

EDS-400A SERIES COMPACT RECORDER INSTRUCTION MANUAL FOR HARDWARE

Thank you for purchasing a product of KYOWA ELECTRONIC INSTRUMENTS.

Please read this manual carefully to ensure the long life and reliability of the product.

The product should not be used in any manner other than as described in this manual.

This manual covers only the hardware operating instructions.

For details of the Software, please refer to the "Instruction Manual for Software."

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STANDARD ACCESSORIES

The following accessories are enclosed with EDS-400A Series EDS-400A/EDS-450A Compact Recorder.
After unpacking, check the contents to ensure that all accessories are enclosed:

DC power cable (P-57: 2 m)	1
Attachable rubber foot	1
Compact flash memory card (128 MB)	1
CD-R (EDS-40A Control Software, Instruction Manual)	1
Inspection Report	1
Warranty	1

OPTIONAL ACCESSORIES

Strain input cable	: U-49 (R05-NDIS Standard Connector, 30 cm)
Voltage input cable	: U-50 (R05-BNC, 1.5 m)
Sync cable	: N-79 (20 cm)
AC adapter	: SA-10A-EDS (100 to 240 VAC)
Remote-control unit	: RCU-04A
Data Analysis Software	: DAS-100A

SAFETY PRECAUTIONS (Be sure to read the safety precautions prior to use.)

PRIOR TO USE

For safe use of the EDS-400A (EDS-450A), be sure to read the safety precautions described below.

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

SAFETY SYMBOLS

For safety operation of the EDS-400A (or EDS-450A), the following “WARNING” and “CAUTION” symbols are used in SAFETY PRECAUTIONS of this manual and indicated on the product.

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

! WARNING
● Power supply To prevent fire hazards, ensure that the power supply voltage specified for the EDS-400A (or EDS-450A) (10 to 16 VDC) matches the local line voltage before connecting the system to the DC power supply. ● Inflammable Environment To prevent the risk of fire and explosion, do not operate the EDS-400A (or EDS-450A) in an area exposed to flammable gases, vapors or dust. ● Abnormal Condition To prevent fire hazards, if smoke is emitted from the EDS-400A (or EDS-450A), turn OFF the power switch immediately, disconnect the power cable from the power supply and stop using the instruments. ● Measurement Under High Voltage Do not measure a target charged with high voltage. It may reduce the performance of the system or cause a system failure.

! CAUTION

- After turning off the system power, wait at least five seconds before turning on the power again.
If the system power is turned on within five seconds of power-off, or if the system power is turned on and off repeatedly in quick succession, a system failure may occur due to the rush current generated upon power input.
- Use the EDS-400A (or EDS-450A) in a temperature range of 0 to 50°C.
Using the EDS-400A (or EDS-450A) outside the specified operating temperature range may diminish the system's performance or cause a failure.
If the EDS-400A (or EDS-450A) must be used under direct sunlight or in a cold place, provide a sunshade or keep the operating area warm.
- Use the EDS-400A (or EDS-450A) within a relative humidity range of 20% to 90%.
Using the EDS-400A (or EDS-450A) in an environment exceeding the operating humidity range or in an area exposed to splashing water may diminish the system's performance or cause a failure.
- Do not use the EDS-400A (or EDS-450A) immediately after an abrupt change in the environment.
Leave the EDS-400A (or EDS-450A) in the operating environment until it is adapted to the change prior to use.
An abrupt change in ambient temperature and humidity occurring through transport of the system or other reason may cause dew condensation, which could in turn diminish the system's performance or cause a failure.
- Do not use the EDS-400A (or EDS-450A) in an environment that is subject to significant amounts of dust.
If dust should enter the internal mechanism, a system failure may occur due to poor connector contact, reduced insulation, etc. Prevent dust intrusion not only when the EDS-400A (or EDS-450A) is operating but also when it is in storage.
- Do not use the EDS-400A (or EDS-450A) in an area that is subject to significant vibration or impact.
If the EDS-400A is subjected to strong vibration or severe impact, a system failure may result.
- Do not use the EDS-400A (or EDS-450A) in an area that is subject to a strong magnetic field.
Use the EDS-400A (or EDS-450A) in an environment where the magnetic field is acceptable for use of the PC.
Using the EDS-400A (or EDS-450A) near a radio transmitter/receiver, microwave oven, electric furnace or any other equipment that generates a strong magnetic field may diminish the system's performance or cause a failure.
- Use the EDS-400A (or EDS-450A) with a power supply of the specified voltage range.
The power supply should be able to provide 10 to 16 VDC and be free of momentary power failure or noise.
- Do not pull directly on the connector cables.
When routing the connector cables, provide a margin for the length so that no excessive force will be applied to the cable connections. Pulling the cable or applying excessive force may cause a system failure or interruption of the measurement process.
- Take proper precautions when handling the CD-R.
Do not store the CD-R under direct sunlight or in a hot or humid place.
Do not put any object on the disc, bend the disc, or otherwise apply force to it.
Handle the disc carefully so as not to leave fingerprints, stains or scratches on either side.
- Do not disassemble or modify the EDS-400A (or EDS-450A).
Do not attempt to disassemble or modify the EDS-400A (or EDS-450A) since inappropriate disassembly or modification by the user may result in electric shock or system failure.
- Do not insert a foreign object into the slot for the Compact flash memory card.
Inserting a foreign object into the slot for the Compact flash memory card (hereinafter referred to as CF card) may cause a system failure.
- Warm the EDS-400A (or EDS-450A) prior to use.
Wait around 30 minutes following power-up for pre-heating, in order to measure accurately.

NOTATIONS USED IN THIS INSTRUCTION MANUAL

OPERATING KEYS, MENU OPTIONS AND SET OR SELECTED ITEMS

Operating panel keys are expressed in “.” (quotation marks).

PRECAUTIONS

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

Examples of Notations

NOTE

The information provided merits special attention in the handling of the system.

MEMO

The information provided is useful as a reference.

ESSENTIAL PRECAUTIONS FOR USE OF THE PRODUCT

NOTE

1. Never turn OFF the power during data recording.
Turning OFF the power of the EDS-400A (or EDS-450A) during data recording will damage the current recording data and null the data resulting to create a size 0 file.
In some instances, data in the CF card or the card itself may be damaged.
2. Never turn OFF the power while collecting data through LAN.
Or, data in the CF card or the data itself may be damaged.
When collecting data through LAN, since you cannot visually check whether it is actually collecting data, check to be sure that it is not collecting data using the Control Software and then, turn OFF the power.
3. If power failure is likely to occur, always use an uninterruptible power supply unit.
4. When using an external battery, use the battery with enough capacity to satisfy the measurement time. Consumption current of the EDS-400A (or EDS-450A) is approximately 0.6 A when 12 VDC is supplied.
5. Before recording data, always install the CF card in the card slot of the EDS-400A (or EDS-450A). Or, no data recording is started.
6. Do not forget to turn OFF the power before ejecting the CF card from the card slot of the EDS-400A (or EDS-450A)
When the power is turned ON, the EDS-400A (or EDS-450A) may be currently accessing the CF card for recording data or collecting data through LAN. If the CF card is ejected at this time, data in the CF card or the CF card itself is likely to be damaged. Therefore, before ejecting the CF card, check to be sure that the EDS-400A (or EDS-450A) is not operating and then, turn OFF the power.
7. Use CF card with a processing speed of x 45 or higher.
Using a CF card with a processing speed below x 45 may stop recording data, depending on the sampling speed.
8. If multiple EDS-400As are used, be sure to use preformatted CF cards of the same type and capacity. The use of CF cards of varying types and capacities will create discrepancies in the writing speeds of the cards, which affects synchronization at the start of data recording.
9. When formatting the CF card, never make the Volume Label "blank."
10. To record more than 169 data files into the CF card, it is required to format the CF card with "FAT32."
11. The EDS-400A (or EDS-450A) is provided with a real-time clock function. Clock data is backed up for approximately 8 hours^{*1}. If the system power has been turned OFF for 8 hours or more, the built-in clock will not display the correct time the next time the EDS-400A (or EDS-450A) is started. If the measurement requires clock information, connect the EDS-400A (or EDS-450A) to the PC and establish "LAN connection" using the bundled Control Software. The moment a certain data is transferred between the EDS-400A (or EDS-450A) and the PC, the PC's clock information is automatically set in the EDS-400A (or EDS-450A).

*1: When the EDS-400A (or EDS-450A) is continuously powered for more than 4 hours.

[Reference] Setting conditions other than the time; such as the range, sampling frequency, zero suppression data, etc. are recorded in the non-volatile memory of the EDS-400A (or EDS-450A), so they will not be lost semi-permanently.

INITIAL SETTINGS FOR LAN

The initial settings (factory settings) for the local area network are as follows:

System ID	0 (Master)
IP address	192 . 168 . 0 . 1
Gateway	0 . 0 . 0 . 0
Subnet mask	255 . 255 . 255 . 0

MEMO

The procedure used to revert the LAN settings to the initial settings is described in Chapter 6, "TECHNICAL INFORMATION" and in 6-2, "INITIALIZATION," of this manual.

