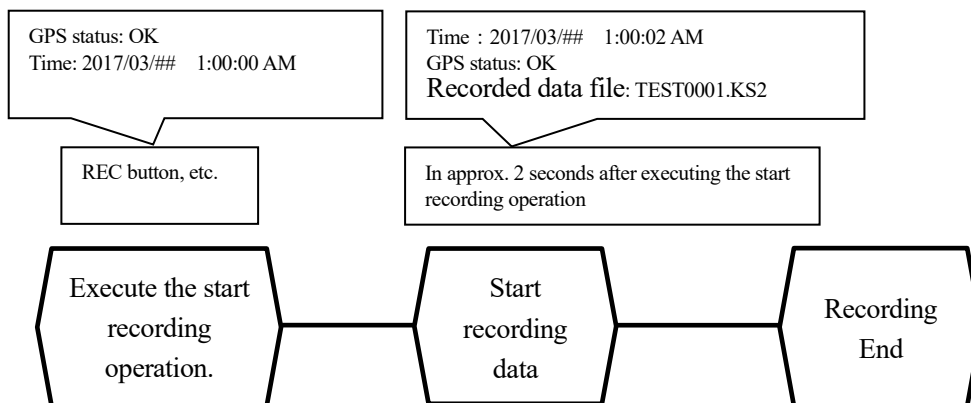
For details, refer to “6-5 GPS SENSOR STATUS”.

Examples are described as follows.

<Example>

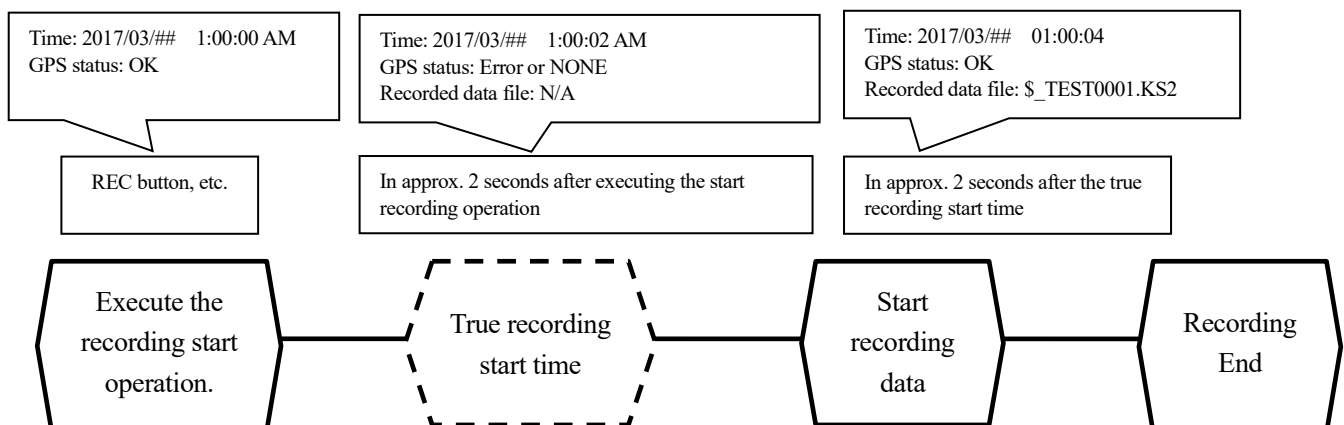
Measuring mode:	Point ZERO (Manual) measurements
File name:	TEST
File No.:	1

● When the GPS status is OK



When the GPS status is OK, the Point ZERO (Manual) measurement starts recording data in approx. 2 seconds after executing the start recording operation (e.g. pushing of REC button) at the moment of "000" for ms value (hh:mm:ss.000 ms).

● When the GPS status is “Error” or “NONE”

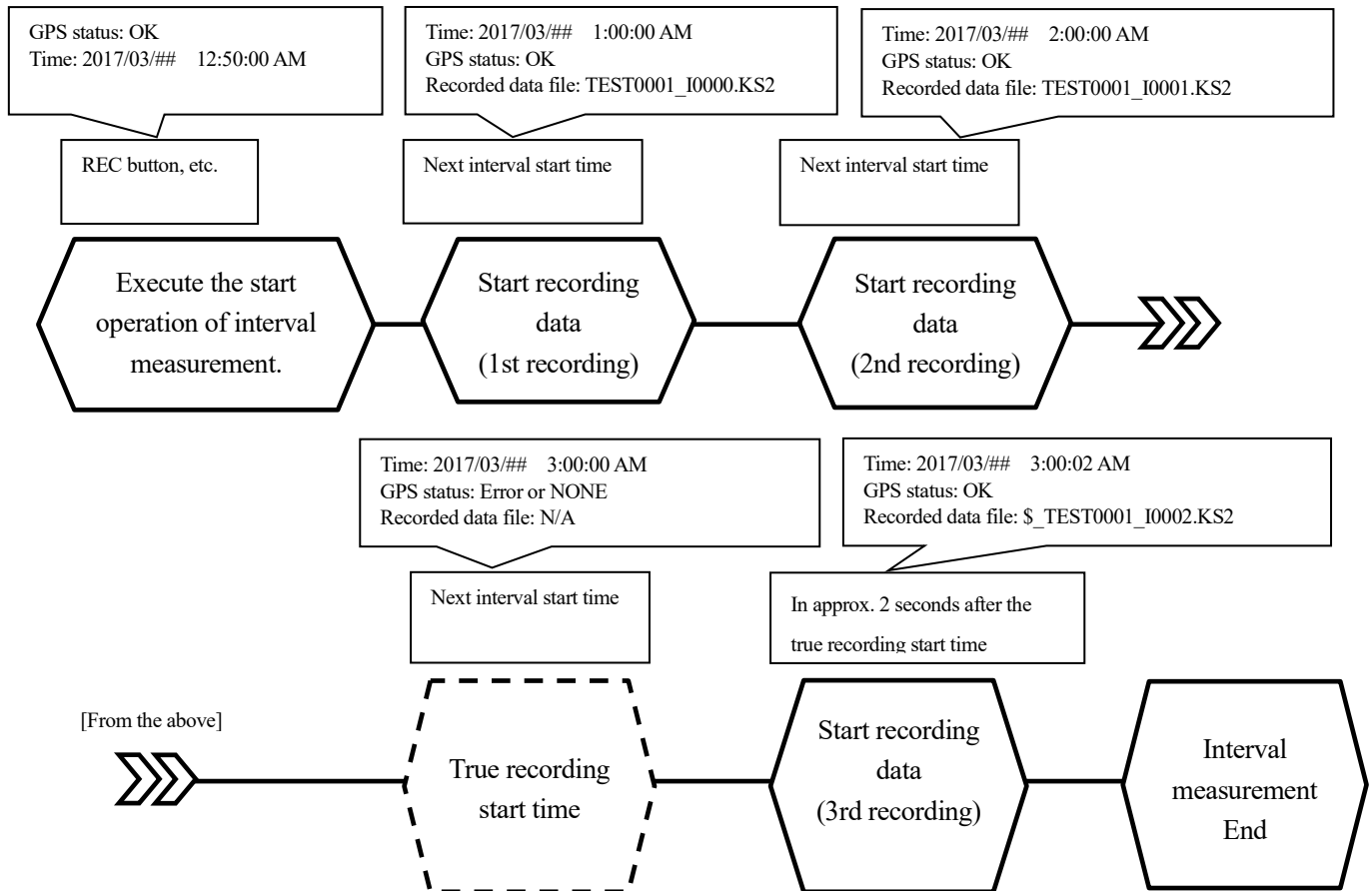


The GPS status is “Error”, due to bad reception conditions of the GPS satellites, or “NONE”, due to the disconnection of the GPS sensor, at the true recording start time.

→ The EDX-5000A starts recording data in approx. 2 seconds after the true recording start time based on the internal clock.

< Example >

Measuring mode: Interval (GPS synchronization) measurement
 The number of repeat times: 2
 Interval start time: 2017/03/## 01:00:00
 Interval Time: 0 day 1 hour 0 minute 0 second
 File name: TEST
 File No.: 1



1st recording and 2nd recording:

GPS status: OK
 Starts recording data at the pre-set interval start time.

3rd recording:

The GPS status is “Error”, due to bad reception conditions of the GPS satellites, or “NONE”, due to the disconnection of the GPS sensor, at the true recording time.

→ The EDX-5000A starts recording data in 2 seconds after the true recording time (interval start time) based on the internal clock.

6-4 RECORDING GPS DATA

This section describes how to set the ETA-55A for recording GPS data.

The recorded GPS data file is saved in NMEA format.

NOTE

- Irrespective of the pre-set sampling frequency, GPS data is recorded at the timing of the output of GPS sensors' data.
- Pause function is disabled while recording the GPS data.

6-4-1 Setting ETA-55A for Recording GPS Data

In order to record GPS data when EGPC-50A has been installed, insert a check mark for "Using GPS sensor" in **Settings** – **Option Function**.



6-4-2 Converting the NMEA Format Files into the KML/CSV Format Files

NMEA format files can convert into the KML/CSV format files by using the NMEA_Converter (NMEA FILE CONVERSION SOFTWARE).

The NMEA_Converter is available in the "Tool" - "NmeaConverter" in the DVD.

For details, refer to INSTRUCTION MANUAL NMEA_Converter.

6-5 GPS SENSOR STATUS

When under Point ZERO (Manual) measurements, interval (GPS synchronization) measurements, or recording GPS data, GPS sensor status can be checked.

6-5-1 Details of the GPS Sensor Status

The GPS sensor status consists of the following information which is obtained from the GPS sensor.

Latitude:	Latitude (N: North latitude, S: South latitude)
Longitude:	Longitude (E: East longitude, W: West longitude)
Speed:	Speed (km/h)
GPS time:	The time received from the GPS sensors.
Rec start time:	Next recording start time
Num. of satellites:	The number of GPS satellites in use. Use the "Num. of satellites" as a guide when checking the receiving conditions.
GPS status:	OK: GPS fix available. The time synchronization function is available. Error: Fix not available. The time synchronization function is not available. NONE: GPS sensor not connected.
Traveling direction:	Course over ground (degree, TN: 0°)
Magnetic declination:	Magnetic declination (+: East. -: West)
Altitude above sea level:	Below mean sea level (m)
Geoidal height:	Geoidal height (m)
HDOP:	Horizontal dilution of precision
PDOP:	Position dilution of precision
VDOP:	Vertical dilution of precision

6-5-2 Checking the GPS Sensor Status

When using the ETA-55A, insert a check mark for “Using GPS sensor” as described in “6-4-1 Setting ETA-55A for Recording GPS Data”, and then set the items which are desired to be display to “ON”. When set to ON, items can be displayed in graphs and in the Numeric window.



MEMO

- GPS status

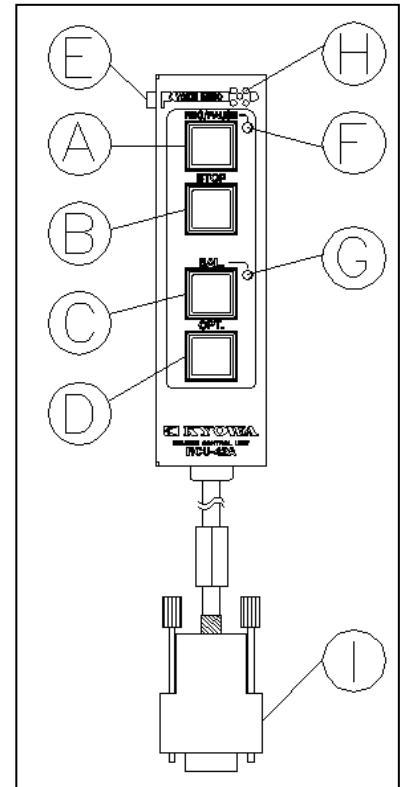
The required time for changing the GPS status from “0” (Not received) to “1” (received) varies with environments.

The time is greatly affected by environments, including “the number of GPS satellites in use”, “location of the GPS sensors set”, and “weather”.

7. RCU-42A REMOTE CONTROL UNIT

Parts names and various functions of the RCU-42A are described below.

A: REC/PAUSE switch:	The REC/PAUSE switch has the same function as that of the "REC" on the main unit. Normally with EDX-5000A, PAUSE will not be applied even if this switch is pressed during REC. (Refer to the note below) Press STOP switch to finish recording.	
B: STOP switch:	The STOP switch has the same functions as that of the "STOP" on the main unit. Pressing the STOP switch while recording data stops the data recording.	
C: BAL. switch:	The BAL. switch has the same functions as that of the "BAL." on the main unit. Press the BAL. switch for more than 1 second to perform balancing during monitoring.	
D: OPT. switch:	The OPT. switch has the same functions as that of the "OPT." on the main unit. The function of this switch can be set by using the ETA-55A.	
E: VOICE MEMO switch:	Voice memo can be recorded while pressing the VOICE MEMO switch. Refer to "7-1".	
F: REC/PAUSE LED	Indicates the state of data recording.	
	While recording data (REC):	Lights up in red.
	While recording voice memo:	Lights up in red.
	While pausing (PAUSE):	Blinks in red.
	While monitoring data:	Slowly blinks in red.
	Other than above:	Lights out.
G: BAL. LED	Indicates the state of balancing.	
	While balancing:	Lights up in orange.
	Other than above:	Lights out.
H: MIC	A built-in microphone is provided. During voice recording, keep a distance of approximately 10 cm from the microphone.	
I: Connector	Connect the connector to the CONT. IN connector on the rear panel of the main unit.	



NOTE

Before connecting the RCU-42A, turn OFF the EDX-5000A.

NOTE

With the EDX-5000A, even if pressing the REC/PAUSE switch during REC, it is set that PAUSE will not be applied. This setting can be changed by software. For details, refer to the EDX-5000A Instruction Manual for Main Unit Software.

MEMO

The RCU-42A has a built-in buzzer. The built-in buzzer emits the same beep sound as the EDX-5000A. If the beep sound cannot be heard clearly from the EDX-5000A, use the RCU-42A instead. For details, refer to the EDX-5000A Instruction Manual for Main Unit Software.

7-1 RECORDING VOICE MEMO

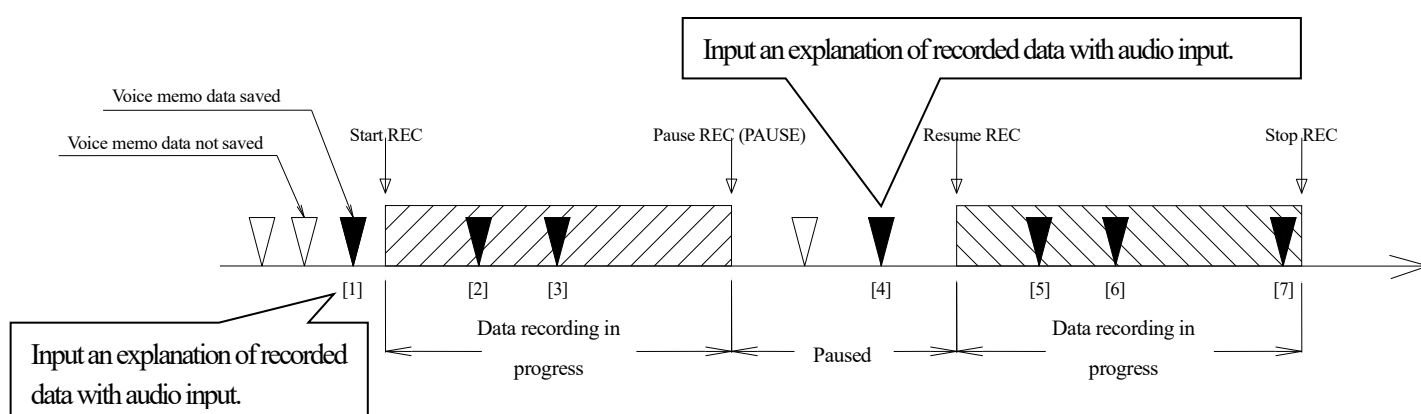
Voice memo can be recorded by using the optional goods, RCU-42A.

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

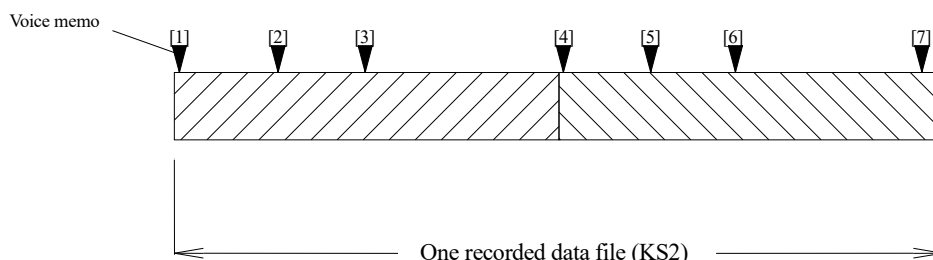
- During data recording Voice memo is recorded while the VOICE MEMO switch is being pressed.
- Before starting data recording Voice memo is recorded while the VOICE MEMO switch is being pressed, but only the voice data recorded right before starting data recording is saved in the data file.

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

With this function, for [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 memo to be key in using keyboard for the recorded data file).



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



Voice memo can record up to 1 minute at one time. The total number of voice memo recording is limited to 254 times.

NOTE

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

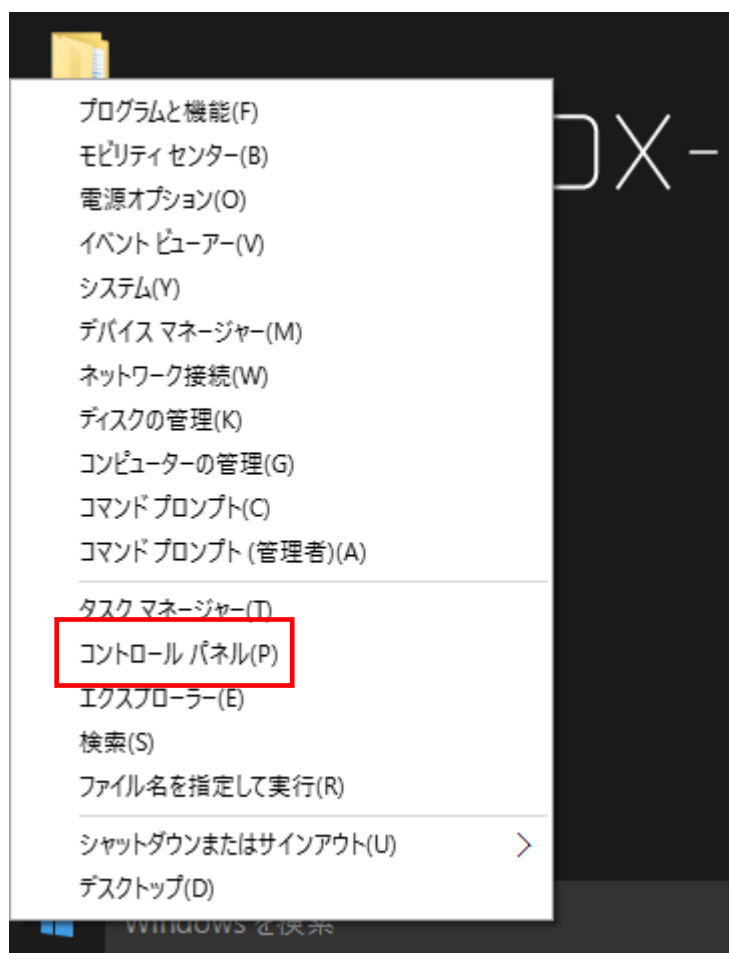
8. CHANGING THE DISPLAY LANGUAGE IN WINDOWS 10

With EDX-5000A, the display language of Windows 10 can be switched from Japanese to English, or from English to Japanese. When switching, refer to the following procedure.

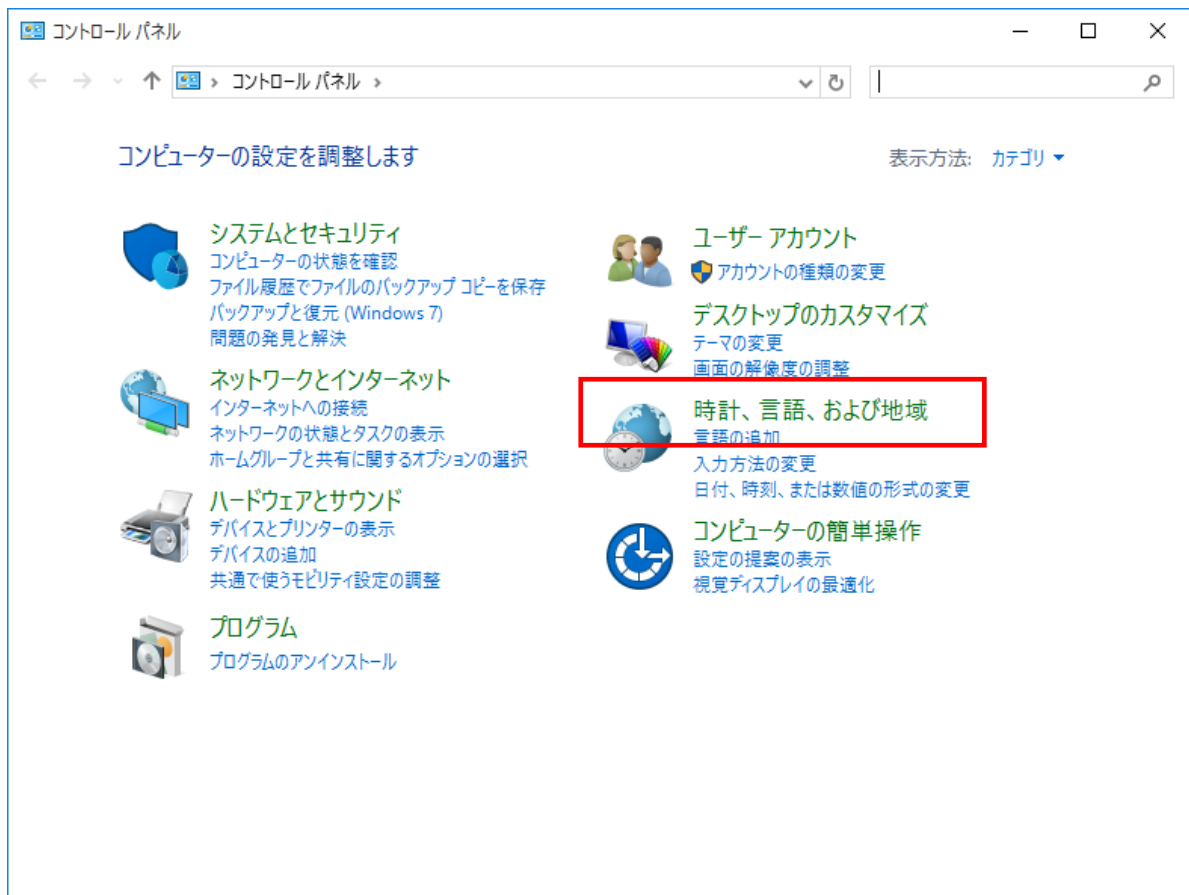
8-1 CHANGING FROM JAPANESE TO ENGLISH

To change from Japanese to English, follow the procedure below.

- 1) Right-click on “Windows” at the bottom left of the desktop screen and select "コントロール パネル(P)".



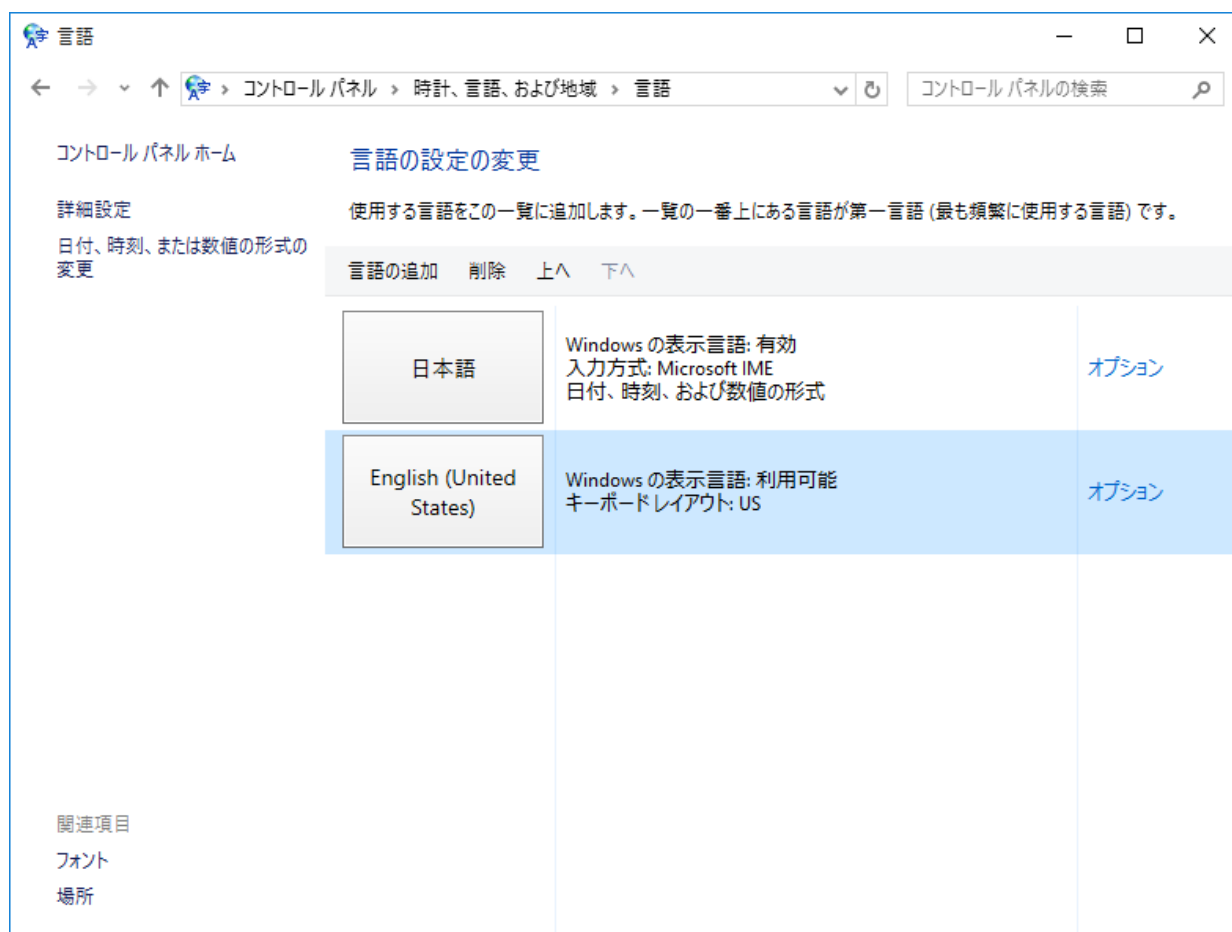
2) Click on “時計、言語、および地域”.



3) Click on “言語”.



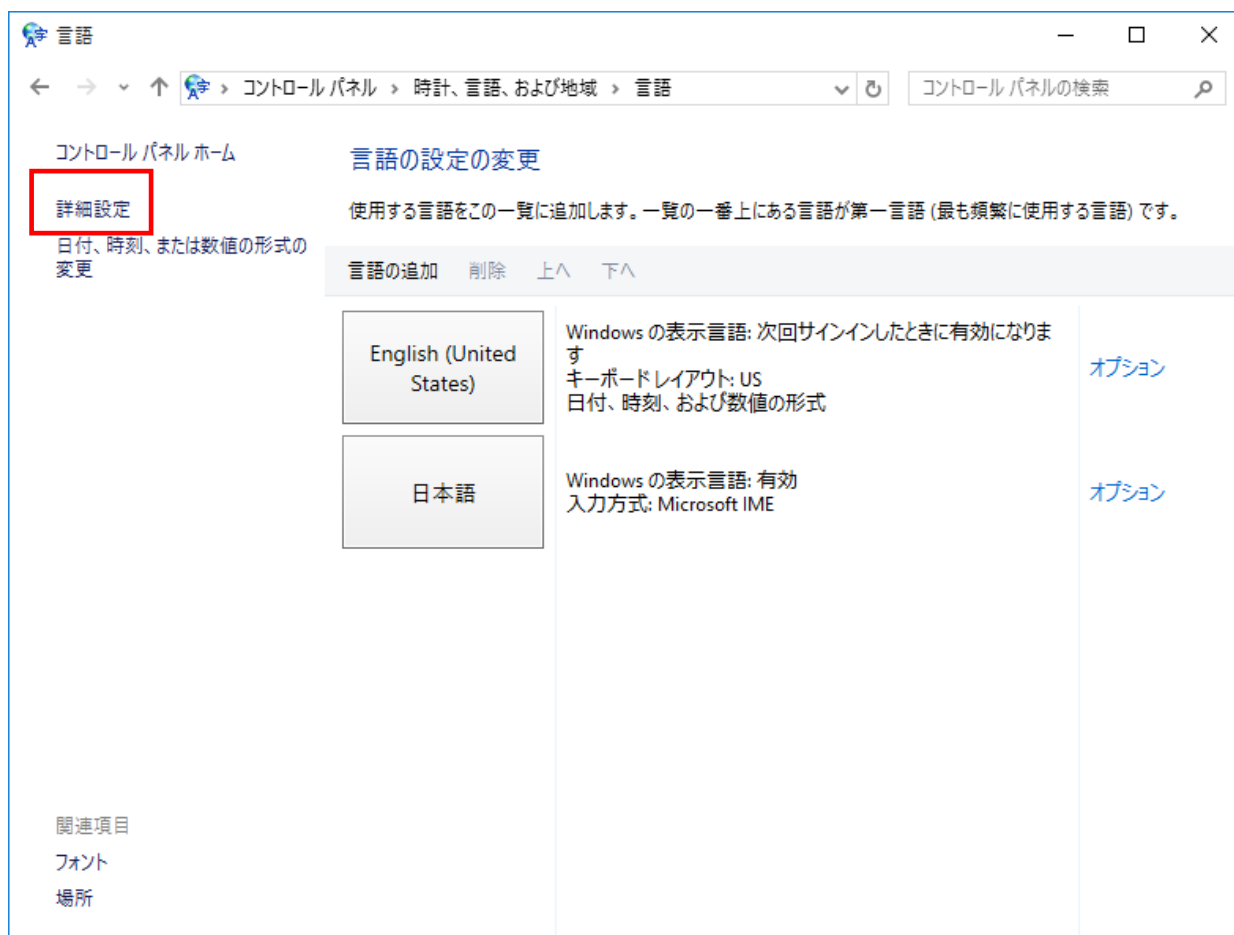
4) Click on “English (United States)” to enable it under selected.



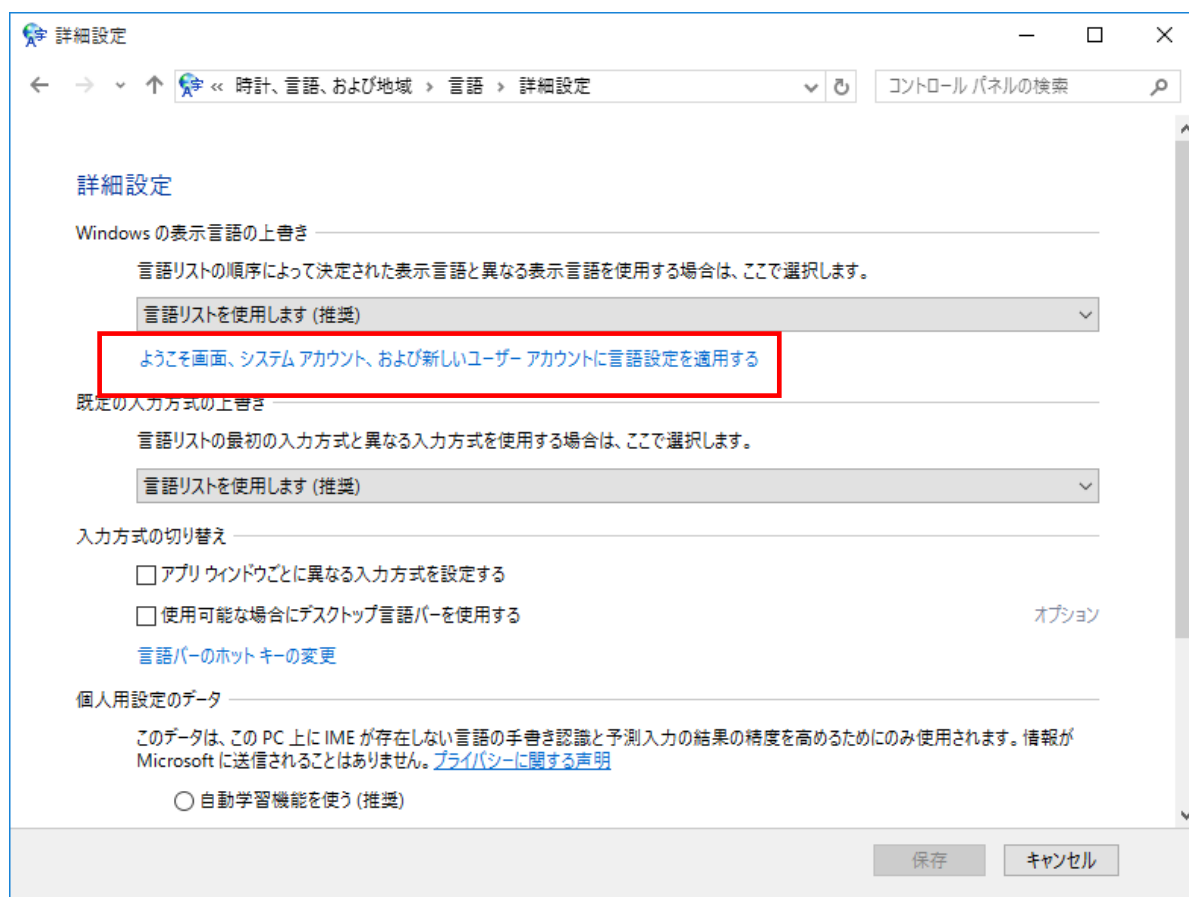
5) Click on “上へ” and move “English (United States)” to the upper side of the list.



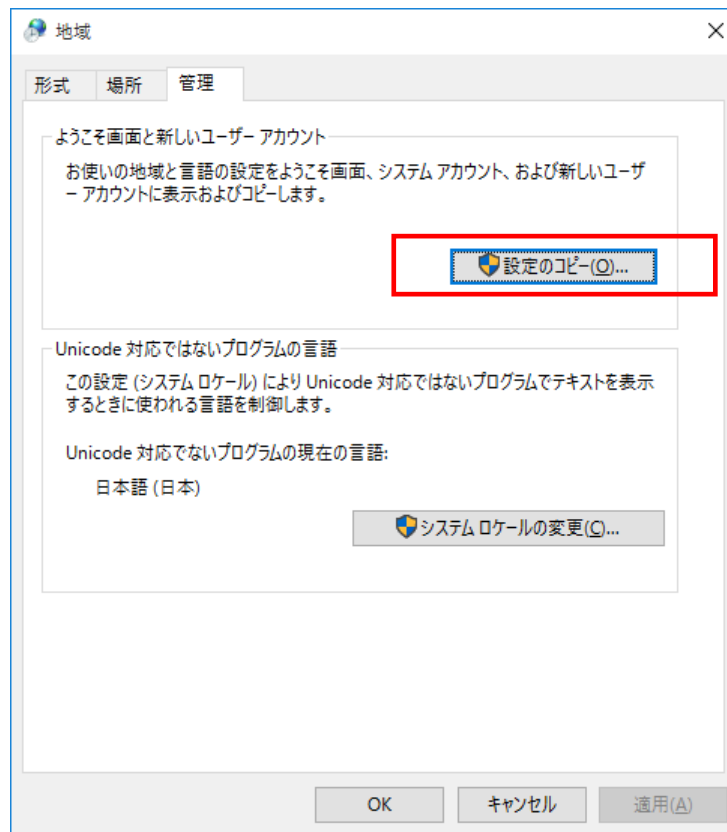
6) Click on “詳細設定”.