1 PRODUCT OVERVIEW

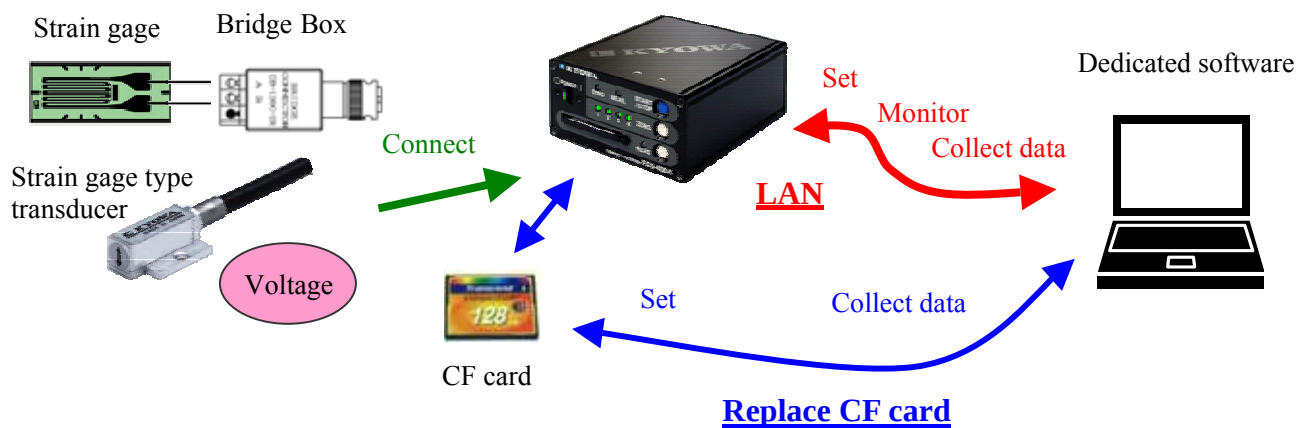
1-1 OVERVIEW

The EDS-400A Series EDS-400A/EDS-450A is a strain/voltage recorder designed for use in combination with PC. It can be used in various applications, including vehicle onboard measurement

The user can set conditions for recording, perform zero suppression^{*1}, start/stop measurement and collect data from the PC connected to the EDS-400A (or EDS-450A) via LAN. These operations can also be performed via the panel screen switches or by using a CF card^{*2} without the need to connect a PC.

The EDS-400A is capable of measuring the maximum of 32 channels by connecting up to eight EDS-400A units (each EDS-400A can measure 4 channels). Therefore, it is possible to configure systems for applications ranging from simple testing to advanced measurement.

The EDS-450A is solely used for measuring 4 channels.



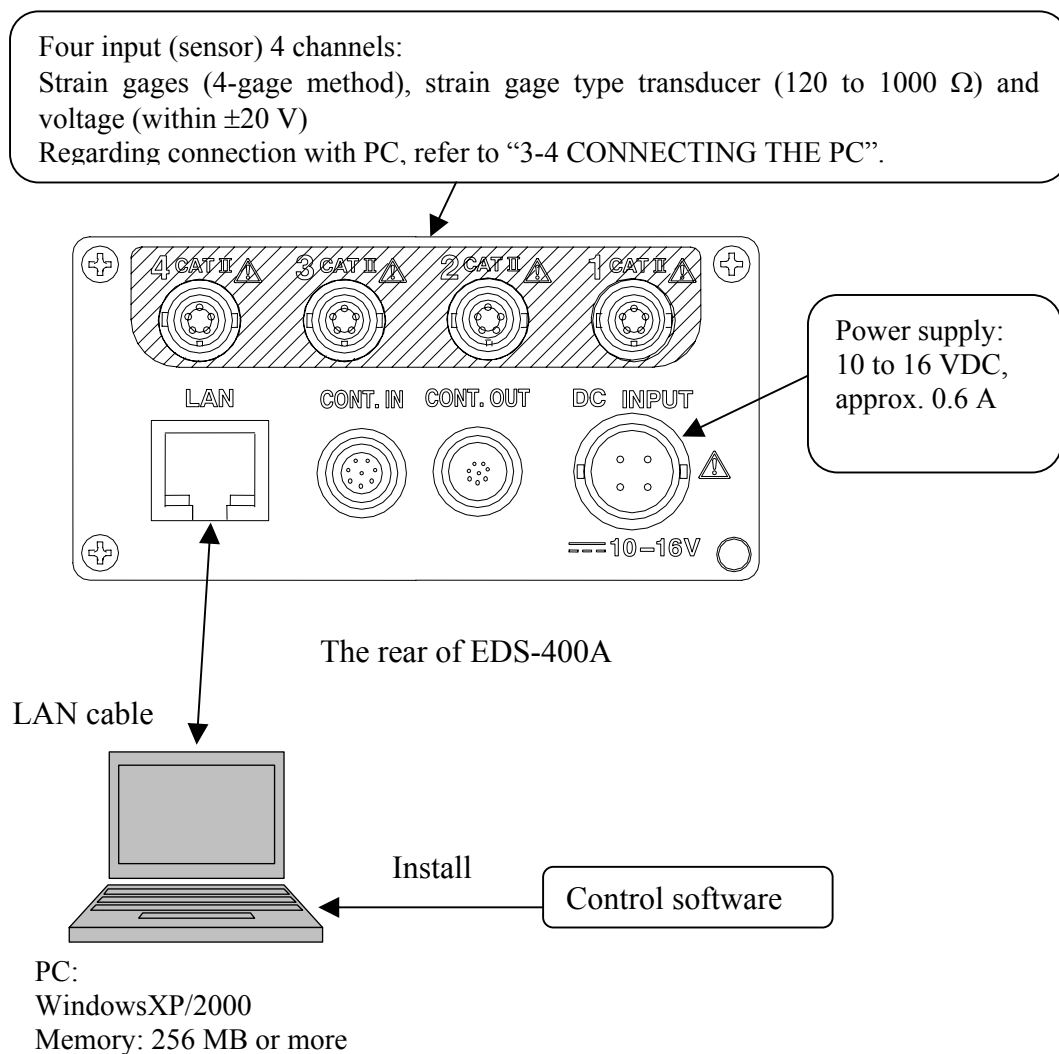
MEMO

Zero suppression^{*1}: This term means zero balance in the strain input mode, or the function used to shift the input voltage to 0 V in the voltage input mode.

CF card^{*2}: Compact flash memory card

1-2 SYSTEM CONFIGURATION

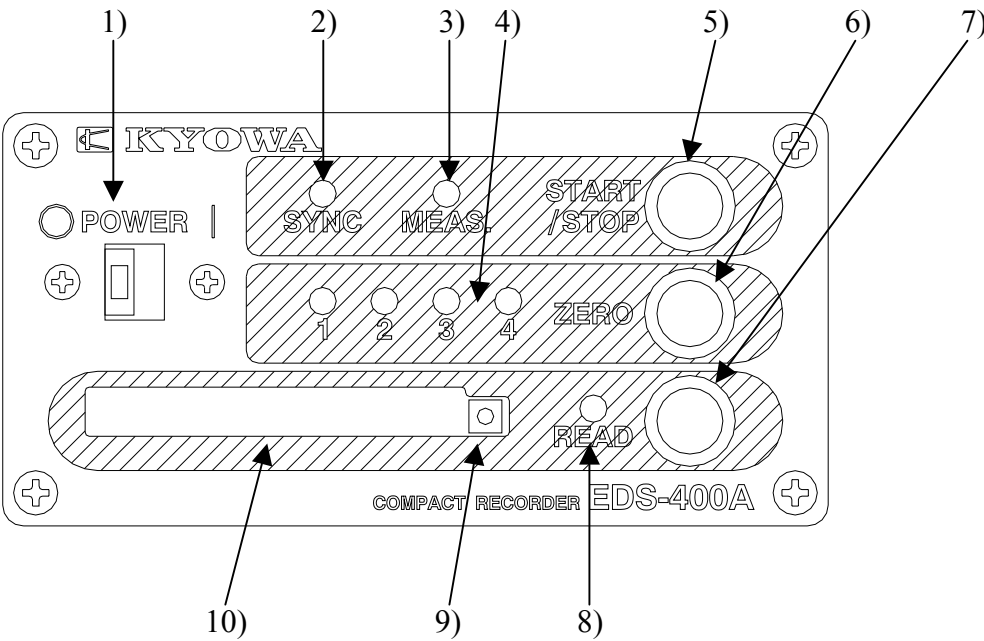
PC:	Use a PC equipped with a LAN interface. The following minimum specifications are recommended: CPU: Pentium III 700 MHz or equivalent, or faster OS: English-version WindowsXP/2000 Memory: 256 MB or more Hard-disk drive: 10 MB or more of free disk space (excluding space for storage of measured data) Display: Resolution 1024 × 768 dots or higher Display colors: Full-color LAN interface: 10BASE-T/100BASE-TX CD-ROM drive: Used for installation of Control Software, etc.
DC power supply:	Power supply of 10 to 16 VDC required Current consumption is approximately 0.6 A (when 12 VDC is supplied).
LAN cable:	Use a cross cable when the connecting the EDS-400A (EDS-450A) directly to the PC, or a straight cable when connecting it to a PC via a hub. Regarding connection with PC, refer to “3-4 CONNECTING THE PC”.
LAN hub:	Purchase a LAN hub, as necessary, if multiple EDS-400As are to be used.
Control Software:	To be installed on the PC for use.