7) Click on “ようこそ画面、システムアカウント、および新しいユーザーアカウントに言語設定を適用する” in “Windows の表示言語の上書き”.



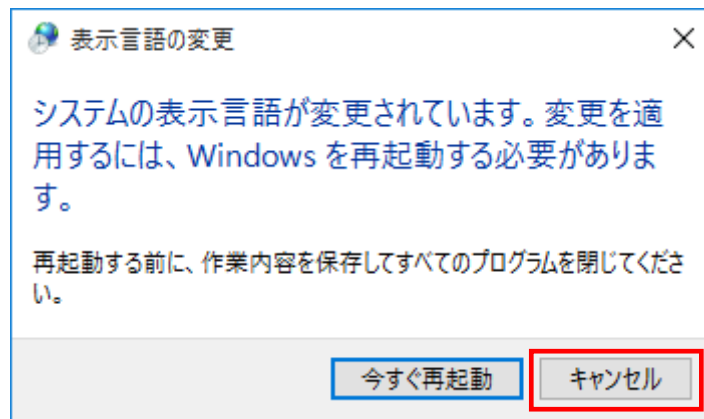
8) Click on “設定のコピー” in “ようこそ画面と新しいユーザーアカウント”.



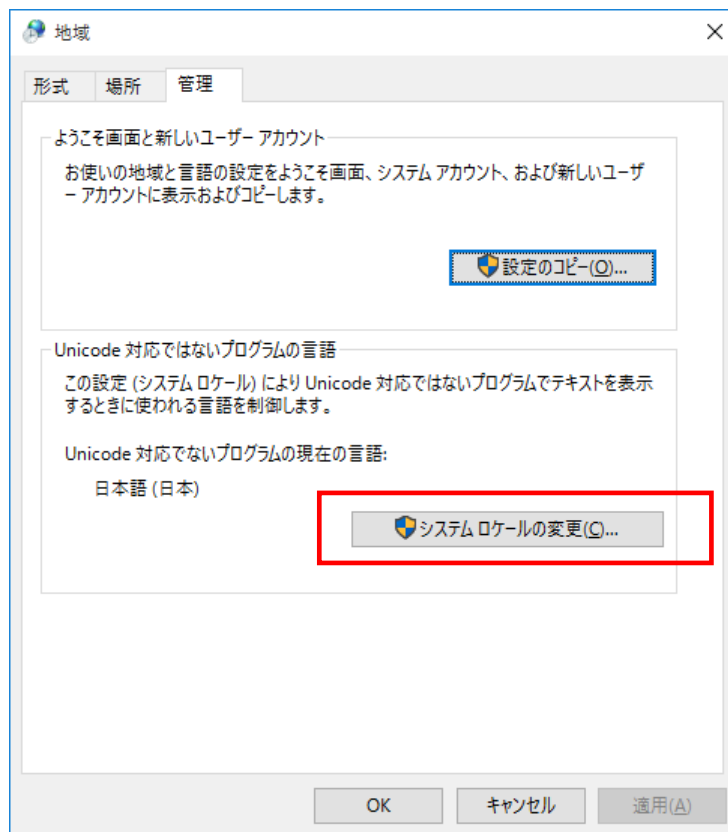
9) Tick the checkbox next to “ようこそ画面とシステムアカウント” in “現在の設定のコピー先” and click on “OK”.



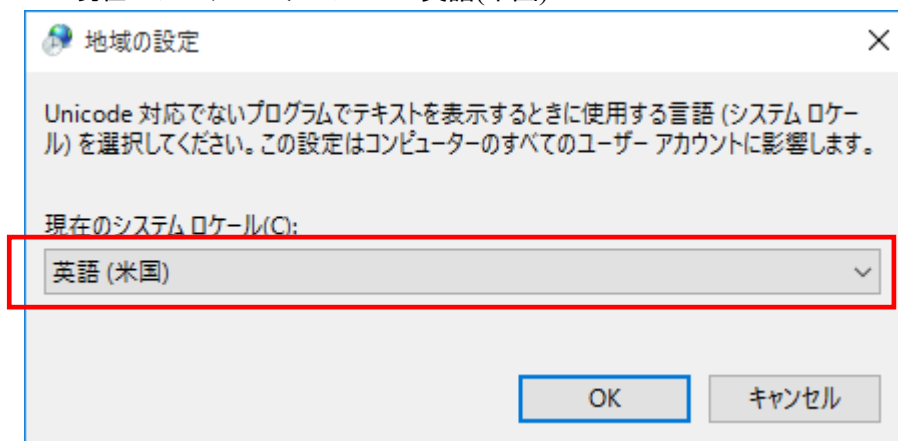
10) Click on “キャンセル”.



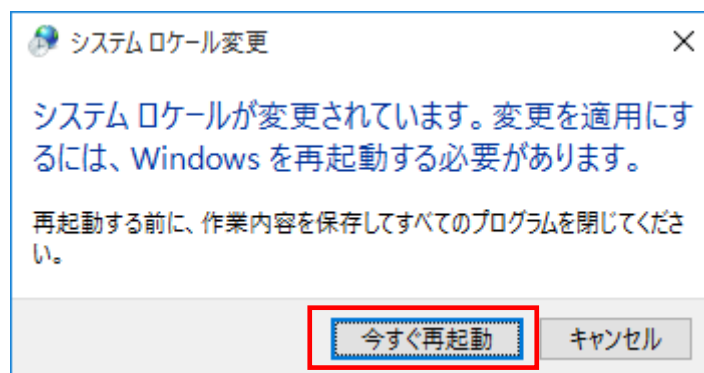
11) Click on “システム ロケールの変更(C)” in “Unicode 対応ではないプログラムの言語”.



12) Change content in “現在のシステムロケール” to “英語(米国)” and click on “OK”.



13) Click on “今すぐ再起動”. (Restarting will start)



14) After restarting, if the language has changed to English, the changing of language is complete.

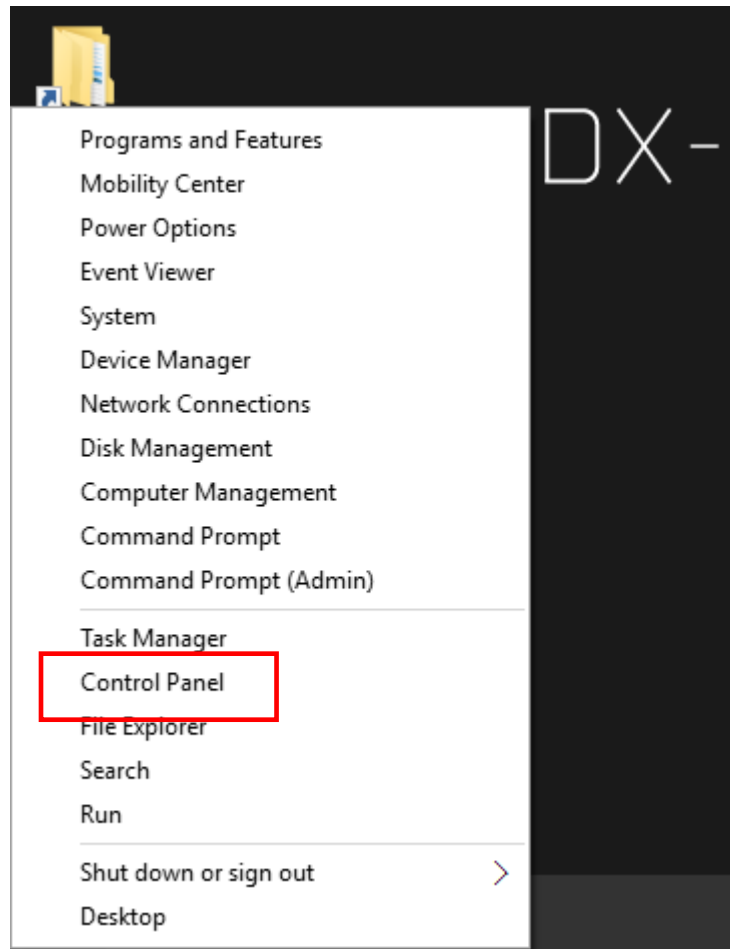
NOTE

- The software launched after restarting is displayed in Japanese. You will need to change the software language separately. For details, refer to the EDX-5000A Instruction Manual for Main Unit Software.
- When purchasing the Japanese version of EDX-5000A, the installer will appear in Japanese when performing updates even if the OS language has been set to English.
- The language displayed in Acrobat Reader cannot be changed using the above steps. Hold down the Ctrl key when launching Acrobat Reader to select the language.

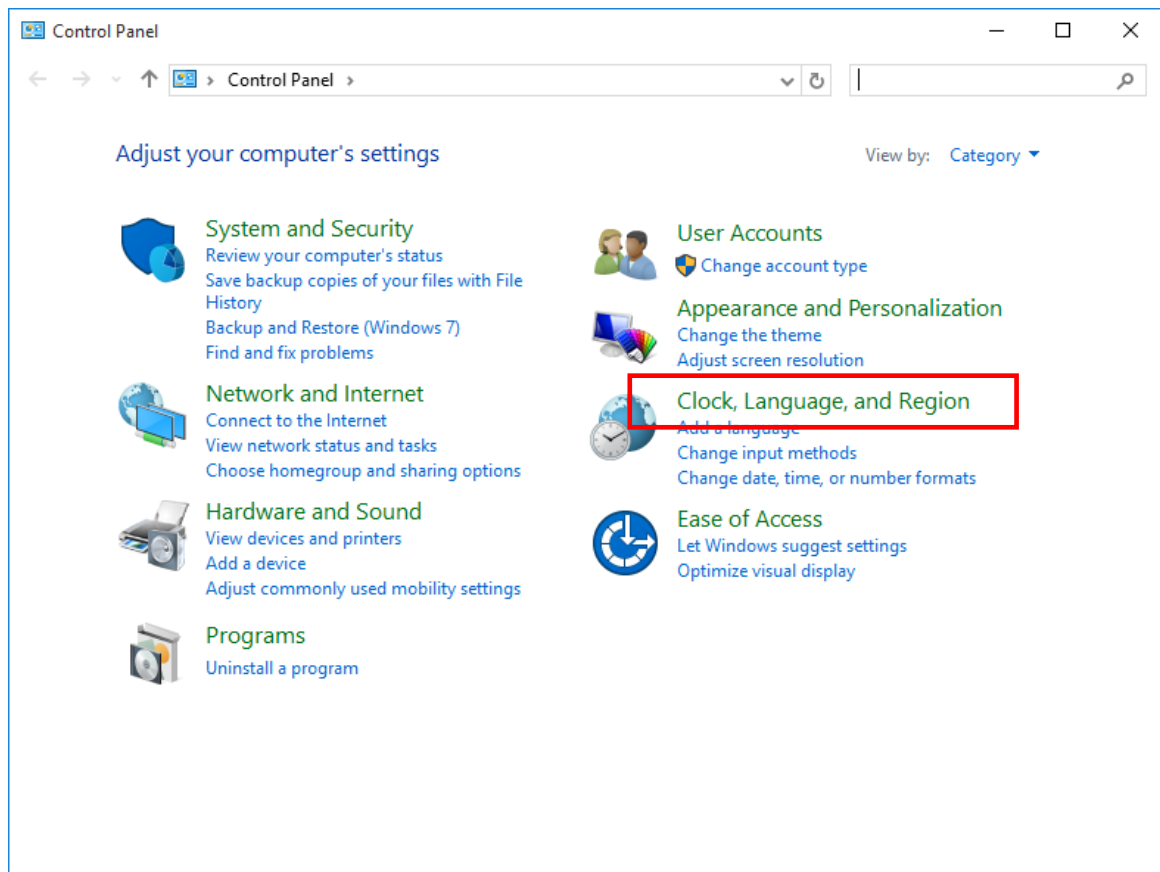
8-2 CHANGING FROM ENGLISH TO JAPANESE

To change from English to Japanese, follow the procedure below.

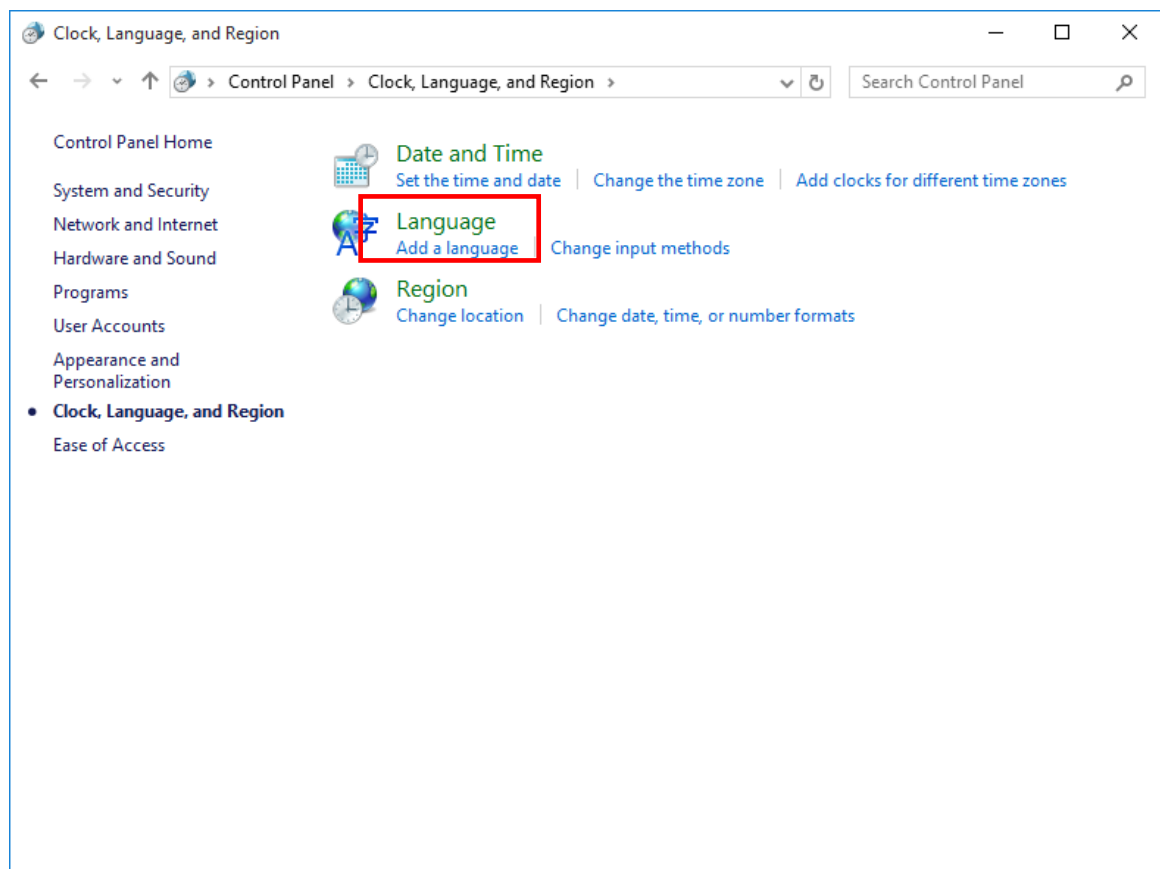
1) Right-click on “Windows” at the bottom left of the desktop screen and select "Control Panel".



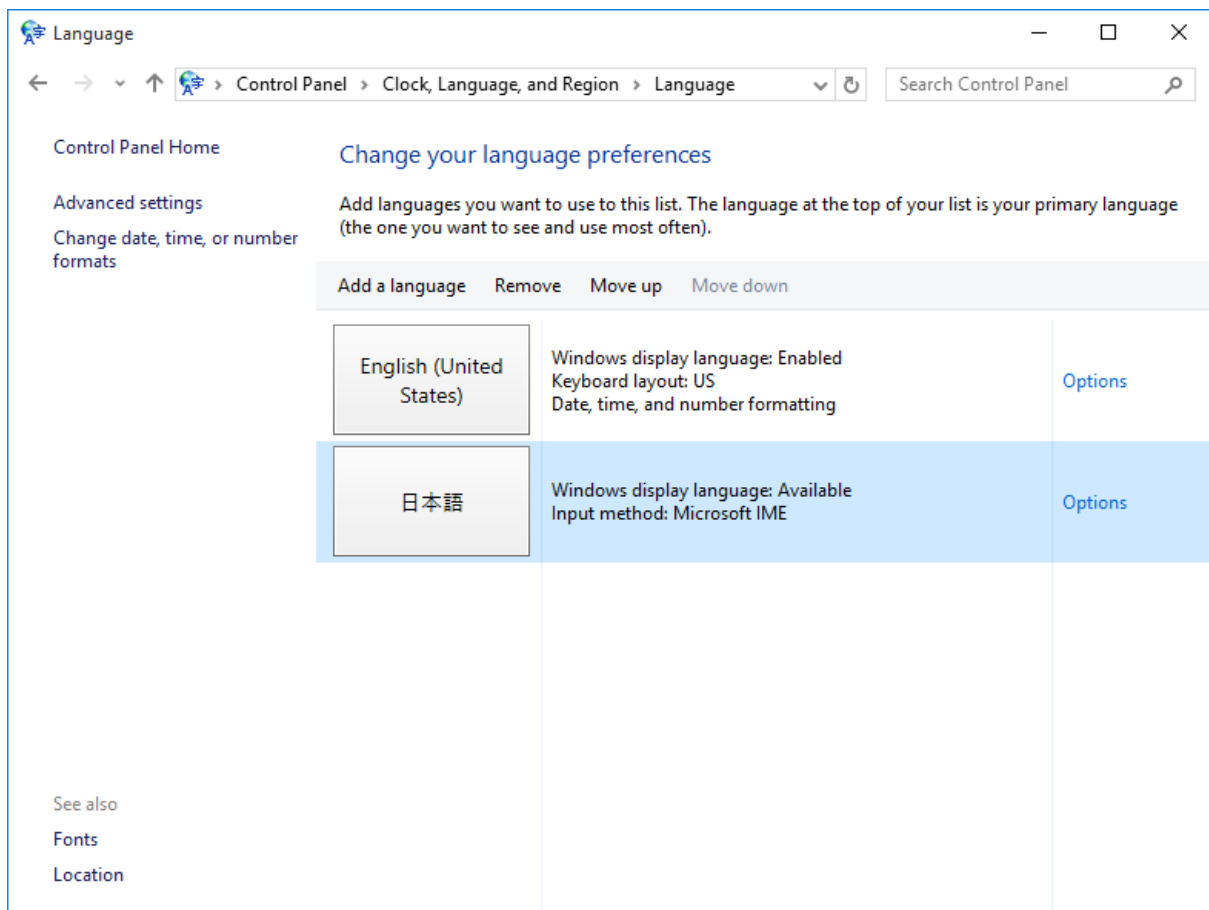
2) Click on “Clock, Language, and Region”.



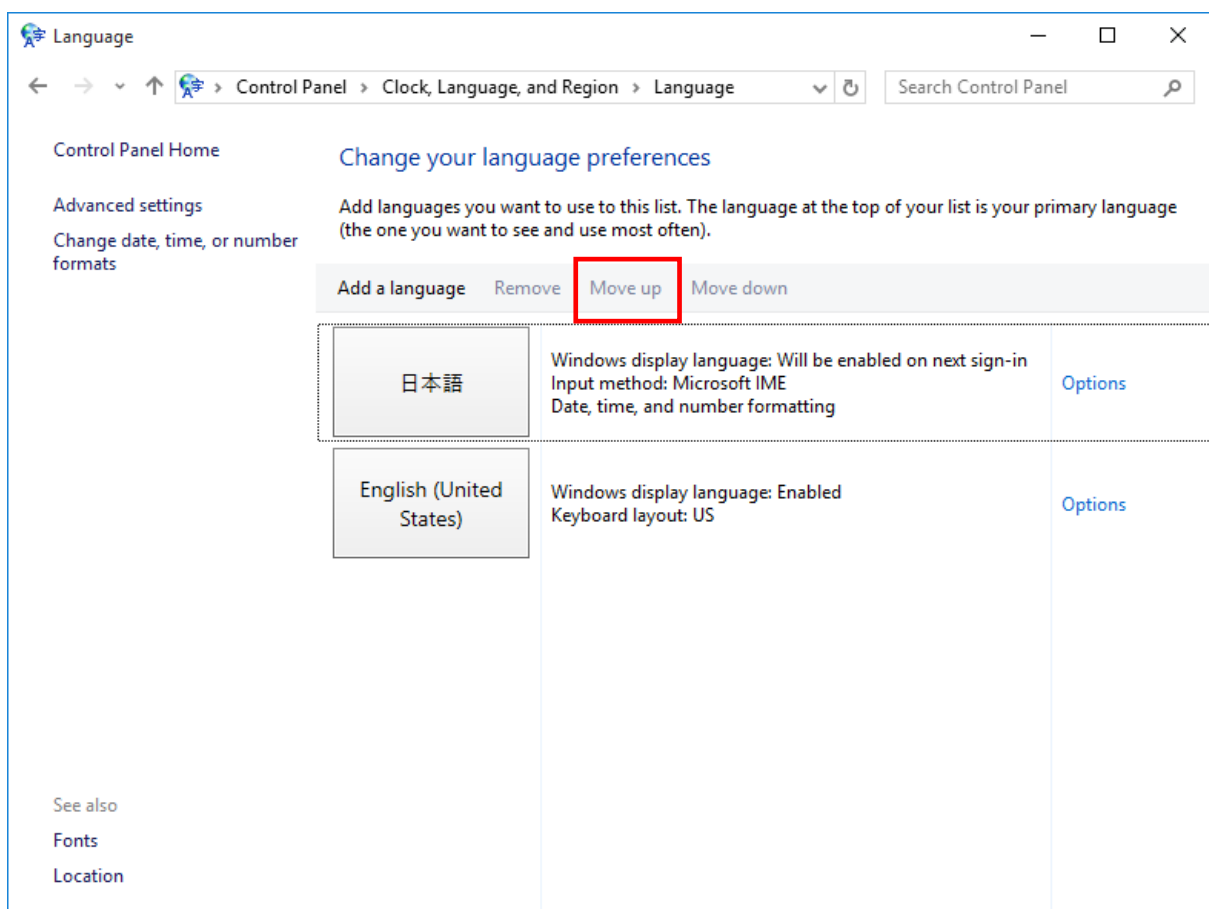
3) Click on “Language”.



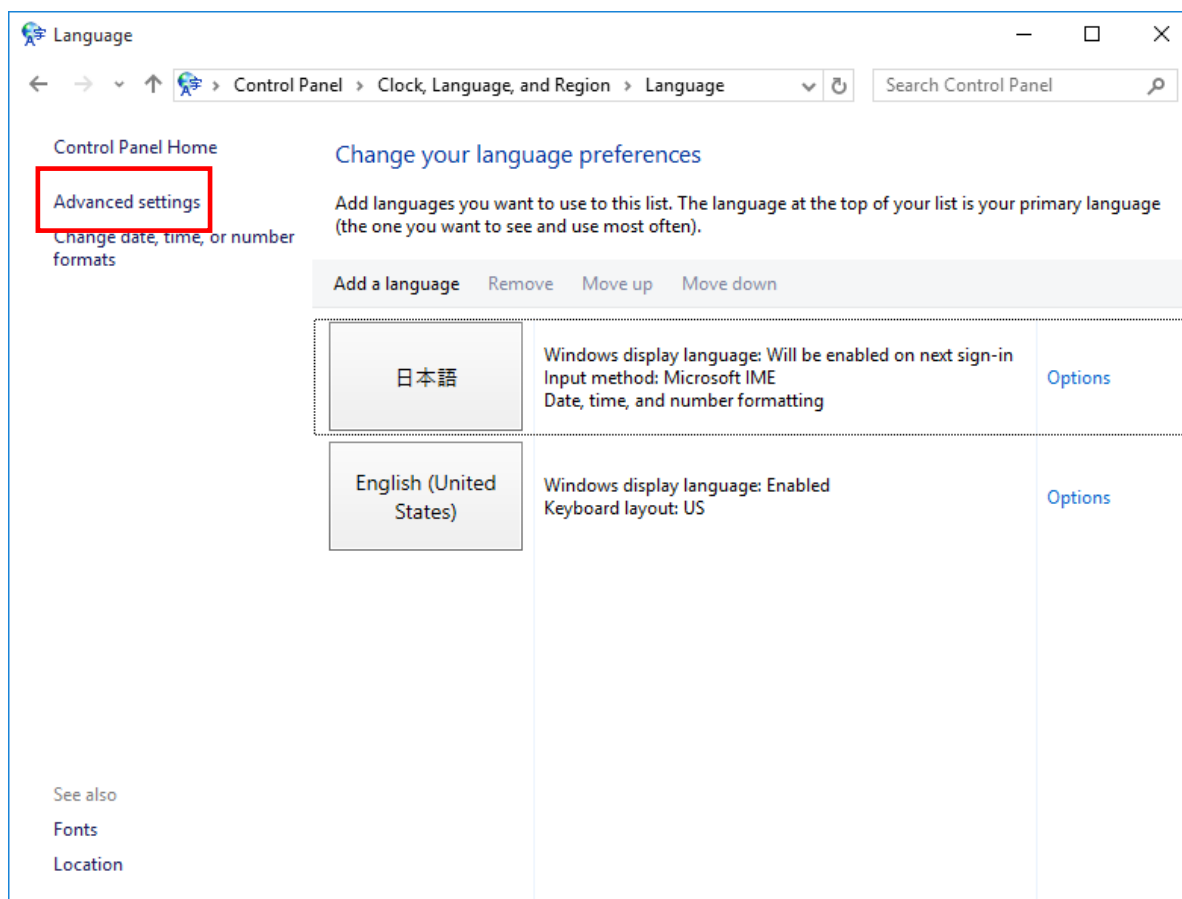
4) Click on “日本語” to enable it under selected.



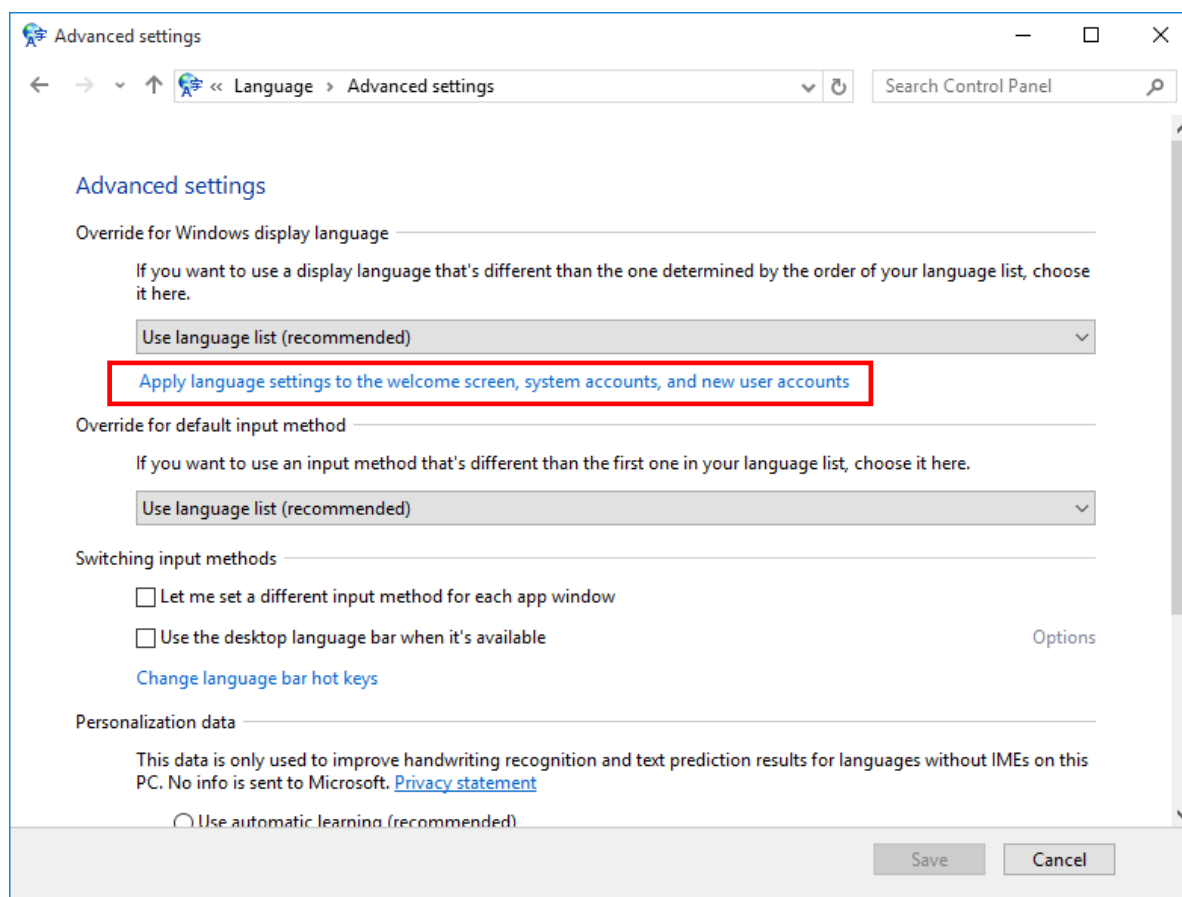
5) Click on “Move up” to move “日本語” to the upper side of the list.



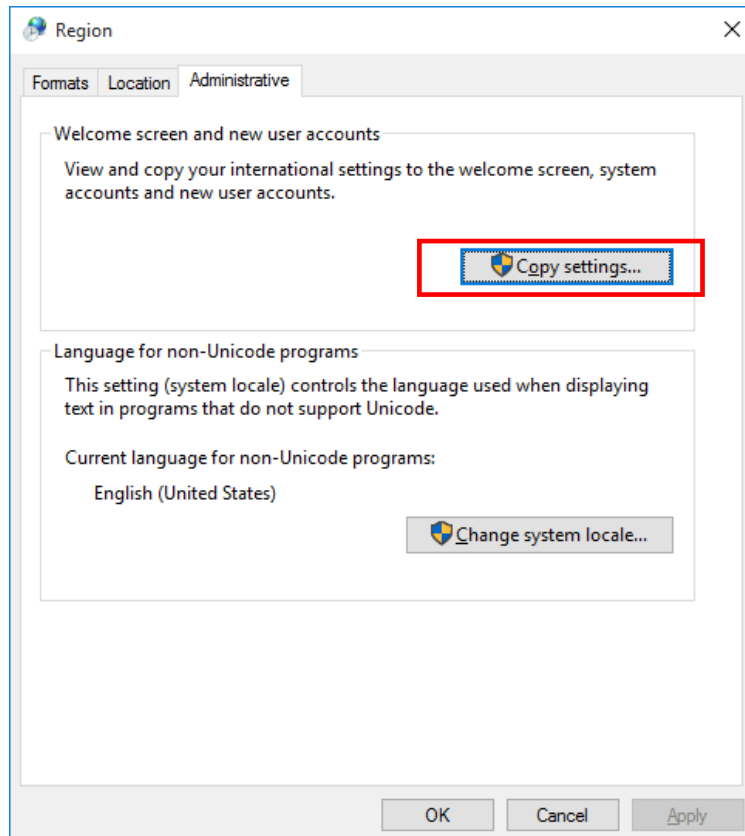
6) Click on “Advanced settings”.



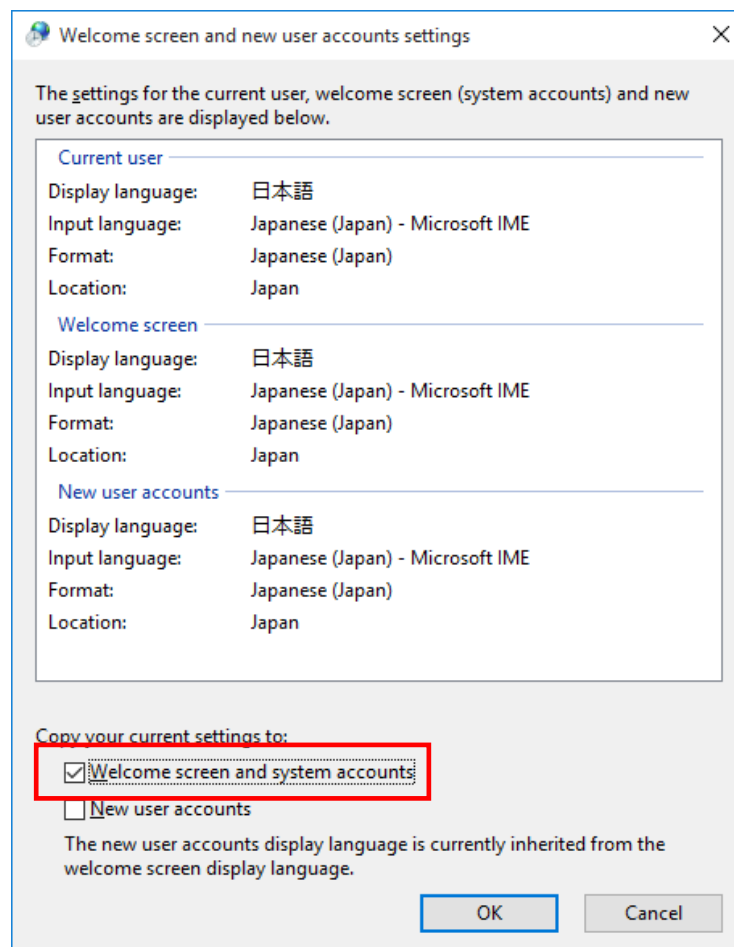
7) Click on “Apply language settings to the welcome screen, system accounts, and new user accounts” in “Override for Windows display language”.



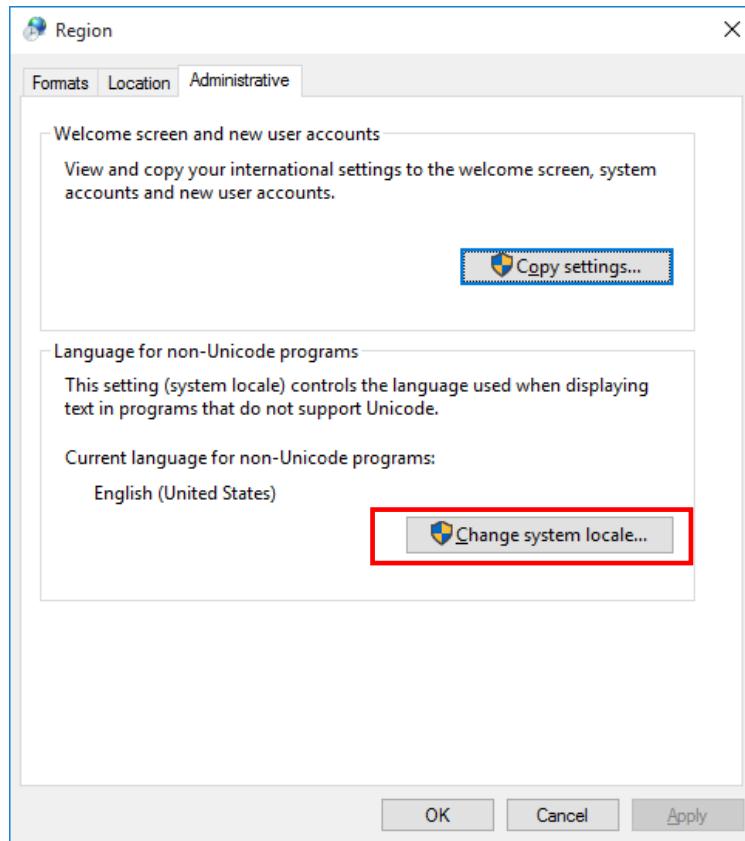
8) Click on “Copy settings” in “Welcome screen and new user accounts”.