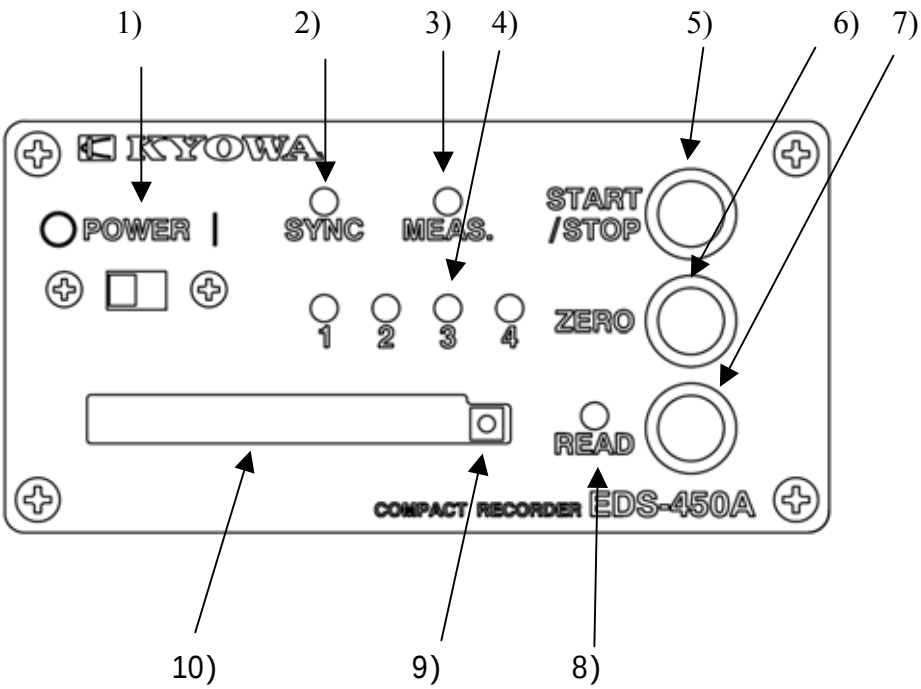
2 NOMENCLATURE AND MAIN FUNCTIONS

2-1 FRONT

EDS-400A



EDS-450A



- 1) "POWER" switch
System power is turned OFF when this switch is slid to the "O" position or ON when slid to the "I" position. When the EDS-400A power is ON, the "POWER" switch lights up green.
- 2) "SYNC" lamp
This lamp indicates the status of synchronization.
 Steady green light: The system is set as the master.
 Steady orange light: The system is set as a slave and is not receiving the sync signal.
 Flashing orange light: The system is set as a slave and is receiving the sync signal.

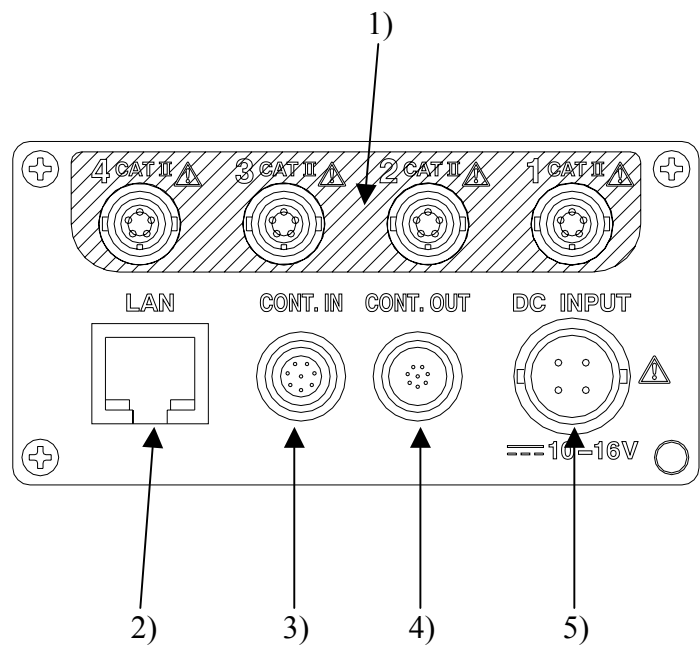
NOTE

The EDS-450A is used only as a master unit and not as a slave unit.

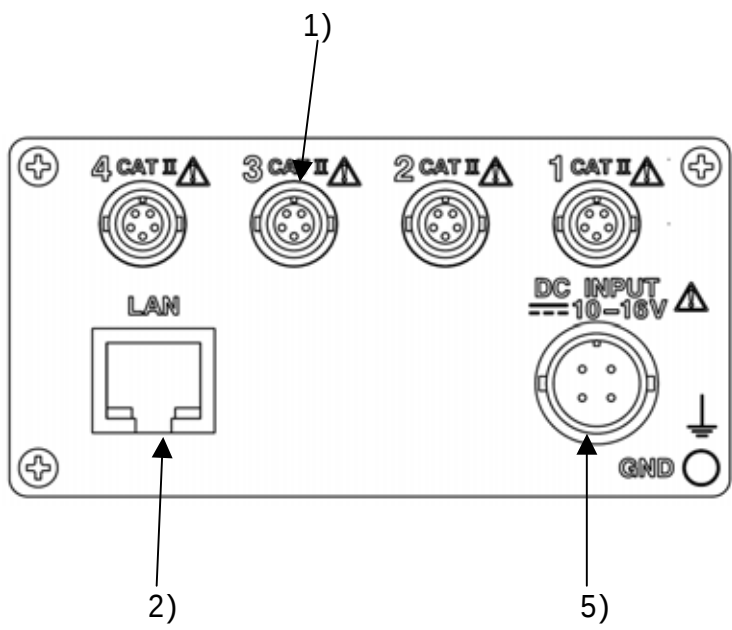
- 3) "MEAS." lamp
This lamp indicates the status of data recording.
 Steady green light: Master – Recording data
 Slave – Waiting for the sync signal
 Flashing green light: Master – Waiting to be triggered
 Steady red light: The lamp remains lit in red after a start signal is received until recording data is actually started.
 Flashing red light: A data recording error has occurred.
 Off: Data recording is stopped.
- 4) "1," "2," "3" and "4" lamps
These lamps indicate the zero-suppression setting status and the input status of each channel.
 Steady green light: The result of zero suppression is normal.
 Steady orange light: A signal exceeding the set range was input during recording data. The lamp will remain lit in orange until recording data is started again or zero suppression is implemented.
 Flashing red light: Result of zero suppression is abnormal.
 Off: The range setting or zero suppression is set OFF.
 Turns off momentarily: Zero suppression is in progress.
- 5) "START/STOP" switch
Pressing this switch while recording data is stopped will start recording.
Pressing it during recording will stop recording.
- 6) "ZERO" switch
Pressing this switch will implement zero suppression on the channels for which zero suppression is enabled. This switch is invalid during recording.
- 7) "READ" switch
To set the conditions for recording, place in the card slot 10) a CF card containing recording conditions and then press this switch.

- 8) "READ" lamp
- This lamp indicates the setting status of conditions when the "READ" switch 7) is used to set the conditions for recording.
- Steady green light: Recording conditions were set successfully.
- Flashing green light: The recording conditions are being read.
- Flashing red light: An error occurred while reading the conditions for recording.
- Off: The recording conditions are not read, or the conditions thus read were subsequently changed via LAN communication.
- 9) Card eject button
- Pressing this button once will cause the button to pop up. Pressing the button again will eject the CF card. Insert a CF card when the button is not popping up.
- 10) Card slot
- Install a CF card prior to recording.
- Since the recorded data is directly written to the CF card, an attempt to start recording without a card in the slot will generate an error.

2-2 REAR
EDS-400A



EDS-450A



- 1) "1," "2," "3" and "4" input connectors These connectors are used to input strain/voltage.
 Connector type R05-R5F (Tajimi Electronics)
 Applicable plug type R05-PB5M (Tajimi Electronics)

- 2) "LAN" connector This connector is used to connect a 10BASE-T/100BASE-TX LAN cable.
 Connector shape RJ-45 modular jack

- 3) "CONT. IN" connector (Only EDS-400A)
 This "CONT IN" connector is used when multiple EDS-400As are used by cascade connection, a remote-control unit is connected or EDS-400A is controlled via external signals.
 Cascade connection
 Connect the "CONT. IN" on each EDS-400A to the "CONT. OUT" connector on the previous unit via an optional cascade cable.
 Connection of remote-control unit
 An optional remote-control unit can be connected to start or stop the EDS-400A, or to implement zero suppression.
 External signal connection
 External signal input can be used to start or stop the EDS-400A, or to implement zero suppression.