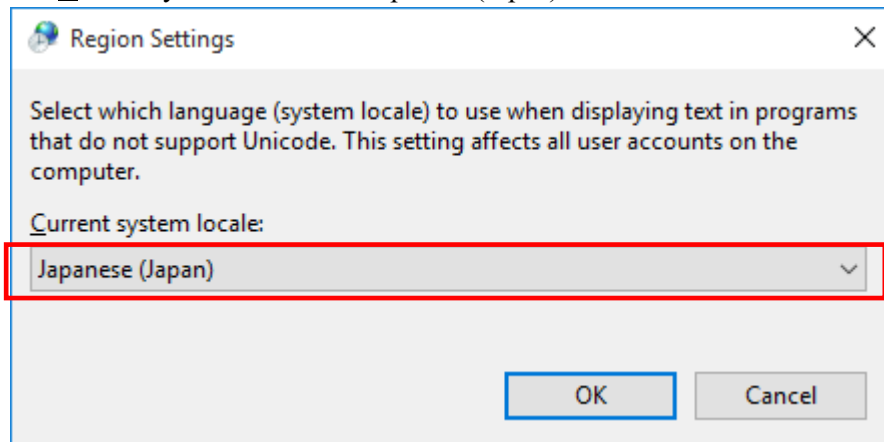
9) Tick the checkbox next to “Welcome screen and system accounts” in “Copy your current settings to” and click on “OK”. At this time, a pop-up message that requires user to restart is displayed, but click on "Cancel".



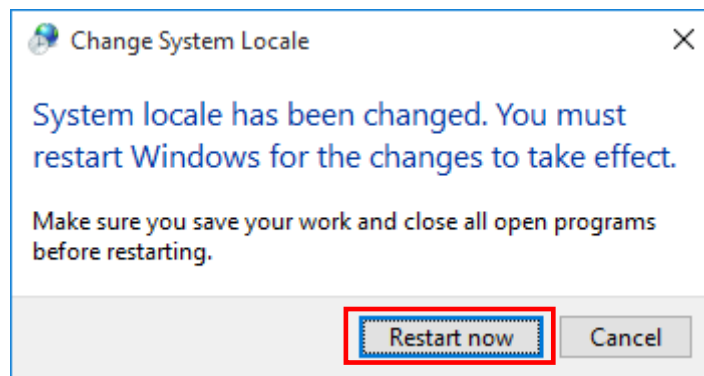
10) Click on “Change system locale” in “Language for non-Unicode programs”.



11) Change content in “Current system locale” to “Japanese (Japan)” and click on “OK”.



12) Click on “Restart now”. (Restarting will start)



13) After restarting, if the language has changed to Japanese, the changing of language is complete.

NOTE

- The software launched after restarting is displayed in Japanese. You will need to change the software language separately. For details, refer to the EDX-5000A Instruction Manual for Main Unit Software.
- When purchasing the Japanese version of EDX-5000A, the installer will appear in Japanese when performing updates even if the OS language has been set to English.
- The language displayed in Acrobat Reader cannot be changed using the above steps. Hold down the Ctrl key when launching Acrobat Reader to select the language.

9. TROUBLESHOOTING

In the event in which EDX-5000A is not operating as expected or in an unstable manner, trace the factor(s) that may cause such a condition before concluding that the system has failed. Dianogsis and countermeasure against various kind of problems are described in the following table. If the problem persists after corrective action is taken, contact KYOWA or our representative. If the system is damaged due to any causes other than as written in the Instruction Manual or if the user has disassembled or remodeled the system, Kyowa Electronic Instruments Co., Ltd. may not be able to offer repair service.

9-1 TROUBLESHOOTING FOR THE MAIN UNIT EDX-5000A

Problem	Dianogsis and Countermeasures
When the AC power supply is used, power is not supplied to the main unit. The POWER LED does not light up.	- Does the AC power outlet provide the specified voltage? Check the voltage by using a tester or the like. Refer to “3-2 CONNECTING TO THE AC POWER SUPPLY”. - Is the power cord securely connected? - Has the AC fuse blown? A spare AC fuse is built into the AC inlet socket. When blown, remove the underlying cause for the fuse blowing before replacing it.
When the DC power supply is used, power is not supplied to the main unit. The POWER LED does not light up.	- Does the DC power outlet provide the specified voltage? Check the voltage by using a tester or the like. Refer to “3-3 CONNECTING TO THE DC POWER SUPPLY”. - Is the power cord securely connected? - Has the DC fuse blown? A spare DC fuse is included as accessory of EDX-5000A. When blown, remove the underlying cause for the fuse blowing before replacing it.
A balance adjustment cannot be achieved even if the BAL. switch is pressed.	Are all target channels of balance adjustment turned OFF in the channel condition? Set the target channel with the ETA-55A.
The BATTERY LED does not light up.	- Charging has completed. Refer to “5. FOR BUILT-IN BATTERY WITH COUNTERMEASURE AGAINST INSTANTANEOUS POWER FAILURE”. - The built-in battery might have dead or in failure. Contact KYOWA or our representatives.
The CH LED does not light up.	- Is the conditioner card correctly inserted? - Are invalid cards mounted to the EDX-5000A? - Are all measurements ON/OFF turned OFF in the channel condition? Set the CH condition with the ETA-55A.
The POWER LED lights up correctly after turning ON the power but the external display does not work.	Turn OFF the EDX-5000A and disconnect all connecting items with interfaces (LAN, USB, keyboard, mouse) of the EDX-5000A and turn ON the power again. The EDX-5000A may under system failure if the external display still does not work. Contact KYOWA or our representatives.
When playing the recorded VOICE MEMO, the beginning part of the voice memo is not recorded.	Capable of recording voice memo during pressing the VOICE MEMO switch. Check the pressing of VOICE MEMO switch and input voice. Refer to “7-1 RECORDING VOICE MEMO”.
Digital input/output cannot be executed.	- Make sure the digital input/output ports are connected correctly by referring to “3-6 DIGITAL INPUT / OUTPUT (DIO) PORT” and “4-2 FOR EXTERNAL INPUT/OUTPUT”. - Check whether the digital input/output (DIO) conditions are correctly set or not. Make sure the conditions are correct by referring to “3-6-3 Setting Digital Input/Output (DIO) Conditions”.

9-2 TROUBLESHOOTING FOR STRAIN/VOLTAGE MEASUREMENT CARD CDV-40B

Problem	Dianogsis and Countermeasures
The CH LED does not light up even if the card is installed.	- Refer to “The CH LED does not light up.” in “9-1 TROUBLESHOOTING FOR THE MAIN UNIT EDX-5000A”. - Pull out the conditioner card and check whether there is any bent connector’s pin located on the other side of the panel or not. If the connector’s pins are bent, correct the problem and install the card, then confirm that the card type displayed. If the same display appears after the problem is remedied, contact KYOWA or our representatives for service.
A balance adjustment cannot be achieved.	Is OFF selected for the BAL item in the conditioner setting? If “OK” doesn’t appear even if “OK” is selected, it is suspected that a sensor had disconnected from the input or there is a sensor error or the sensor’s input is unstable. Also, the bridge resistance of the sensor or the sensor output may have exceeded the balancing range of the conditioner card ($\pm 12000 \mu\text{m/m}$).
Excessive noise is present in the waveform displayed.	- Is the GND terminal of the EDX-5000A grounded? - When using the strain gage, noise may be reduced by connecting the GND terminal of the EDX-5000A to the measuring target attached with strain gages. Refer to “3-5 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-5000A? If so, move the input cable away 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 of 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 of the frequency of the input signal.

9-3 TROUBLESHOOTING FOR DYNAMIC STRAIN MEASUREMENT CARD DPM-42B/A (-F), DPM-42B-I (-F)

Problem	Dianogsis and Countermeasures
The CH LED does not light up even if the card is installed.	- Refer to “The CH LED does not light up.” in “9-1 TROUBLESHOOTING FOR THE MAIN UNIT EDX-5000A”. - Pull out the measurement card and check whether there is any bent connector’s pin located on the other side of the panel or not. If the connector’s pins are bent, correct the problem and install the card, then confirm that the card type displayed. If the same display appears after the problem is remedied, contact KYOWA or our representatives for service.
“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? - Can the balance adjustment be achieved? If the balance adjustment cannot be achieved, “NG” appears on the Result of CompIntSense dialog box. - Are Internal/External of Switchover Oscillator correctly set? - Standalone (EDX-5000A: 1) Set oscillator to Internal. - Online (EDX-5000A: 1) Set oscillator to Internal. - Synchronous master Set oscillator to Internal. - Synchronous slave Set oscillator to External. - Online control synchronous master Set oscillator to Internal. - Online control synchronous slave Set oscillator to External. - Did you turn ON/OFF the EDX-5000A units in the correct order during synchronous operation? Turn OFF all EDX-5000A units, wait approx. 2 hours and turn ON the power again. Refer to “4-3 SYNCHRONOUS OPERATION” and “4-4 ONLINE CONTROL”. - If the same display still appears after the problem is remedied, contact KYOWA or our representatives for service.
A balance adjustment cannot be achieved.	- Is OFF selected for the BAL item in the conditioner setting? If “OK” doesn’t appear even if “OK” is selected, it is suspected that a sensor had disconnected from the input or there is a sensor error or the sensor’s input is unstable. - Are Internal/External of Switchover Oscillator correctly set? - Standalone (EDX-5000A: 1) Set oscillator to Internal. - Online (EDX-5000A: 1) Set oscillator to Internal. - Synchronous master Set oscillator to Internal. - Synchronous slave Set oscillator to External. - Online control synchronous master Set oscillator to Internal. - Online control synchronous slave Set oscillator to External. - Did you turn ON/OFF EDX-5000A units in the correct order during synchronous operation? Turn OFF all EDX-5000A units, wait approx. 2 hours and turn ON the power again. Refer to “4-3 SYNCHRONOUS OPERATION” and “4-4 ONLINE CONTROL”. - If the same display still appears after the problem is remedied, contact KYOWA or our representatives for service.

9-4 TROUBLESHOOTING FOR THE EGPC-50A

Problem	Dianogsis and Countermeasures
CAN data cannot be received.	• Check whether or not the CAN cables are correctly connected and have no connection error. • Check whether or not the CAN communication conditions are correctly set. Make sure the conditions are correctly set by referring to “6-2-1 Setting CAN Communication Conditions”. • Check whether or not the CAN receiving conditions are correctly set. Make sure the conditions are correctly set by referring to “6-2-2 Setting CAN Receiving Conditions”.
CAN data cannot be output.	• Check whether or not the CAN cables are correctly connected and have no connection error. • Check whether or not the CAN communication conditions are correctly set. Make sure the conditions are correctly set by referring to “6-2-1 Setting CAN Communication Conditions”. • Check whether or not the CAN communication conditions and CAN output conditions are correctly set. Make sure the conditions are correctly set by referring to “6-2-3 Setting CAN Output Conditions”.
The "ECAN overflow" occurs.	• Are the number of CAN messages to be received per second too many? Make sure the CAN messages input is within the restriction of input number by referring to “6-2-4 The Number of CAN Messages that can be Received Per Second”.
	• Decrease the number of analog channels to be recorded. • Lower the sampling frequency. • Set "the AD data format" to "16-Bit". Make sure the CAN messages input is within the restriction of input number by referring to “6-2-4 The Number of CAN Messages that can be Received Per Second”.
Measurements cannot be started.	• Check whether or not the GPS sensor is correctly connected and have no error in connection. Measurement cannot be started if GPS sensor is not connected while "Records GPS data." or "Records data by using the time data received through the GPS sensor." is enabled.
The GPS status is Error.	• Check whether or not the GPS sensor is correctly connected and have no error in connection. • Make sure there is no obstacle around the GPS sensor.
Status LED for the GPS port is OFF.	• For Point ZERO (Manual) measurements or Interval (GPS synchronization) measurements, make sure the measuring mode is Manual, Manual (Set Record Data), or Interval. Make sure the checkbox next to the “Records data by using the time data received through the GPS sensor.” is ticked. Make sure the conditions are correctly set by referring to “6-3 SETTING THE TIME SYNCHRONIZATION FUNCTION”. • For recording GPS data Make sure the checkbox next to the “Records GPS data.” is ticked. Make sure the conditions are correctly set by referring to “6-4 RECORDING GPS DATA”.

10. MAINTENANCE

10-1 MAINTENANCE DESCRIPTIONS

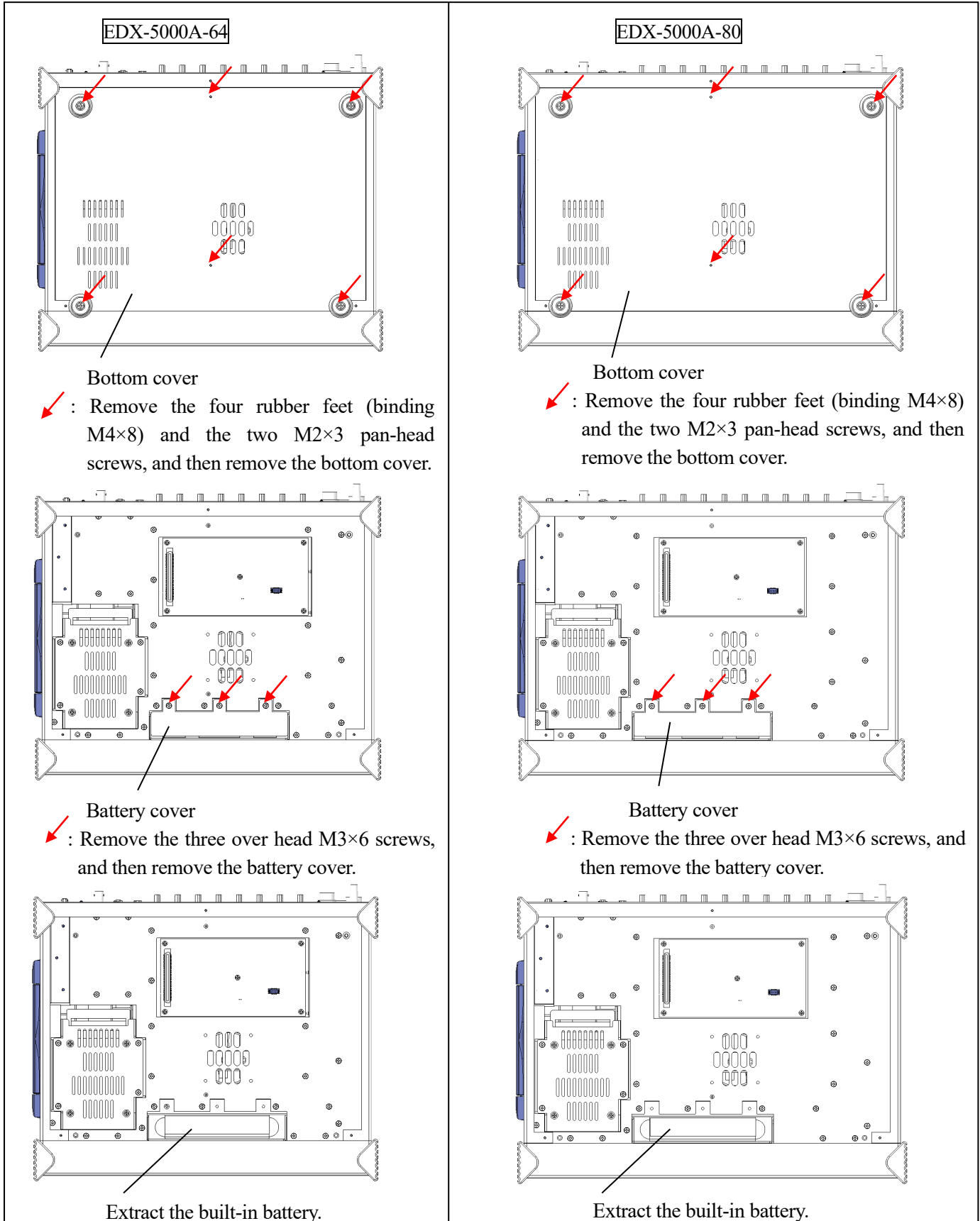
The following items are provided for scheduled maintenance for the EDX-5000A.

Maintenance service is performed at the intervals specified below.

Item	Description	Service intervals
Charging the built-in battery (Ni-MH) for 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 has to be replaced at KYOWA if it has been over-discharged. For details, refer to “10-2 REPLACING THE BUILT-IN ”.	Once every 5 months
Replacement of built-in battery (Ni-MH)	The lifespan of a built-in battery is approximately 1 year. Replace the built-in battery within 1 year or the built-in battery’s capacity becomes smaller. The expire date is indicated on a label located at the rear of the main unit. For details, refer to “10-2 REPLACING THE BUILT-IN ”.	Once every year
Replacement of Internal Disk (HDD)	The internal 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 disk once every 2 years. The old internal disk must be returned to KYOWA for replacement.	Once every 2 years
Replacement of Internal Disk (SSD)	As internal disk (SSD) characteristically degrade the more it is written to and read from. The higher the frequency of use, the shorter their lifespan. It is recommended to replace the internal disk once every 5 years. The old internal disk must be returned to KYOWA for replacement.	Once every 5 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 every year
Replacement of fan	The fan is a mechanical part. Replace the fan within 3 years. The old fan must be returned to KYOWA for replacement.	Once every 3 years
Replacing lithium battery (1/2 AA) for memory backup	The CPU board incorporates barrel-type lithium battery for memory backup. The battery lasts about 3 to 5 years at normal temperature (20 to 30 °C). Replace the battery within 5 years. The old battery must be returned to KYOWA for replacement.	Once every 5 years

10-2 REPLACING THE BUILT-IN BATTERY

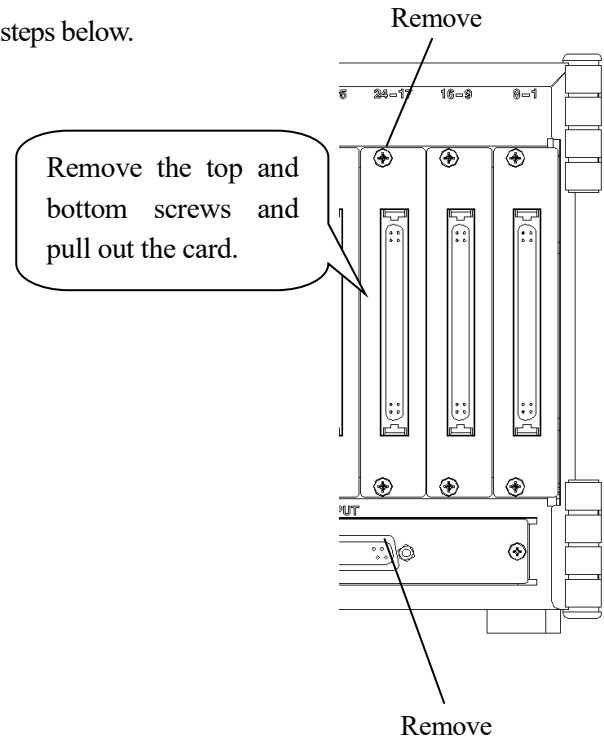
Replace the built-in battery while the power is OFF and the AC or DC power cable is pulled out from the socket. Using the figure below as a guide, remove the screws from the bottom panel of this unit, and then remove the built-in battery. Reconnect each of the terminals from the old built-in battery to the new built-in battery, insert the new built-in battery and return the unit to its original state. Contact a Kyowa sales representative to acquire a new built-in battery.