- 4) "CONT. OUT" connector (Only EDS-400A)
 When multiple EDS-400As are used, this "CONT. OUT" connector is connected to the "CONT. IN" connector on the next unit via an optional cascade cable.

- 5) "DC INPUT" connector This connector is used to supply 10 to 16 VDC power to the EDS-400A (or EDS-450A) via the supplied DC power cable.
 Connector type RM12BRD-4PH (Hirose Electric)
 Applicable connector plug type RM12BPG-4S (Hirose Electric)
 → Refer to 3-1.
 To supply power to the EDS-400A (or EDS-450A) from 100 to 240 VAC power, use an AC adaptor (Optional).

3 CONNECTIONS

3-1 CONNECTING A POWER SUPPLY

3-1-1 Connecting Method

Connect the supplied DC power cable to the power connector to supply 10 to 16 VDC.

Connect the negative side to the both black and green lead wires, and then connect the positive side to the both red and white lead wires.

3-1-2 Pin Assignments

EDS-400A (or EDS-450A) side connector
Cable connector

Type: RM12BRD-4PH
Type: RM12BPG-4S

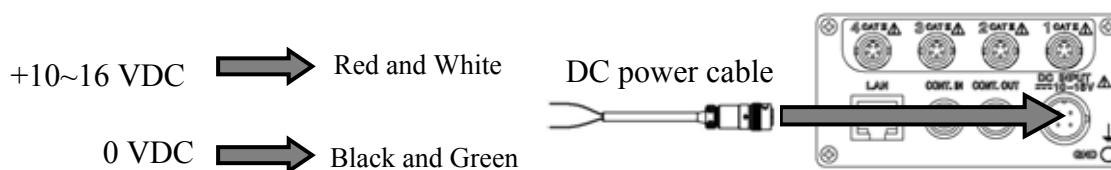
Manufacturer: Hirose Electric
Manufacturer: Hirose Electric

Pin No.	Description of signal
1	+10 to 16 VDC input
2	+10 to 16 VDC input
3	0 VDC
4	0 VDC

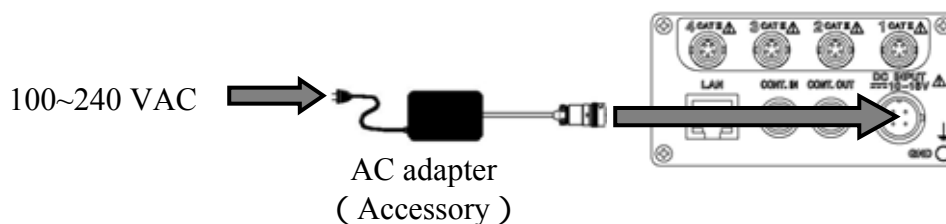
NOTE

- Check the supply voltage is in a range from 10 to 16 VDC before connecting the power supply.
- Connecting the power cable in reversed polarities or supplying excessive voltage may damage the equipment. Exercise due caution.

«When an accessory DC power cable is used. »



«When an accessory AC adapter is used. »



3-2 CONNECTING INPUT CONNECTORS

The manufacturers and applicable types of input connectors are as follows:

EDS-400A (or EDS-450A) side connector	Type: R05-R5F	Manufacturer: Tajimi Electronics
Cable connector	Type: R05-PB5M	Manufacturer: Tajimi Electronics

3-2-1 Inputting Strain

Use a 4-conductor shielded cable to connect a strain-gage transducer or strain-gage bridge according to the pin numbers listed below.

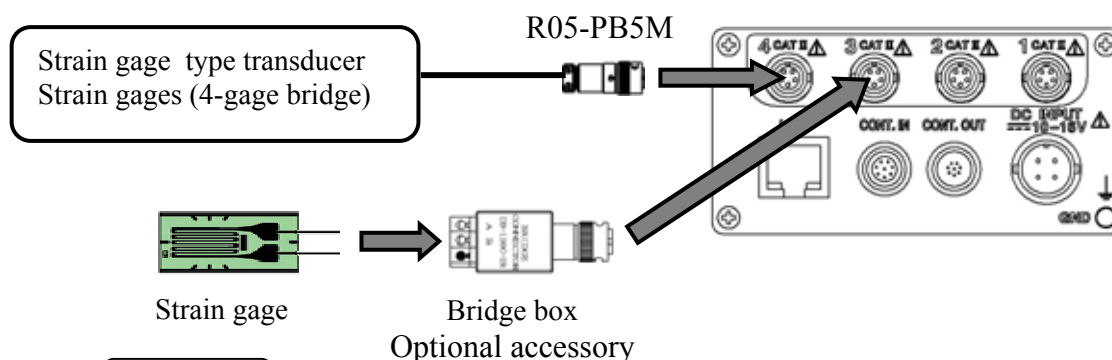
(Cable colors conform to the representative color-coding system applied to Kyowa transducers.)

Pin No.	Description of signal
A	Positive side of bridge power supply (red lead wire)
B	Negative side of bridge output (white lead wire)
C	Negative side of bridge power supply (black lead wire)
D	Positive side of bridge output (green lead wire)
E	Shielded cable

NOTE

- Wire the inputs using a four-pin shielded cable of minimal length.
- Keep the input cable as far as possible from power cables or other cables that are prone to significant noise.
- When EDS-400A (or EDS-450A) is used at the place where vibrations are applied, use the enough length of input cables and securely fix them, in order not to apply extra force to the connected portion of the input cables.

«When input signals are directly hook up to the input connectors. »

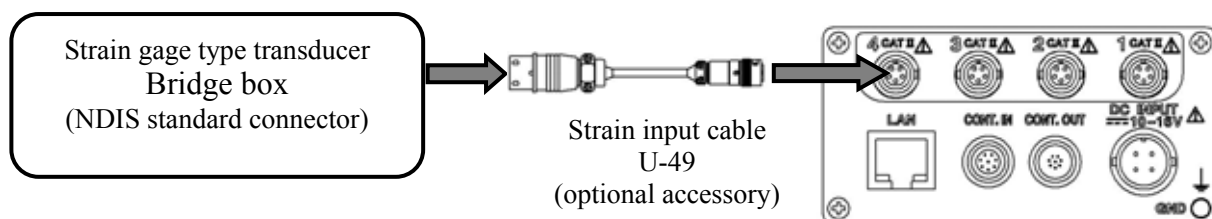


MEMO

R05-PB5M type connector bridge box(Optional accessory)

DB-120C-2R	120Ω,1 gage 2 wire type bridge box
DB-120C-3R	120Ω,1 gage 3 wire type bridge box

«When strain input cables are used.



3-2-2 Inputting Voltage

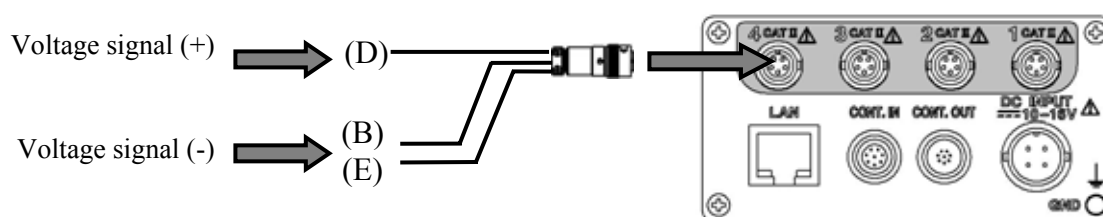
Connect voltage signals according to the pin numbers listed below.
The use of a shielded cable is recommended for the input of weak signals.

Pin No.	Description of signal
A	Not connected
B	Input signal (negative side)
C	Not connected
D	Input signal (positive side)
E	Input signal (negative side), shielded cable

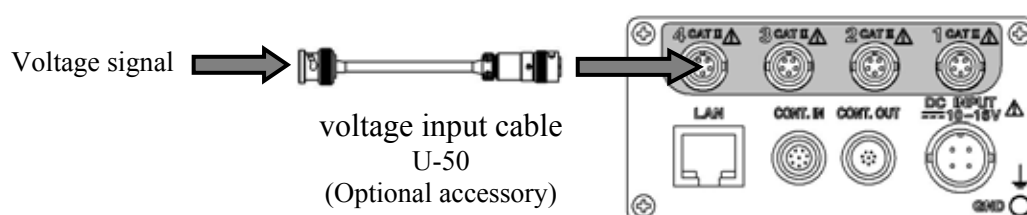
NOTE

- When inputting voltage, be sure to connect **pins B and E** of the input connector.
- Keep the input cable as far away as possible from power cables or other cables that are prone to significant noise.
- When the EDS-400A (or EDS-450A) is used at the place where vibration is applied, use the input cable with enough length and securely fix them, in order not to apply extra force to the connected portion of the input cables.

«When input signals are directly hook up to the input connectors. »



«When voltage input cables are used. »



3-3 CONNECTING MULTIPLE EDS-400AS (ONLY EDS-400A)

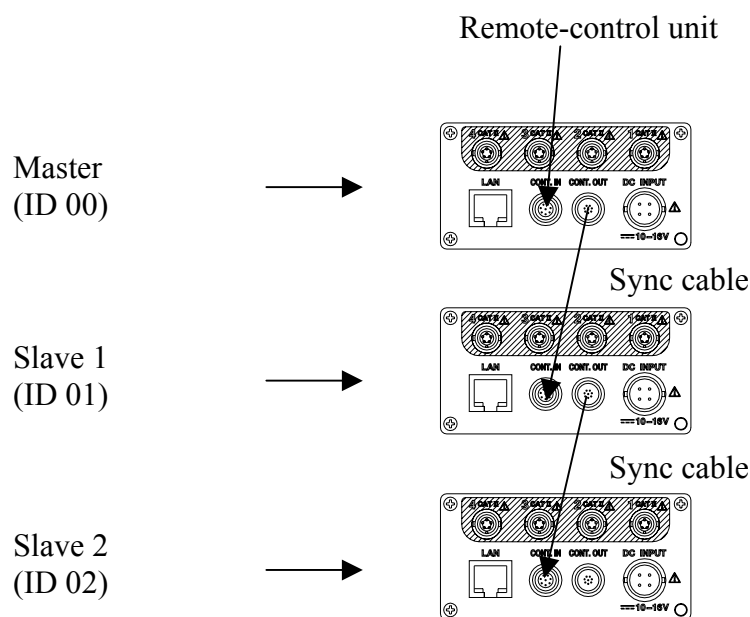
A maximum of eight EDS-400A units can be connected for measurement of up to 32 channels.

It should be noted that the EDS-450A is only solely used and not with multiple units.

When multiple EDS-400As are used, connect them using the optional sync cables.

Connect the "CONT OUT" connector on the master unit to the "CONT IN" connector on a slave unit, then connect the "CONT OUT" connector on the slave unit to the "CONT IN" connector on the next slave unit, and so on.

If an optional remote-control unit is used, connect it to the "CONT IN" connector on the master unit.



NOTE

1. When multiple EDS-400A units are used, set an ID number for each unit using the bundled control software. For the setting procedure, refer to the instruction manual for the control software.
2. Set the ID number of the master to 00. When the power is turned on, the "SYNC" lamp on the master will light in green.
3. Set the ID numbers of slaves sequentially to 01, 02, 03, ..., and so on. When the power is turned on, the "SYNC" lamps on the slaves will light or flash in orange.
4. Set unique ID numbers. The system will not function properly if duplicate ID numbers are used.
5. Be sure to turn OFF the power before connecting sync cables. Connecting a sync cable while the power is on may cause a slave to start recording data the moment the cable is connected to the unit.
6. Be sure to wire the sync cables correctly, as incorrect wiring may cause the units to malfunction.
7. When the sync cables are connected, turn ON the power to all connected EDS-400As. The system will not operate correctly if the power of any connected EDS-400A is off. When you turn OFF EDS-400A, disconnect sync cable of the EDS-400A.
8. When turning ON the power, do so sequentially from unit 00, followed by units 01, 02, 03, ..., 07. When turning off the power, do so from the unit with the largest ID number. An incorrect power ON/OFF sequence may prevent accurate measurement.

3-3-1 Connecting "CONT. IN" (Only EDS-400A)

The CONT IN connector types and pin assignments are shown below:

EDS-400A side connector

Type: PRC07-R8F

Manufacturer: Tajimi Electronics

Cable connector

Type: PRC07-P8M

Manufacturer: Tajimi Electronics

Pin No.	Description of signal
A	Clock + input
B	Clock – input
C	Start/stop input
D	Trigger input
E	Zero input
F	GND
G	Recording status output
H	GND

3-3-2 Connecting "CONT. OUT" (Only EDS-400A)

The CONT OUT connector types and pin assignments are shown below:

Connector on EDS-400A

Type: PRC07-R8M

Manufacturer: Tajimi Electronics

Cable connector

Type: PRC07-P8F

Manufacturer: Tajimi Electronics

Pin No.	Description of signal
A	Clock + output
B	Clock – output
C	Start/stop output
D	Trigger output
E	Zero output
F	GND
G	Not connected
H	GND

3-4 CONNECTING THE PC

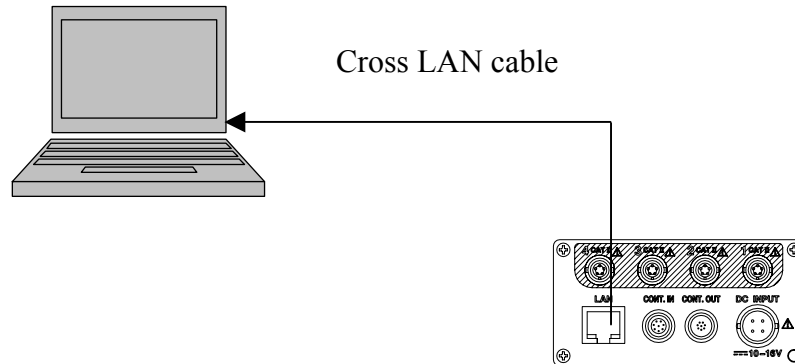
Connect the "LAN" connector on the rear panel of the EDS-400A (or EDS-450A) to the PC LAN connector using a commercially available LAN cable.

Use a **cross LAN cable** to connect the EDS-400A (or EDS-450A) directly to the PC.

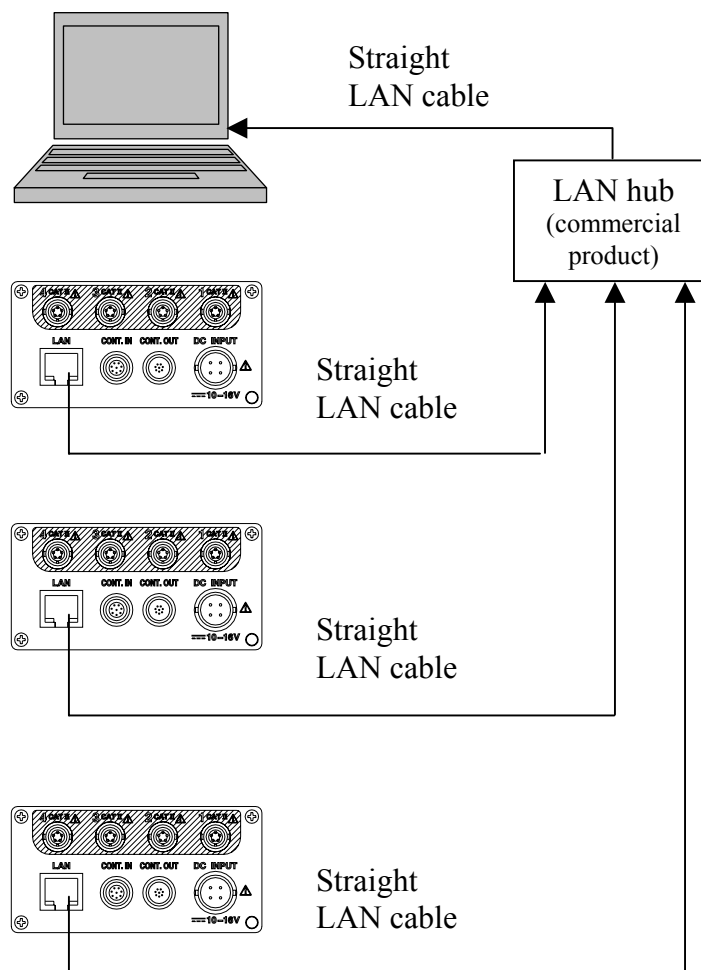
Use a **straight LAN cable** to connect a hub between the EDS-400A(or EDS-450A) and the PC.

Refer to the Software Instruction Manual for the PC settings required to connect the EDS-400A (or EDS-450A) to the PC.

3-4-1 Connecting the EDS-400A (or EDS-450A) Directly to the PC



3-4-2 Connecting the EDS-400A to the PC via a Hub



3-5 CONNECTING EXTERNAL CONTROL SIGNALS (Only EDS-400A)

The following operations are enabled by inputting a contact signal or TTL signal (0 to 5 V) to the "CONT. IN" connector. A given operation is executed when the contact signal turns ON or TTL signal level becomes L (0 V). The signals thus input must be free of "chatter."

Note that the EDS-450A is not provided with external control function.

- [1] Start/Stop
Inputting a contact signal or TTL signal between C and F of the "CONT. IN" connector, as shown below, will start recording if it is currently stopped or stop recording if it is currently in progress.
- [2] Trigger
Inputting a contact signal or TTL signal between D and F of the "CONT. IN" connector, as shown below, will issue a trigger when the system is waiting for a trigger in the external trigger mode.
- [3] Zero
Inputting a contact signal or TTL signal between E and F of the "CONT. IN" connector, as shown below, will implement zero suppression.

The CONT IN connector types and pin assignments are shown below:

EDS-400A side connector

Type: PRC07-R8F

Manufacturer: Tajimi Electronics

Cable connector

Type: PRC07-P8M

Manufacturer: Tajimi Electronics

Pin No.	Description of signal
A	NC
B	NC
C	Start/stop input
D	Trigger input
E	Zero input
F	GND
G	NC
H	NC

[Note] NC: Do not connect anything.