10-3 REPLACEMENT OF CONDITIONER CARD

To replace the conditioner card, turn OFF the power and follow steps below.

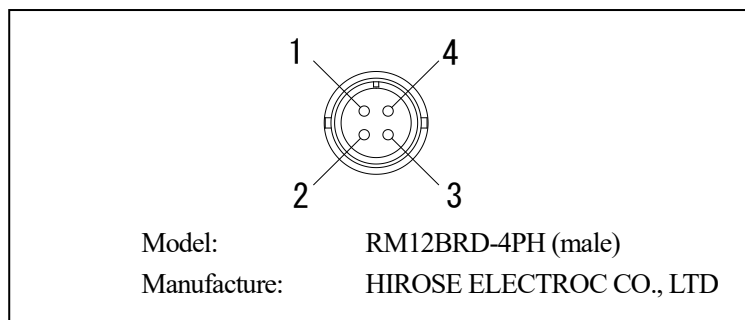
- 1) Unscrew the screws located on both sides of the conditioner card's panel.
- 2) Slowly pull out the conditioner card.
- 3) Slowly push in the new replacement card along the guide rail in the casing, and then tighten the screws at the top and bottom of the conditioner card's panel.
- 4) After replacing the conditioner card, turn ON the EDX-5000A and set measuring conditions. If the CH LED corresponding to the slot where the conditioner card was replaced lights up, it means that it is properly replaced. If the EDX-5000A is not operating properly, the CH LED remains OFF even if the measuring conditions are set. In this case, extract the conditioner card and re-insert it once again.



11. CONNECTOR'S PINS' ASSIGNMENT

11-1 DC POWER SUPPLY CONNECTOR

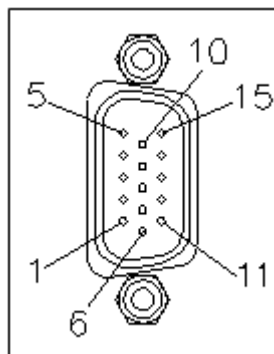
Pin No	Name
1	Positive side
2	Positive side
3	Negative side
4	Negative side



Adaptable plug (cable side): RM12BPE-4S (HIROSE ELECTROC CO., LTD female)

11-2 CONT. IN CONNECTOR

Pin No.	Name	Description
1	reserve	Connect nothing.
2	reserve	Connect nothing.
3	reserve	Connect nothing.
4	OSC+	Oscillator input and output for the DPM card
5	5 V	Power supply of 5 V (Connect nothing.)
6	reserve	Connect nothing.
7	reserve	Connect nothing.
8	reserve	Connect nothing.
9	reserve	Connect nothing.
10	OSC-	Oscillator input and output for the DPM card
11	reserve	Connect nothing.
12	EXT_CLK_IN	External clock input
13	EXT_TRG_IN	External trigger input
14	reserve	Connect nothing.
15	GND	GND (COM for external inputs)

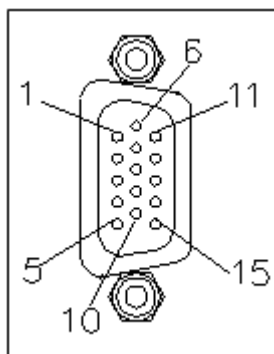


Model: XM4K-1542-502 (male)
 Manufacture: OMRON Corporation

Adaptable connector (cable side): DHW20-151F200 (Technical electron co. Ltd. female)
 Hood: 17JE-09H2-1C4 (DDK Ltd. unified screw thread)

11-3 CONT. OUT CONNECTOR

Pin No.	Name	Description
1	reserve	Connect nothing.
2	reserve	Connect nothing.
3	reserve	Connect nothing.
4	OSC+	Oscillator input and output for the DPM card
5	5 V	Power supply of 5 V (Connect nothing.)
6	reserve	Connect nothing.
7	reserve	Connect nothing.
8	reserve	Connect nothing.
9	reserve	Connect nothing.
10	OSC-	Oscillator input and output for the DPM card
11	reserve	Connect nothing.
12	EXT_CLK_OUT	External clock output
13	EXT_TRG_OUT	External trigger output
14	reserve	Connect nothing.
15	GND	GND (COM for external inputs)



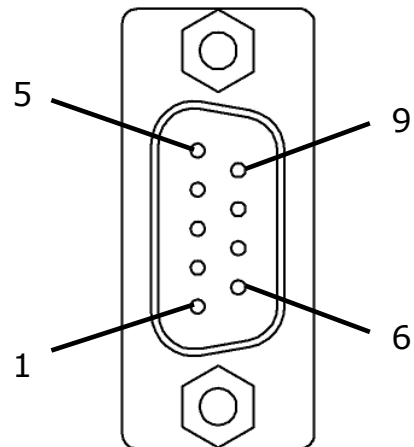
Model: XM4L-1542-502 (female)
 Manufacture: OMRON Corporation

Adaptable connector (cable side): DHW10-151F200 (Technical electron co. Ltd. male)
 Hood: 17JE-09H2-1C4 (DDK Ltd. unified screw thread)

11-4 EGPC-50A: GPS/CAN1 PORT CONNECTOR

The pins' assignment of the GPS/CAN1 port connector is as follows.

Pin No.	Name	Description
1	D5 V	5 V power supply for the GPS sensor
2	CAN_L	Input/output the CAN low signal.
3	CAN_GND	GND of the CAN
4	TxD	Transmit data
5	DCOM	GND for GPS sensor
6	(GND)	GND (Internally short-circuited with the pin No. 3 and pin No. 5.)
7	CAN_H	Input/output the CAN high signal.
8	RxD	Receive data
9	PPS	GPS sync pulse signal



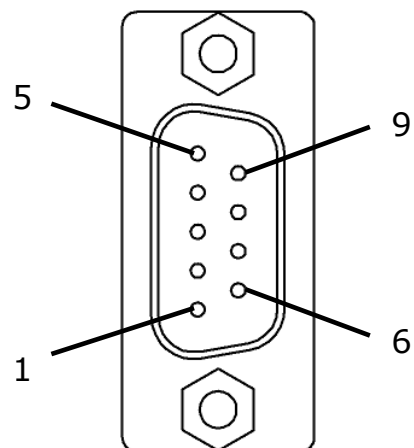
Model: JCDE9EPAN4B

Manufacture: JC ELECTRONICS CORPORATION

11-5 EGPC-50A: GPS/CAN2 PORT CONNECTOR

The pins' assignment of the GPS/CAN2 port connector is as follows.

Pin No.	Name	Description
1	Reserve	Connect nothing.
2	CAN_L	Input/output the CAN low signal.
3	CAN_GND	GND of the CAN
4	Reserve	Connect nothing.
5	(GND)	GND (Internally short-circuited with the pin No. 3 and pin No. 6.)
6	(GND)	GND (Internally short-circuited with the pin No. 3 and pin No. 5.)
7	CAN_H	Input/output the CAN high signal.
8	Reserve	Connect nothing.
9	Reserve	Connect nothing.



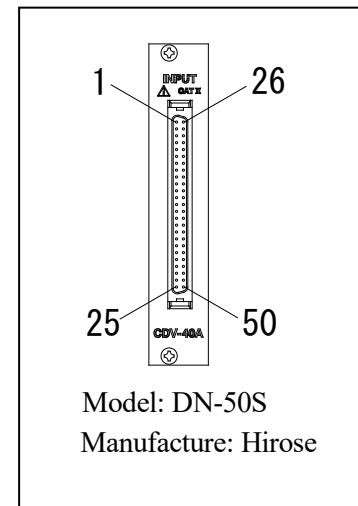
Model: JCDE9EPAN4B

Manufacture: JC ELECTRONICS CORPORATION

12. CONNECTOR'S PINS' ASSIGNMENT OF CDV-40B

12-1 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



13. HARDWARE SPECIFICATIONS

13-1 OVERALL SPECIFICATIONS

1) Model

Model	Maximum Number of Analog Input Channels	Data Storage Device (Internal Disk)	Windows10
EDX-5000A-64-H	64	HDD	Japanese
EDX-5000A-64-HE	64	HDD	English
EDX-5000A-64-S	64	SSD	Japanese
EDX-5000A-64-SE	64	SSD	English
EDX-5000A-80-H	80	HDD	Japanese
EDX-5000A-80-HE	80	HDD	English
EDX-5000A-80-S	80	SSD	Japanese
EDX-5000A-80-SE	80	SSD	English

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

- 2) Compatible Conditioner Cards CDV-40B(-F), CVM-41A, DPM-42B(-F), DPM-42B-I(-F), CTA-40A, CFV-40A, CCA-40A(-F), CDV-44AS, CDA-44AS, CDA-45AS, AD-40AS(-F)
 * The number of CFV-40A that able to be mounted is up to 2 units.

- 3) Number of Input Channels EDX-5000A-64: Max. 64 CH (When 8 units of CDV-40B are installed)
 EDX-5000A-80: Max. 80 CH (When 10 units of CDV-40B are installed)

- 4) Analog Input For details, refer to the specs of respective conditioner cards.

- 5) Digital Input The number of input/output: Max. 8
 Input/output setting: For every bit, switchover of digital input/digital output/remote control input (COMMON: same)
 *Remote control input: To "Start the measurement", "Stop the measurement", "Execute the balance adjustment", etc.
 Input format: Isolation-type, TTL level input
 Input voltage: Max. 5 VDC
 Isolation type: Digital isolator
 Output format: Isolation-type, Open collector output (with 10 k-ohm built-in pull-up resistor)
 Output voltage: 5 VDC
 Output current: Max. 25 mA per point
- 6) Voice Input 1 channel (Voice memo input during data recording can be recorded together)
 Use remote control unit, RCU-42A (optional goods)

7) Sampling Frequency	Sampling system:	Simultaneous sampling of all channels
	Sampling frequency:	1/2/5 system
	1 Hz to 200 kHz:	When recording data up to 32 CH (16 CH)
	1 Hz to 100 kHz:	When recording data up to 64 CH (32 CH)
	1 Hz to 50 kHz:	When recording data up to 80 CH (64 CH)
	1 Hz to 20 kHz:	When recording data up to 80 CH (80 CH)
	1 Hz to 10 kHz:	When real-time simultaneous process is enabled
		2 ⁿ system
	2 Hz to 131.072 kHz:	When recording data up to 32 CH(16 CH)
	2 Hz to 65.536 kHz:	When recording data up to 64 CH(32 CH)
	2 Hz to 32.768 kHz:	When recording data up to 80 CH(64 CH)
	2 Hz to 16.384 kHz:	When recording data up to 80 CH(80 CH)
	2 Hz to 8.192 kHz:	When real-time simultaneous process is enabled
[Note] AD data format: In 16-bit mode		
[Note] In the 24-bit mode, the number of channels mentioned in parentheses.		
8) Data Storage Device	Hard Disk Drive (HDD)	Capacity: 300 Gbytes or more
	Solid State Drive (SSD)	Capacity: 30 Gbytes or more
9) Display	Channel status LED	
	(The level of OVER value of input can be set for each channel)	
	REC/BUSY/BATTERY/POWER LED	
	With 12.1-inch wide touch panel mounted display	
10) Operation Keys	Touch panel and front mounted keys (REC, STOP, BAL., OPT).	
	Operation with external keyboard and mouse is also possible.	
11) External Control Connectors	CONT IN, CONT OUT (remote control, synchronous operation)	
12) External I/O Connectors	External trigger	TRG IN, TRG OUT
	External clock	CLK IN, CLK OUT(output at any frequency division ratio)
13) External Device Interface	USB port for keyboard	
	USB port for mouse	
	15-pin VGA connector for external display	
	USB 2.0 ports, 3 on the front	
	USB 3.0 ports, 2 on the rear	
	LAN port 100/1000BASE-T	
14) Power Supply	100 to 240 VAC, 50/60 Hz	
	10 to 30 VDC (AC/DC dual use)	
	Built-in battery with countermeasure for instantaneous power failure	
15) Current Consumption	[64 CH/unit type]	Approx. 1.8 A (100 VAC when 8 units of CDV-40B are installed)
	[80 CH/unit type]	Approx. 2.0 A (100 VAC when 10 units of CDV-40B are installed)
16) Operating Temperature and Humidity Ranges	0 to 40 °C, 20 to 80 % (non-condensing)	
17) Storage Temperature Range	-20 °C to 60 °C	

18) Vibration Resistance	[EDX-5000A-64-H, EDX-5000A-64-S, EDX-5000A-80-H, EDX-5000A-80-S] 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-5000A-64-H, EDX-5000A-80-H] 9.8 m/s ² (1 G), 10 to 200 Hz (when operating) [EDX-5000A-64-S, EDX-5000A-80-S] 19.6 m/s ² (2 G), 10 to 200 Hz (when operating)
19) Shock Resistance	196.1 m/s ² (20 G), 11 ms
20) Dimensions	[EDX-5000A-64] 365 (W)×159 (H)×300 (D) mm (excluding protrusions) [EDX-5000A-80] 410 (W)×159 (H)×300 (D) mm (excluding protrusions)
21) Weight	[EDX-5000A-64] Approx. 11.5 kg (main unit only) [EDX-5000A-80] Approx. 12.5 kg (main unit only)
22) Optional Function	CAN data recording (number of input channels: up to 512 channels) GPS data recording (trajectory data recording, time synchronization function)
23) Online Control	Control by DCS-100A
24) EMC Directive	2014/30/EU
25) Low Voltage Directive	2014/35/EU (Installation Category II, Pollution Degree 2)
26) RoHS Directive	2011/65/EU, (EU)2015/863(10 restricted substances)(RoHS)

13-2 INTERNAL CONDITIONER CARDS' SPECIFICATIONS

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

Item	Strain measuring	Voltage measuring
Number of input channels	8 (centralized connector)	
Input type	Balanced differential input	Unbalanced input
Input resistance	Approx. (10 M-ohm + 10 M-ohm)	Approx. 1 M-ohm
Coupling	DC/AC (DC cut) switchover	
Applicable gage factor	2.00	–
Bridge Excitation	2.00 VDC $\pm$ 2 % (120 ohm to 1 k-ohm)	–
Balance adjustment 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 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 DC to 50 kHz, +1 dB and –3 dB deviations AC coupling (DC cut) 0.2 or 1 Hz to 50 kHz (refer to the high-pass filter section)	
Low-pass filter	Transfer characteristics 2nd order Butterworth Cutoff frequency: 8 steps of 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz and F (Flat) Amplitude ratio at cutoff point -3 dB $\pm$ 1 dB Attenuation -12 dB/oct. $\pm$ 1 dB/oct.	
Anti-aliasing Filter (CDV-40B-F only)	8th order Butterworth Cutoff frequency: Automatically set at sampling frequency $\times$ 0.25 Attenuation: -48 dB $\pm$ 5 dB (when with sampling frequency $\times$ 0.5) *With low-pass filter set to [AUTO] on the mainframe	
High-pass filter (DC cut)	Cutoff frequency Two steps of 0.2 Hz and 1 Hz Attenuation -6 dB/oct.	
AD converter resolution	16 bits	
TEDS function	Read information from TEDS-installed sensor	

13-3 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
		Assign arbitrary functions such as “Start monitoring”, “Input CAL”, etc. with the ETA-55A.
3) Display	6. “VOICE MEMO”:	Used for recording voice.
	The LED display allows the user to distinguish whether the data recording is in progress, data recording is paused or data recording has been stopped.	
	LED indication of balance adjustment.	
4) Alarm	Same with the EDX-5000A	
5) Cable Length	Approx. 1.5 m	
6) Dimensions	35 (W) × 125 (H) × 22 (D) mm	
	[Note] excluding protrusions.	
7) Weight	Approx. 220 g	

13-4 GPS/MULTI-CHANNEL CAN OPTIONAL MODULE SPECIFICATIONS

- 1) Model EGPC-50A
- 2) Input/Output Port

GPS/CAN common port	×1	Dsub connector (9-pin, male)
CAN port	×1	Dsub connector (9-pin, male)
- 3) Number of CAN Input Channels Max. 512 channels
- 4) CAN Version Compatibility CAN2.0A/B (ISO-11898, ISO11519-2 compliance)
- 5) CAN Communication Speed

High Speed CAN :
1000/800/500/250/125/100/83.3/62.5/50/33.3/25/20/10 [kbps]

Low Speed CAN :
125/100/83.3/62.5/50/33.3/25/20/10 [kbps]
- 6) CAN Data Output

Output Start Cond: Output an arbitrary CAN data when starting the A/D conversion.

Output Stop Cond: Output an arbitrary CAN data when A/D conversion is stopped.

Output Manual Cond: Output an arbitrary CAN data at arbitrary timing.

Output Interval Cond: Output an arbitrary CAN data at the pre-set constant frequency.
- 7) GPS Data

Latitude, longitude, elevation, progressing direction, speed, time, positioning status, number of satellites in use, etc.

Saving format: NMEA format
- 8) Synchronization

Synchronizes the recording start time of EDX-5000A units by using the time data received from GPS satellites.