3-6 TURNING THE POWER ON/OFF

The power is turned ON when the power slide switch on the front panel of the EDS-400A (or EDS-450A) slid to “I” position or turned OFF when slid to the “O” position.

While the power is ON, the EDS-400A “POWER” lamp on the front panel lights up green.

The EDS-400A (or EDS-450A) conducts the initialization process immediately after the power ON. Therefore, wait 1 or 2 seconds before starting any operation.

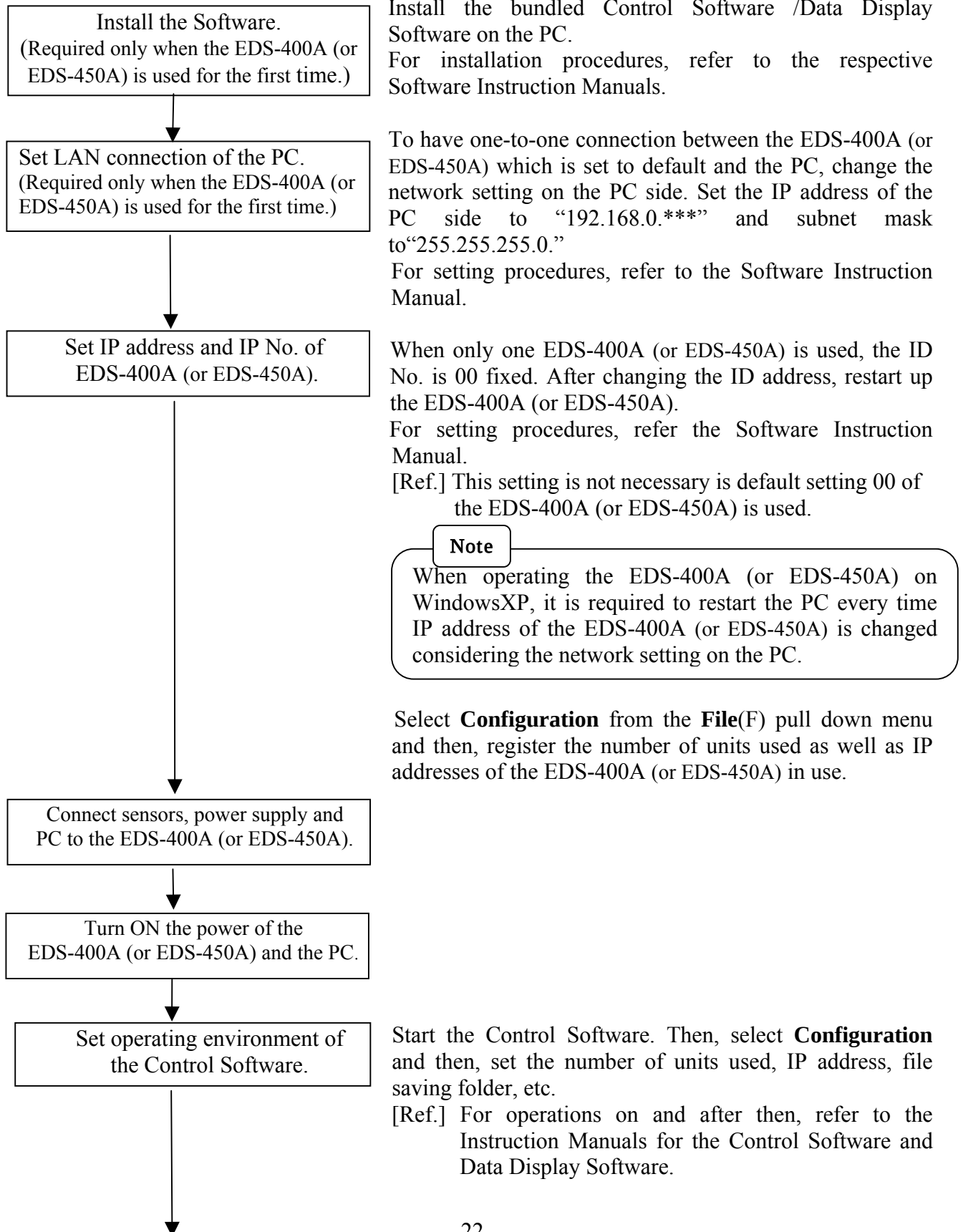
NOTE

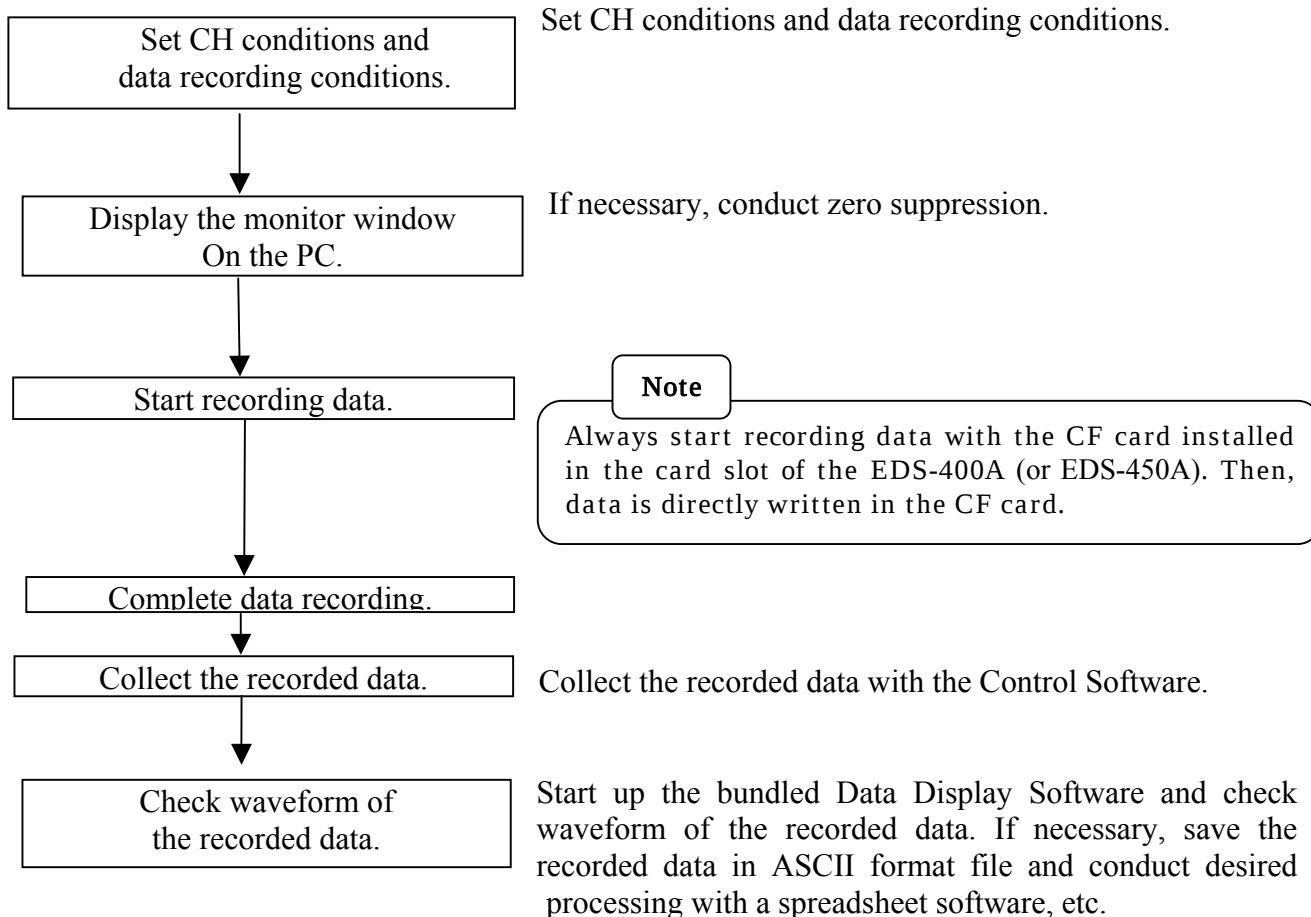
1. Never turn OFF the power during data recording. Turning OFF the power of the EDS-400A (or EDS-450A) during data recording will damage the current recording data and null the data resulting to create a size 0 file.
In some instances, data in the CF card or the card itself may be damaged.
2. Never turn OFF the power while collecting data through LAN.
Or, data in the CF card or the data itself may be damaged.
When collecting data through LAN, since you cannot visually check whether it is actually collecting data, check to be sure that it is not collecting data using the Control Software and then, turn OFF the power.
3. If power failure is likely to occur, always use an uninterruptible power supply unit.
4. When using an external battery, use the battery with enough capacity to satisfy the measurement time. Consumption current of the EDS-400A (or EDS-450A) is approximately 0.6 A when 12 VDC is supplied.
5. After turning OFF the power, wait at least 5 seconds before turning ON the power again.
6. After turning ON the power, wait approximately 30 minutes for pre-heating, before commencing measurement to ensure the accuracy of measured data.
7. When synchronously connecting multiple EDS-400s, sequentially turn ON the power from unit No. 00, followed by unit Nos. 01, 02, 03, ..., and 07. On the contrary, turn OFF the power in due order from the large ID No. Take care that incorrect power ON/OFF may cause faulty measurement.

4 OPERATING PROCEDURES

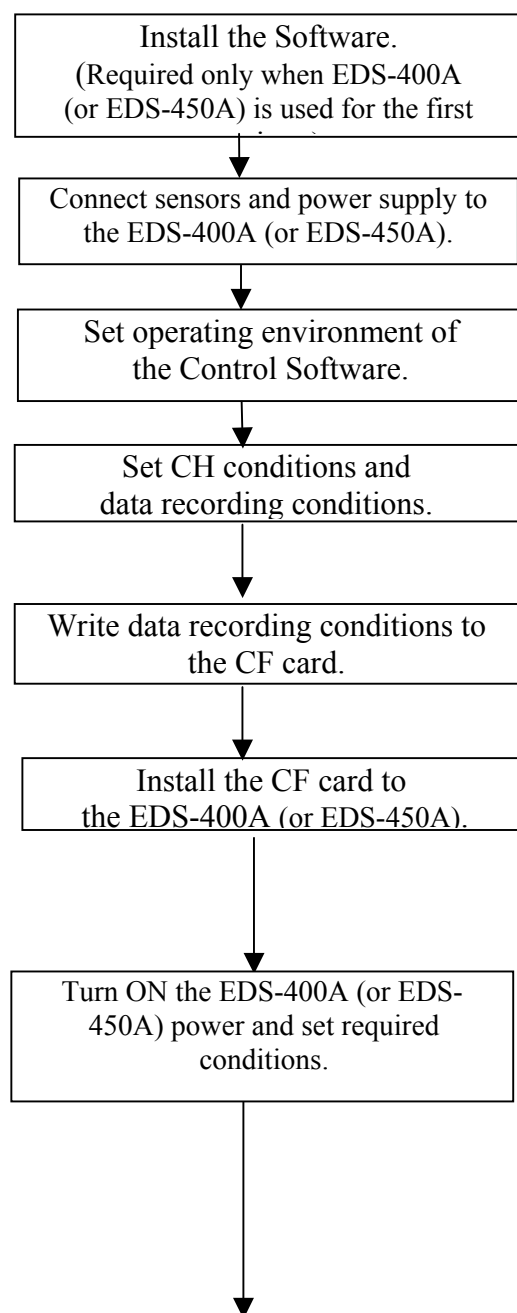
4-1 FLOW OF OPERATION WHEN ONE EDS-400A (OR EDS-450A) IS USED

(1) Online measurement





(2) Offline measurement



Install the bundled Control Software/Data Display Software on the PC.

For installation procedures, refer to the Instruction Manuals for the respective Software.

Start up the Control Software. Then, select **Configuration** to set the number of EDS-400A (or EDS-450A) units used, IP address, file saving folder, CF card drive, etc.

[Ref.] For operations on and after then, refer to Instruction Manuals for the Control Software/Data Display Software.

Set CH conditions and data recording conditions.

Install the CF card in the PC card slot and write data recording conditions to the CF card.

Eject the CF card containing data recording conditions and install it in the card slot of the EDS-400A (or EDS-450A).

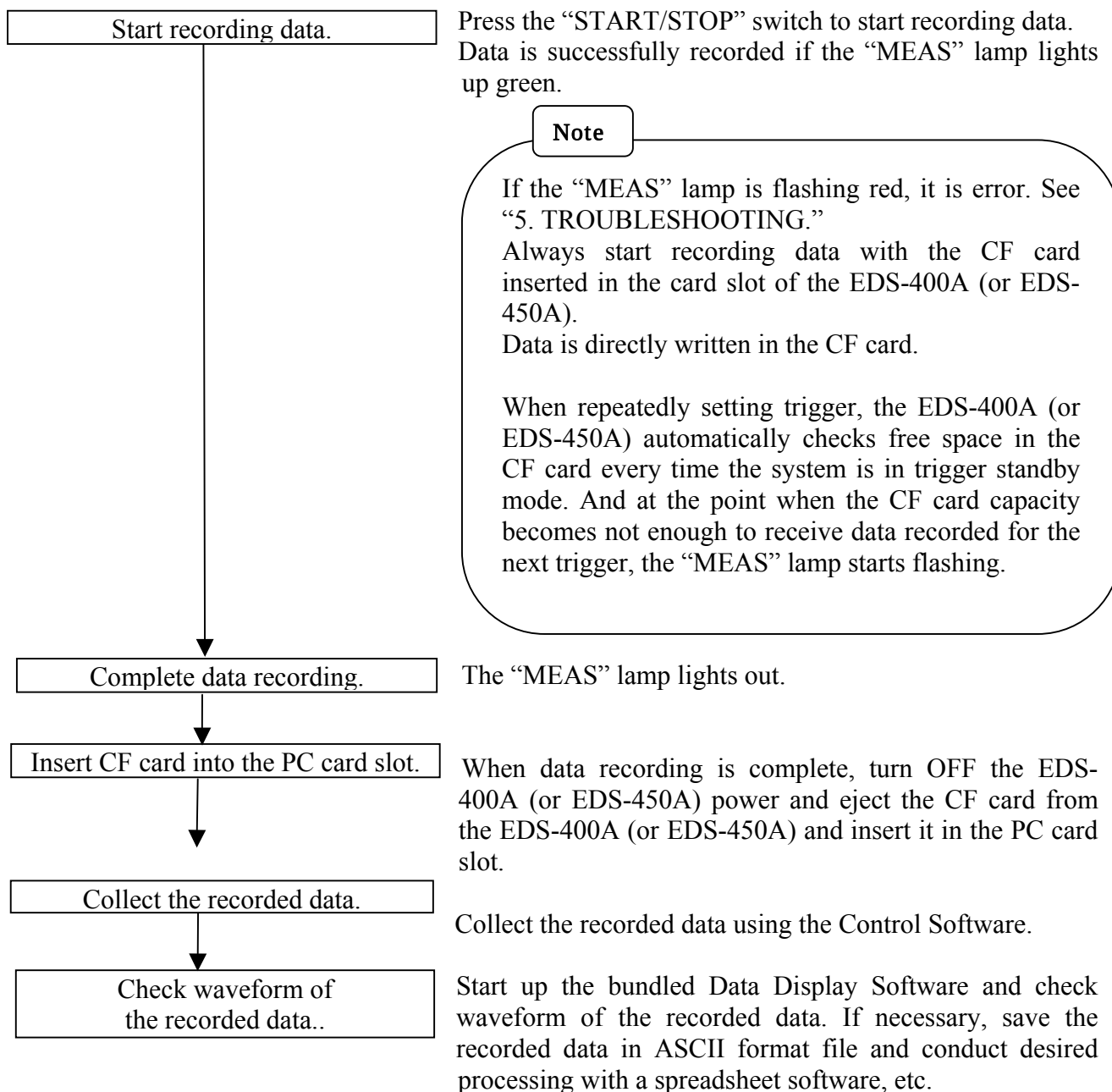
Note

Always install the CF card with no card eject button popping out.

Turn ON the EDS-400A (EDS-450A) power. Press the “READ” switch to set data recording conditions to the EDS-400A (or EDS-450A). The conditions are successfully set if the “READ” lamp lights up green. If necessary, press the “ZERO” switch to conduct zero suppression.