[Function to be used and ports]

Function			Connect		Supplement
Recording CAN Output CAN	Recording GPS data	Time Synchronization	GPS/CAN1 Port	CAN2 Port	
✓			CAN Bus	CAN Bus	【Recording CAN】 Can Use both ports by CAN. 512 channels in total for 2 port (Max. 512 channels for CAN by 1 Port)
			CAN Bus(Either Port)		
	✓		GPS Sensor		【Recording GPS data】
		✓			【Time Synchronization】
	✓	✓			【Recording GPS data and Time Synchronization】
✓		✓			【Recording CAN and Time Synchronization】 Max. 512 channels for CAN
✓	✓			CAN Bus	【Recording CAN and Recording GPS data】 Max. 512 channels for CAN
✓	✓	✓			【All Functions】 Max. 512 channels for CAN

- 9) Accessories GPS sensor (cable length: 5 m)

14. SOFTWARE SPECIFICATIONS

14-1 MAIN UNIT SOFTWARE SPECIFICATIONS

14-1-1 Measuring Conditions

- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|-------------|----------|------------------|--|-------------------|--|--|--|-----------------|---|---------------|--------------------------|---------------|-------------------|-------------|--------------------------------|---------------|-------------|---------------|-------------------|----------------|--|--------|---|---------------|--|---------------|-------------------|
| 1) Channel Conditions | Measurement ON/OFF, measuring mode, range, high-pass filter, low-pass filter, digital high-pass filter, digital low-pass filter, balance ON/OFF, CAL range, calibration coefficient, offset, offset ZERO ON/OFF, unit, channel name, measurement range, rated capacity, rated output, upper limit value, lower limit value, decimal digits (any display item can be selected), internal calibration ON/OFF, input cable, cable compensation value | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2) Number of Recordable Data | Up to remaining disk space of built-in memory | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3) Manual Measurement | Recording from REC to STOP or pre-set number of data. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4) Interval Measurement | Automatic recording according to the pre-set starting time and recording interval. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5) Trigger Measurement | Recording starts/stops according to pre-set trigger conditions. <ul style="list-style-type: none">• Common trigger conditions<table border="0"><tr><td>End trigger</td><td>Settable</td></tr><tr><td>Pre-trigger data</td><td>When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel</td></tr><tr><td>Post-trigger data</td><td>When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel</td></tr><tr><td colspan="2">Trigger data correlates to the number of measuring channels and the AD format.</td></tr></table>• Analog trigger conditions<table border="0"><tr><td>Trigger channel</td><td>Any channel selected from analog channels</td></tr><tr><td>Trigger level</td><td>Set in physical quantity</td></tr><tr><td>Trigger slope</td><td>Positive/Negative</td></tr></table>• Digital trigger conditions<table border="0"><tr><td>Trigger bit</td><td>Any bit from a digital channel</td></tr><tr><td>Trigger level</td><td>Set to 0, 1</td></tr></table>• External trigger conditions<table border="0"><tr><td>Trigger slope</td><td>Positive/Negative</td></tr></table>• Complex trigger conditions<table border="0"><tr><td>Trigger source</td><td>Select from any 4 analog/digital channels, any external trigger channel, and any manual trigger channel.</td></tr><tr><td>AND/OR</td><td>Analog trigger, digital trigger and external trigger can be logically determined by AND/OR.</td></tr><tr><td>Trigger level</td><td>Analog channels: Set in physical quantity
Digital channels: Set to 0, 1</td></tr><tr><td>Trigger slope</td><td>Positive/Negative</td></tr></table> | End trigger | Settable | Pre-trigger data | When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel | Post-trigger data | When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel | Trigger data correlates to the number of measuring channels and the AD format. | | Trigger channel | Any channel selected from analog channels | Trigger level | Set in physical quantity | Trigger slope | Positive/Negative | Trigger bit | Any bit from a digital channel | Trigger level | Set to 0, 1 | Trigger slope | Positive/Negative | Trigger source | Select from any 4 analog/digital channels, any external trigger channel, and any manual trigger channel. | AND/OR | Analog trigger, digital trigger and external trigger can be logically determined by AND/OR. | Trigger level | Analog channels: Set in physical quantity
Digital channels: Set to 0, 1 | Trigger slope | Positive/Negative |
| End trigger | Settable | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pre-trigger data | When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Post-trigger data | When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger data correlates to the number of measuring channels and the AD format. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger channel | Any channel selected from analog channels | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger level | Set in physical quantity | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger slope | Positive/Negative | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger bit | Any bit from a digital channel | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger level | Set to 0, 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger slope | Positive/Negative | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger source | Select from any 4 analog/digital channels, any external trigger channel, and any manual trigger channel. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AND/OR | Analog trigger, digital trigger and external trigger can be logically determined by AND/OR. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger level | Analog channels: Set in physical quantity
Digital channels: Set to 0, 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger slope | Positive/Negative | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6) Load TEDS Information | Load TEDS information and configure settings automatically according to loaded conditions. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7) Load/Save measurement conditions file

Load ME5 file and configure settings according to loaded measurement conditions.

Save the measurement conditions in ME5 file.

*You can also load/save ME5 file using DCS-100A and .EDX-3000B COMPATIBLE SOFTWARE.

14-1-2 Measuring Operation

Monitoring measurement, start recording, pause recording, stop recording, balancing, and CAL output, etc. are possible.

14-1-2-1 Real-time process

Monitoring and recording of data can be done simultaneously.

Limit of sampling frequencies is up to 10 kHz.

1) Video Data Acquisition

Applicable Cameras	DirectX-compatible web cameras (A web camera recognized by OS as an imaging device)
Number of Applicable Cameras	1
Resolution	Max. 640 × 480 pixels
Frame Rate	Max. 30 frames per second
Saving File Formats	AVI (Audio-Video Interleave) format [Note] Resolution and frame rate depend on an applied web camera. A web camera is required separately.

Measuring Conditions for Video Acquisition

Measuring Modes: Manual, Manual (Data points preset)

2) Arithmetic Processing

Digital Filter	Characteristic	Butterworth (IIR)
	Types	Low-pass filter, high-pass filter
	Order	1 to 8
	Amplitude at Cutoff	-3 dB
	Attenuation Characteristic	-6 dB×N dB/oct. (N: Order of filter)
	[Note] Can be used with low-pass filter with conditioner card.	
Four Arithmetic Operations	Number of Channels	Up to 64 channels
	Channel Conditions	Calculation ON/OFF, unit, arithmetic expression (within 200 characters), decimal digits (within 40 characters), channel name (within 40 characters), zero in arithmetic operations, zero value in arithmetic operations
	Operators and Constants	Addition: +, subtraction: −, multiplication: *, division: /, power: ^, pi: PI, brackets: ()

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

3) FFT Analysis

Analysis Types	Linear spectrum, Power spectrum, Cross spectrum, Autocorrelation, Cross-correlation
Window Functions	OFF, Hamming, Hanning, Fejer, Blackman, Gaussian
Number of Analytical Data	256, 512, 1024, 2048, 4096, 8192
Number of analysis Channels	Up to 4 channels.

14-1-2-2 Saving format

Save as Kyowa standard file format (KS2 format).
KS2 file version: 01.06

14-1-3 Monitor Screen

- 1) Y-time Graphs X-axis: Time; Y-axis: Measured value (physical quantity) graph.
Able to display up to 8 channels.
- 2) X-Y Graphs X-axis: Measured value; Y-axis: Measured value graph.
Able to display any combination of 4 channels.
- 3) Bar Graphs Able to display the maximum/minimum values for each channel.
Able to display up to 80 channels.
- 4) Circle Meters Able to display any channel in a circle meter.
- 5) Numeric Graphs Able to display the maximum/minimum values for each channel.
Able to display up to 80 channels.
- 6) Over Input Display Able to display the value color, background color, etc. of over input channels in red.
- 7) Graph Scale Able to display auto-scale of the Y-axis in the Y-time graphs, X- and Y-axes in the X-Y graphs, and Y-axis in the bar graphs.

- | | |
|-------------------------------------|---|
| 8) Cursor Display | Able to display the cursor in the Y-time graphs and the X-Y graphs.
The cursor position can be displayed by physical quantity. |
| 9) Number of Multi-window Displayed | Up to 12 windows can be displayed. |
| 10) Image Saving | Able to save each graph as image file. |

14-1-4 Configuration

- | | |
|-----------|---|
| 1) Others | Oscillator switching (internal/external), beep sound of operation, balance adjustment standard value, AD data format switching (16/24-bits), option switch settings |
|-----------|---|

14-1-5 GPS/Multi-channel CAN Optional Functions

- | | |
|--------------------------------------|---|
| 1) CAN Data Recording | Up to 512 channels of CAN data can be recorded for each unit.
(CAN data is saved in E4A file format.)
[Note] However, CAN condition settings are configured by EDX-3000B compatible software. |
| 2) CAN Trigger | Starts/stops recording using analog triggers, digital triggers, and complex triggers.
[Note] However, CAN trigger condition settings are configured by EDX-3000B compatible software. |
| 3) Graph Display | Multi-display of numerical and analog data in graphs. |
| 4) Point ZERO (Manual) Measurement | Able to start manual measurement at zero second (at the moment when msec is zero) using the time data received from GPS satellites. |
| 5) Point ZERO (Interval) Measurement | Able to start interval measurement at zero second (at the moment when msec is zero) using the time data received from GPS satellites. |
| 6) GPS Data Recording | Able to monitor and record GPS data (latitude, longitude, speed, bearing, etc.).
GPS data is saved in NMEA file format. |

14-2 EDX-3000B COMPATIBLE SOFTWARE

14-2-1 Measuring Conditions

- | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|-------------|----------|------------------|--|-------------------|--|-----------------|---|---------------|--------------------------|---------------|-------------------|-------------|--------------------------------|---------------|-------------|---------------|-------------------|----------------|--|--------|---|---------------|--|---------------|-------------------|
| 1) Channel Conditions | Measurement ON/OFF, measuring mode, range, high-pass filter, low-pass filter, digital high-pass filter, digital low-pass filter, balance ON/OFF, CAL range, calibration coefficient, offset, offset ZERO ON/OFF, unit, channel name, measurement range, rated capacity, rated output, upper limit value, lower limit value, decimal digits (any display item can be selected), internal calibration ON/OFF, input cable, cable compensation value | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2) Number of Recordable Data | Up to remaining disk space of built-in memory | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3) Manual Measurement | Recording from REC to STOP pre-set number of data. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4) Interval Measurement | Automatic recording according to the pre-set starting time and recording interval. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5) Trigger Measurement | Recording starts/stops according to pre-set trigger conditions. <ul style="list-style-type: none">• Common trigger conditions<table border="0"><tr><td>End trigger</td><td>Settable</td></tr><tr><td>Pre-trigger data</td><td>When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel</td></tr><tr><td>Post-trigger data</td><td>When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel</td></tr></table><p>Trigger data correlates to the number of measuring channels and the AD format.</p>• Analog trigger conditions<table border="0"><tr><td>Trigger channel</td><td>Any channel selected from analog channels</td></tr><tr><td>Trigger level</td><td>Set in physical quantity</td></tr><tr><td>Trigger slope</td><td>Positive/Negative</td></tr></table>• Digital trigger conditions<table border="0"><tr><td>Trigger bit</td><td>Any bit from a digital channel</td></tr><tr><td>Trigger level</td><td>Set to 0, 1</td></tr></table>• External trigger conditions<table border="0"><tr><td>Trigger slope</td><td>Positive/Negative</td></tr></table>• Complex trigger conditions<table border="0"><tr><td>Trigger source</td><td>Select from any 4 analog/digital channels, any external trigger channel, and any manual trigger channel.</td></tr><tr><td>AND/OR</td><td>Analog trigger, digital trigger and external trigger can be logically determined by AND/OR.</td></tr><tr><td>Trigger level</td><td>Analog channels: Set in physical quantity
Digital channels: Set to 0, 1</td></tr><tr><td>Trigger slope</td><td>Positive/Negative</td></tr></table> | End trigger | Settable | Pre-trigger data | When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel | Post-trigger data | When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel | Trigger channel | Any channel selected from analog channels | Trigger level | Set in physical quantity | Trigger slope | Positive/Negative | Trigger bit | Any bit from a digital channel | Trigger level | Set to 0, 1 | Trigger slope | Positive/Negative | Trigger source | Select from any 4 analog/digital channels, any external trigger channel, and any manual trigger channel. | AND/OR | Analog trigger, digital trigger and external trigger can be logically determined by AND/OR. | Trigger level | Analog channels: Set in physical quantity
Digital channels: Set to 0, 1 | Trigger slope | Positive/Negative |
| End trigger | Settable | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pre-trigger data | When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Post-trigger data | When in 16-bit mode:
Up to 4,194,304 data/channel
When in 24-bit mode:
Up to 2,097,152 data/channel | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger channel | Any channel selected from analog channels | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger level | Set in physical quantity | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger slope | Positive/Negative | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger bit | Any bit from a digital channel | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger level | Set to 0, 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger slope | Positive/Negative | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger source | Select from any 4 analog/digital channels, any external trigger channel, and any manual trigger channel. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AND/OR | Analog trigger, digital trigger and external trigger can be logically determined by AND/OR. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger level | Analog channels: Set in physical quantity
Digital channels: Set to 0, 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Trigger slope | Positive/Negative | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6) Saving and Loading Measurement Condition File | Able to save and load measurement conditions. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7) Saving and Loading Sensor Information | Able to save and load sensor information files (CSV format files) with channel conditions. | | | | | | | | | | | | | | | | | | | | | | | | | | |

8) Setting DIO

The number of input/output points	Max. 8 points
Input/output setting	Able to set digital input/digital output/remote control input for every bit.

9) Load TEDS Information

Load TEDS information and configure settings automatically according to loaded conditions.

10) Load/Save ME5 file

Load ME5 file and configure settings according to loaded measurement conditions.
 Save the measurement conditions in ME5 file.
 *You can also load/save ME5 file using DCS-100A and .MAIN UNIT SOFTWARE.

14-2-2 Measuring Operation

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

14-2-2-1 Real-time process

Monitoring and recording of data can be done simultaneously.

Limit of sampling frequencies is up to 10 kHz.

4) Video Data Acquisition

Applicable Cameras	DirectX-compatible web cameras (A web camera recognized by OS as an imaging device)
Number of Applicable Cameras	1
Resolution	Max. 640 × 480 pixels
Frame Rate	Max. 30 frames per second
Saving File Formats	AVI (Audio-Video Interleave) format
	[Note] Resolution and frame rate depend on an applied web camera. A web camera is required separately.

Measuring Conditions for Video Acquisition

Measuring Modes: Manual, Manual (Data points preset)

5) Arithmetic Processing

Digital Filter	Characteristic	Butterworth (IIR)
	Types	Low-pass filter, high-pass filter
	Order	1 to 8
	Amplitude at Cutoff	-3 dB
	Attenuation Characteristic	-6 dB×N dB/oct. (N: Order of filter)
		[Note] Can be used with low-pass filter with conditioner card.
Four Arithmetic Operations	Number of Channels	Up to 64 channels
	Channel Conditions	Calculation ON/OFF, unit, arithmetic expression (within 200 characters), decimal digits (within 40 characters), channel name (within 40 characters), zero in arithmetic operations, zero value in arithmetic operations
	Operators and Constants	Addition: +, subtraction: −, multiplication: *, division: /, power: ^, pi: PI, brackets: ()

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

6) FFT Analysis

Analysis Types	Linear spectrum, Power spectrum, Cross spectrum, Autocorrelation, Cross-correlation
Window Functions	OFF, Hamming, Hanning, Fejer, Blackman, Gaussian
Number of Analytical Data	256, 512, 1024, 2048, 4096, 8192
Number of analysis Channels	Up to 4 channels can be displayed in one window, and up to 8 windows can be displayed
Saving	The analysis results can be saved as FFT analysis files (CSV format).

14-2-2-2 Saving format

Save as Kyowa standard file format (KS2 format).
KS2 file version: 01.06

14-2-3 Monitor Screen

- 1) Y-time Graphs
X-axis: Time; Y-axis: Measured value (physical quantity) graph.
Up to 16 channels can be displayed in one graph, and up to 10 graphs can be displayed.
- 2) Y-time (All Channels) Graphs
X-axis: Time; Y-axis: Measured value (physical quantity) graph.
All measurement channels can be displayed with the same color line.
- 3) Y-time (DIV) Graphs
X-axis: Time; Y-axis: Measured value (physical quantity) graph.
Up to 16 channels can be displayed in one graph.
Zero point of displayed channel can be allocated freely to a desired position on the division of Y-axis.
- 4) X-Y Graphs
X-axis: Measured value; Y-axis: Measured value graph.
Able to display combination of max. 8 channels.

- | | |
|--------------------------------------|---|
| 5) Bar Graphs | Able to display up to 32 channels in one graph and up to 4 graphs per window can be displayed.
Peak hold ON or OFF display is possible.
(Able to display peak values.) |
| 6) Digital Graphs | X-axis: Time; Y-axis: Any bit of data of digital CH.
Up to 16 bits can be displayed in one graph, and up to 4 graphs per window can be displayed. |
| 7) Circle Meters | Able to display any channel in a circle meter. |
| 8) Bar Meters | Able to display any desired channel in horizontal or vertical bar meter. |
| 9) Numeric Graphs | Able to display any channel, any 16 channels or all channels.
(Able to display max. and min. values of each channel.) |
| 10) FFT Graphs | Able to display FFT analysis results in graphs.
Up to 4 channels can be displayed. |
| 11) Web Camera | Displays images captured by the web camera. |
| 12) Over Input Display | Able to display the values of over input channels in red.
(Excluding FFT Graphs.) |
| 13) Graph Scale | Able to display auto-scale and full scale values on the Y-time graphs (Y-axis), X-Y graphs (X-, Y-axes) and bar graphs (Y-axis). The Y-axis of Y-time graphs are able to be changed to 1 axis, 2 axes or CH. |
| 14) Display Color | Changeable for any window unit. |
| 15) Titles and Labels | Sets a desired title and for X- and Y-axes. |
| 16) Number of Multi-window Displayed | Numeric windows: Max. 8 windows, Graph windows: Max. 8 windows (Including FFT windows). By combining numeric windows and graph windows, up to 16 windows can be displayed. |
| 17) Auxiliary Lines | Able to display desired auxiliary lines on the Y-time graphs (X-axis and Y-axis), X-Y graphs (X-axis and Y-axis), and bar graphs (X-axis and Y-axis).
(Up to 4 auxiliary lines can be displayed for each set of X axis and Y-axis) |
| 18) Comparative Data Display | Able to compare current data on monitor with previous data by displaying comparative data (Previously recorded KS2 data) in Y-time graphs (All channels excluding DIV) and X-Y graphs. The size of displayable data file is in maximum of 10MB. If exceeds 10MB, data with 10MB from the beginning can be displayed |

14-2-4 Configuration

- | | |
|--------------------|--|
| 1) Control Mode | Switch between offline and online modes |
| 2) File Conversion | Automatically convert files (CSV, XLS, XLSX, RPC III file formats) when terminating measurements. |
| 3) Others | Oscillator switching (internal/external), operation beep, balance adjustment standard value, AD data format switching (16/24 bits), option switch settings |

14-2-5 GPS/Multi-channel CAN Optional Functions

- 1) CAN Data Recording Up to 512 channels of CAN data can be recorded for each unit.
(CAN data is saved in E4A file format.)
- 2) CAN Trigger
 - Analog trigger conditions

Trigger channel	Any CAN channel can be selected
Trigger level	Set according to CAN data
Trigger slope	Positive/Negative
 - Digital trigger conditions

Trigger bit	Any bit from any CAN channel
Trigger level	Set to 0, 1
 - Complex trigger conditions

Trigger source	Select any 4 channels
AND/OR	Analog trigger and digital trigger can be logically determined by AND/OR.
Trigger level	Analog channels: Set according to CAN data Digital channels: Set to 0, 1
Trigger slope	Positive/Negative
- 3) Communication Conditions Communication standards, baud rate, termination resistor
[Note] Sampling points, sample times, and resynchronous jump width are automatically set.
- 4) Measurement ID Conditions Port number, format, frame ID, data length
- 5) Measuring Channel Conditions Start bit, bit length, data type, endian, calibration coefficient, offset
(Conditions for converting extracted CAN data to physical quantity)
- 6) Graph Display Display numerical and analog data in graphs simultaneously.
- 7) Loading CANdb File

File format	DBC format
Maximum number of network nodes	1024
Maximum number of messages	2048
Maximum number of signals	4096
- 8) Point ZERO (Manual) Measurement Able to start manual measurement at zero second (at the moment when msec is zero) using the time data received from GPS satellites.
- 9) Interval (GPS Synchronization) Measurement Able to start interval measurement at zero second (at the moment when msec is zero) using the time data received from GPS satellites.
- 10) GPS Data Recording Able to monitor and record GPS data (latitude, longitude, speed, bearing, etc.).
GPS data is saved in NMEA file format.

14-3 DAS-200A SPECIFICATIONS

14-3-1 Recorded data display

- | | |
|---------------------------|--|
| 1) Graph Display | Up to 4 patterns of display conditions are able to be set for each graph.
Displays any 1, 2, or 4 graphs. |
| 2) Y-time Graphs | Max. 16 channels per graph. Auto-scaled can be displayed by Y-axis. |
| 3) X-Y Graphs | Display 1 graph on a single screen.
Any 4 channels can be displayed for both X and Y axes.
Auto-scaled can be displayed for both X and Y axes. |
| 4) All Data Display | All 4 channels' data can be displayed. |
| 5) Numerical Data Display | List display of data of any 16 channels. |
| 6) Cursor Display | Displays numeric data at cursor location.
Able to zoom in data between 2 cursors.
Able to display max. and min. data between 2 cursors. |
| 7) Scrolling | Able to scroll X-axis on Y-time graphs. |
| 8) Data File Editing | Able to convert the file by extracting an arbitrary data range and arbitrary channel.
Able to display and edit data file title, comments and channel conditions. |
| 9) Max. and Min. Display | Able to display max. and min. data of each channel (max. 5 data)
400-data at front and 400-data at back of the max. or min. with max. or min. at the centre can be displayed in graphs. |
| 10) KS2 File | Compatible with block number (1 block display, all block display).
Able to playback and display list of audio data. |
| 11) Playback Operations | Playback, play in backward, continuous playback, frame-by-frame forward, frame-by-frame backward, jump to the beginning of playback, jump to the end of playback, set the beginning position of playback, set the end position of playback.
Playback speed: $\times 0.1$ to $\times 20$
Playback the measured data and video at the same time. |
| 12) AVI Files | Set playback frame rate and frame number of starting playback (time) |

14-3-2 Analysis Processing

14-3-2-1 Recorded data display

- | | |
|---------------------------------|---|
| 1) Statistical Processing | List display of the maximum value, minimum value, average, and standard deviation of the arbitrary data range.
Statistical calculation results are converted to a CSV format file and saved. |
| 2) Four Arithmetic Calculations | Carries out calculations between channels in a maximum of 2 files, and save the calculation results in a new data file.
(Setting of a maximum 320 expressions is possible)
Expressions (Up to 200 digits) |
| Operators and Constants | Addition: +, subtraction: -,
multiplication: *, division: /,
power: ^, pi: PI, and brackets: () |
| Functions | SQR Square root
ABS Absolute value
SIN Sine |

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

3) FFT Analysis

Analysis types	Linear spectrum, Power spectrum, Cross spectrum, Autocorrelation, Cross-correlation, Coherence, Transfer function
Window functions	OFF, Hamming, Hanning, Fejer, Blackman, Gaussian
Number of analysis data	256, 512, 1024, 2048, 4096, 8192, 16384, 32768
Filters	12 steps of FLAT, 1 Hz, 2Hz, 5 Hz, 10 Hz, 20 Hz, 50 Hz, 100 Hz, 200 Hz, 500 Hz, 1000 Hz, 2000 Hz
Integration times	0 to 2
Average number of times	0 to (0: whole waveform)
Number of shift data	2 or more

Details of analysis result data

Types	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
Autocorrelation	●	Correlation	
Cross-correlation	●	Correlation	
Coherence	●	Coherence	
Transfer function	●	Amplitude (linear) Amplitude (Logarithm)	Phase

Save the analysis results into CSV format files.

4) Histogram Analysis	
Target channels	Max. all channels
Types	Local max/min method, max/min method, 1D rainflow method, amplitude method, 1D time rate method, 1D rainflow method + local max/min method, 1D rainflow method + max/min method and 2D rainflow method.
Slices	1D algorithm: Even numbers from 10 (± 5) to 256 (± 128) 2D algorithm: Even numbers from 10 to 50 Able to set slice width, hysteresis, offset (when max/min method), etc.
Result display	Tables and graphs (3D display during 2D rainflow)
5) Lifespan Prediction Processing	Predicts lifespan from the result of histogram analysis of 1D rainflow method, 2D rainflow method, or amplitude method. The lifespan prediction data is able to be displayed and saved. (Allows S-N data files to be read.)
6) Filter Processing	
Digital filter	IIR filter
Characteristics	4th order Butterworth (Cutoff: -6 dB, no phase delay)
HPF & LPF	FLAT to 500 kHz (Can be set up to 1/2 of sampling frequency)
	Mirroring: Analysis result can be saved in additional format.
7) Differential & Integration Processing	Differentiation / integration count: 0: None, 1 to 2 Analysis result can be saved in additional format.

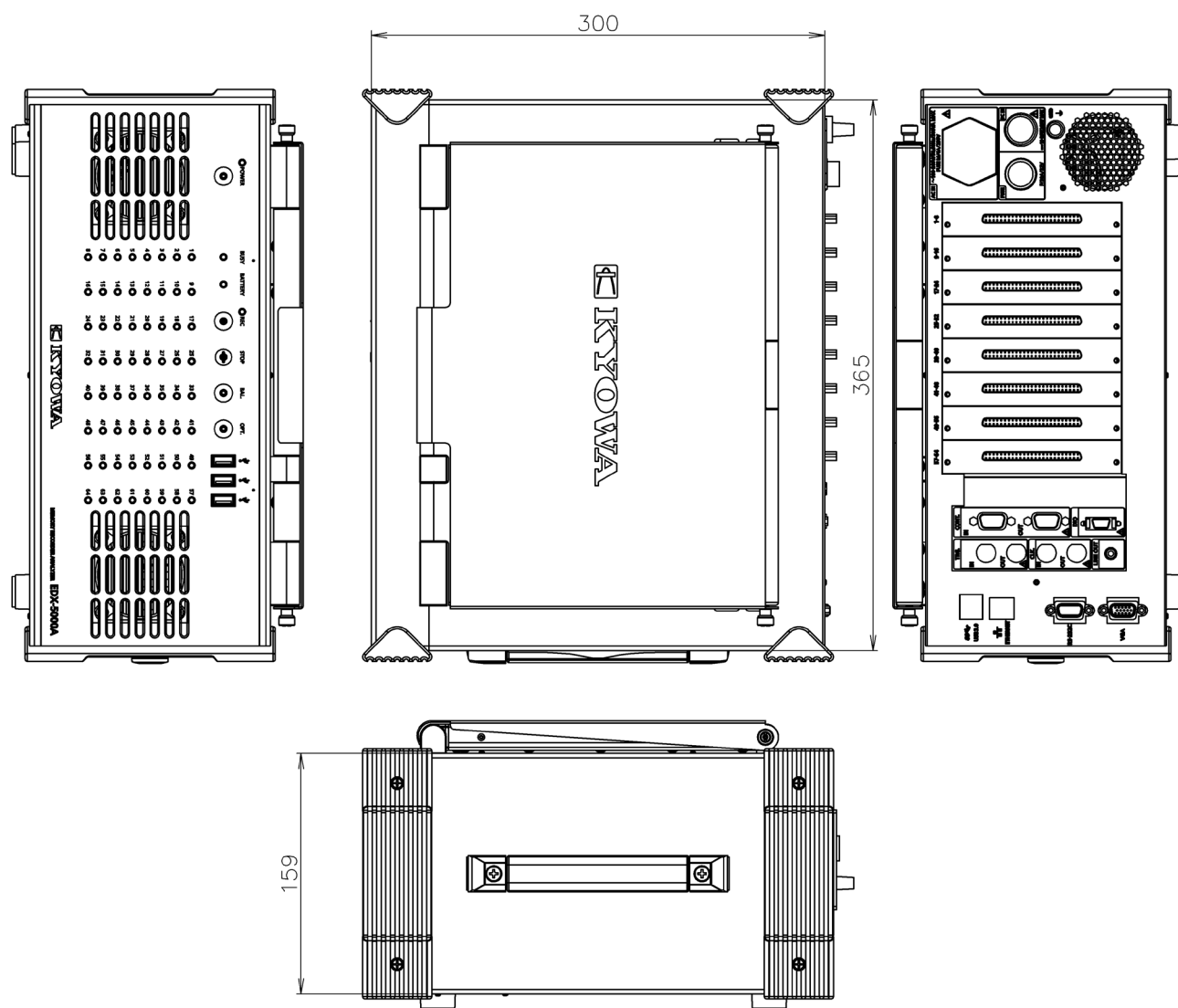
14-3-2-2 Others

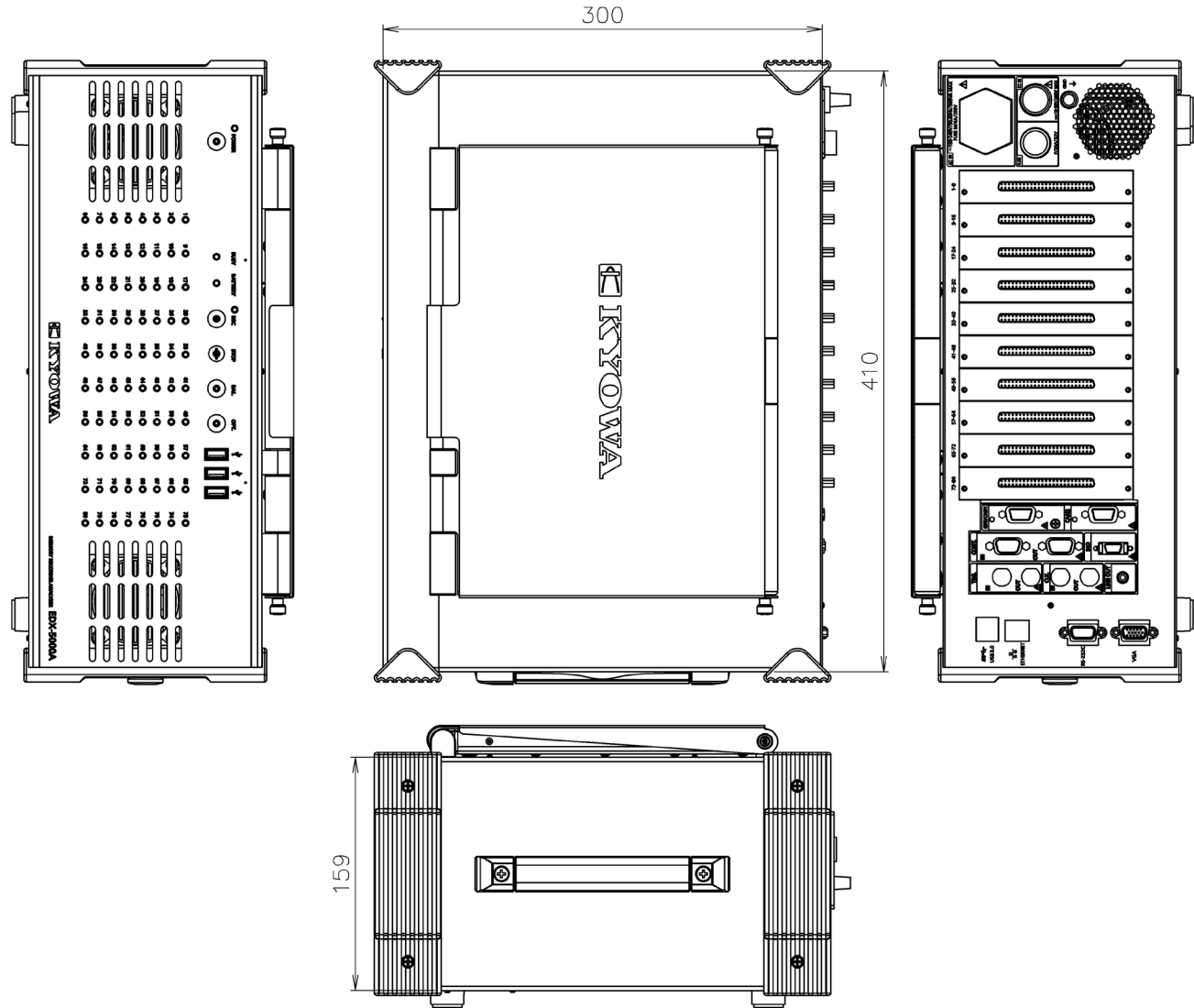
1) Multiple Files Conversion	Batch conversion of multiple data files. • CSV format (Extension: csv) • Excel format (Extension: xls,xlsx) • RPCIII format (Extension: response)
2) File Coupling	Multiple files (Master and slave) acquired in synchronized operation are coupled into one file.
3) Reverse File Conversion	Converts CSV format file into KS2 format file.
4) File Division	Extract a file from the data of specified block number only in data files of multiple blocks.
5) Batch Analysis	Analysis of multiple data files under same conditions at one time. Histogram analysis, filtering and differentiation/integration are possible.
6) Overwriting of Multiple Files	Up to 16 data files can be overwritten as Y-time data and displayed. Arbitrary setting of starting display position for each data file is possible.
7) Multiple File Conversion	Converts multiple of KS2 files acquired from interval measurement, etc. into a CSV file.

15. OUTSIDE DRAWING

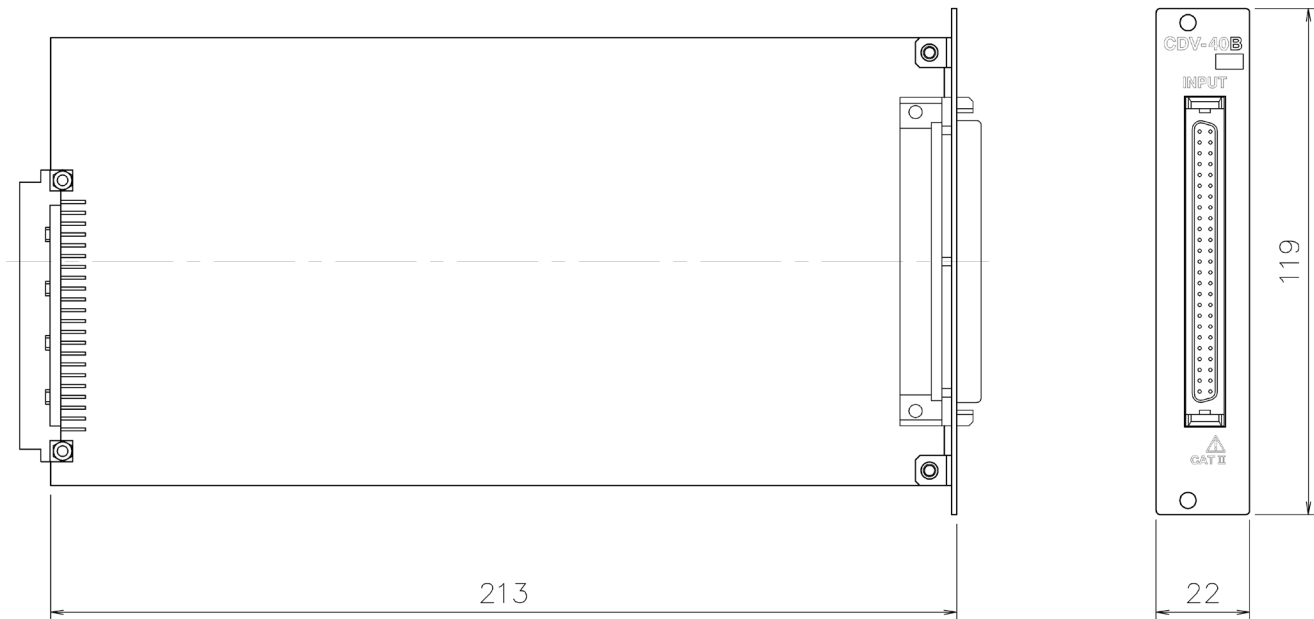
15-1 MEMORY RECORDER/ANALYZER: EDX-5000A

[EDX-5000A-64]





15-2 STRAIN/VOLTAGE MEASUREMENT CARD: CDV-40B



15-3 REMOTE CONTROL UNIT: RCU-42A