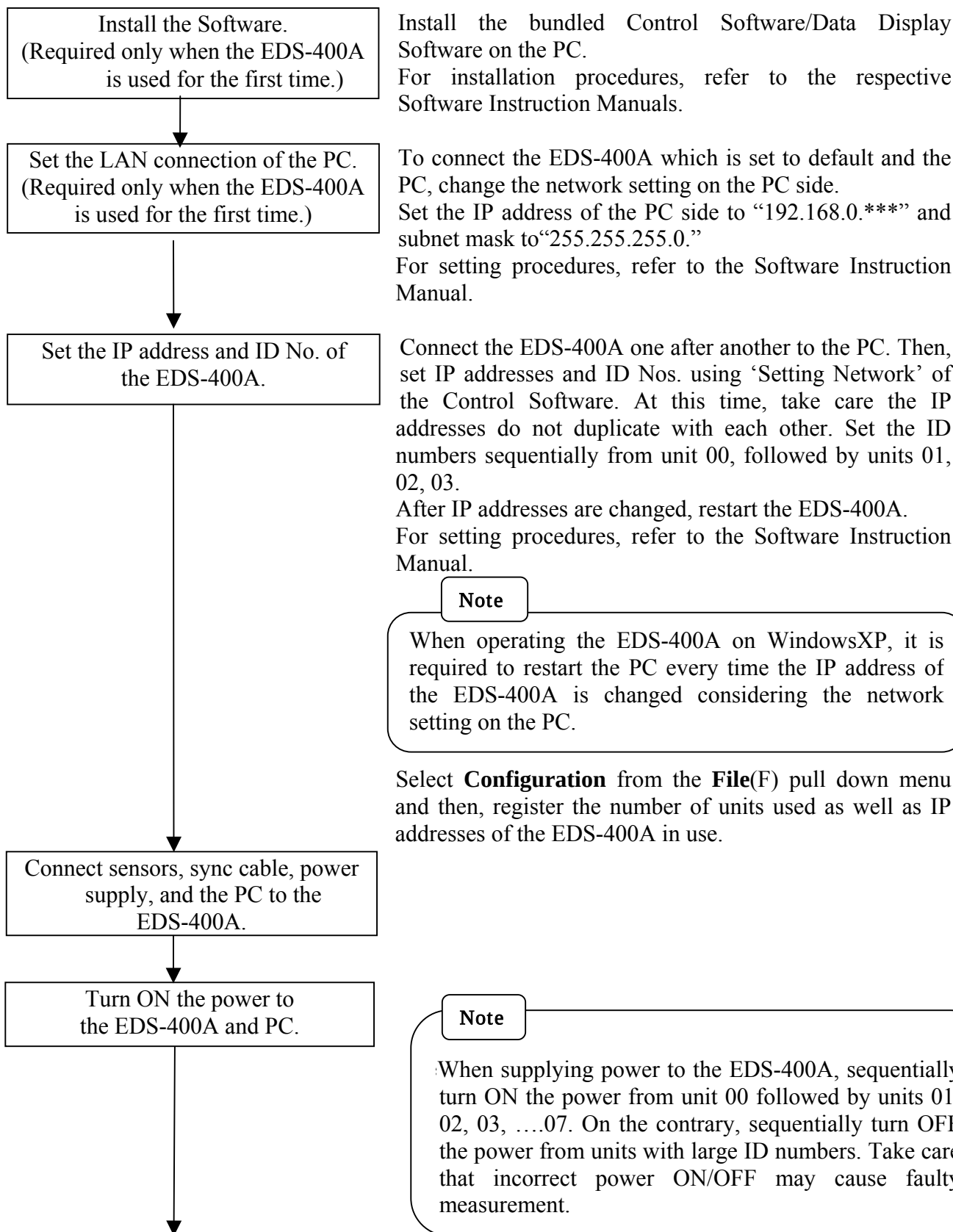
Note

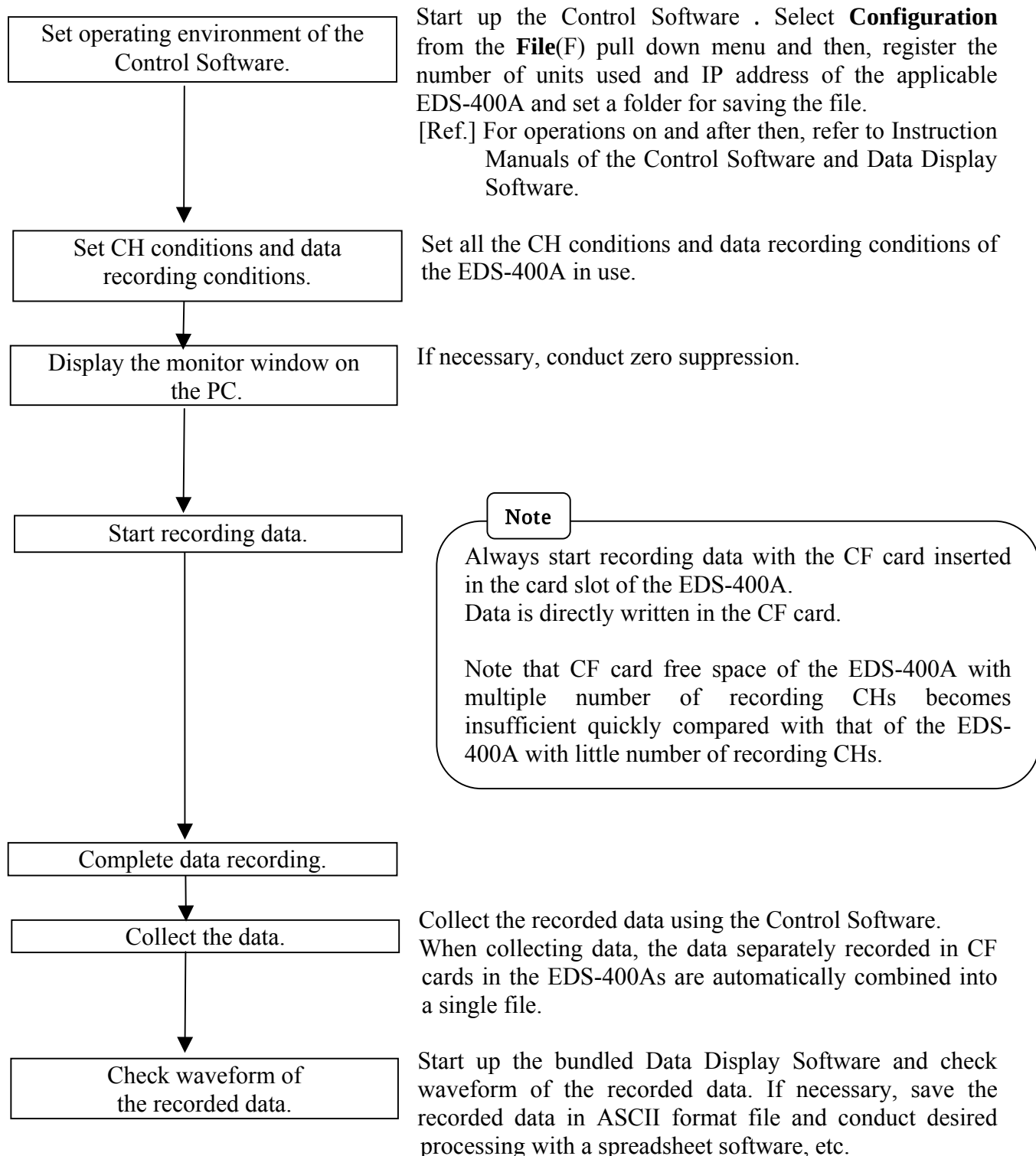
If the “READ” lamp is flashing, it is error.
See “5. TROUBLESHOOTING.”



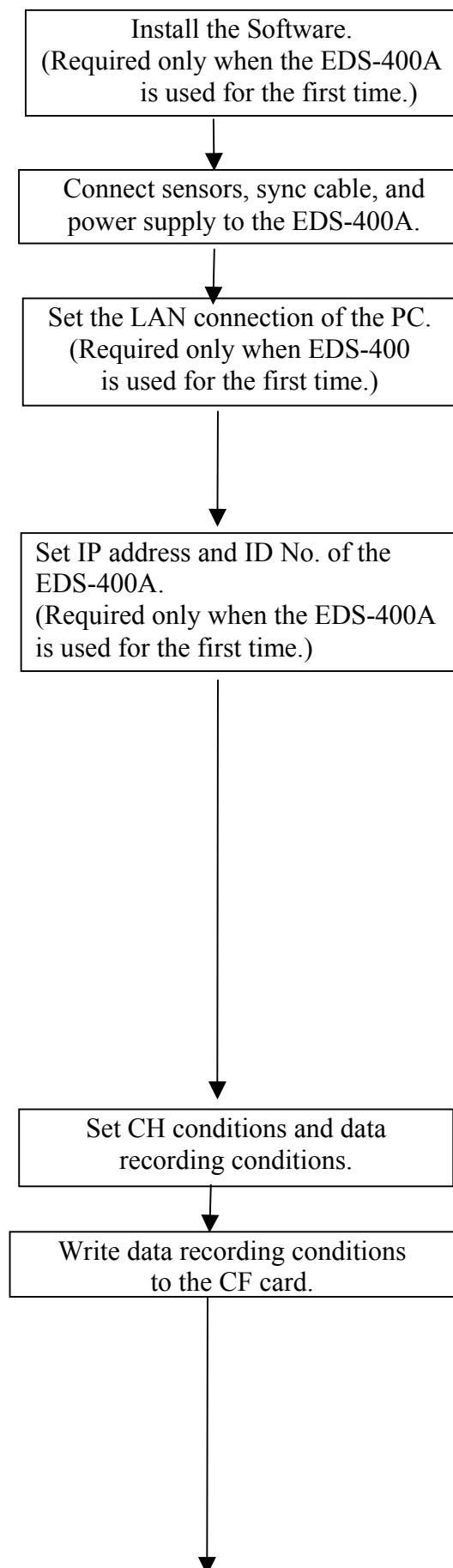
4-2 FLOW OF OPERATION WHEN MULTIPLE UNITS ARE USED (ONLY EDS-400A)

(1) Online measurement





(2) Offline measurement



Install the bundled Control Software/Data Display Software on the PC.
For installation procedures, refer to the respective Software Instruction Manuals.

To communicate with the EDS-400A, set network on the PC side. Set the IP address of the PC side to “192.168.0.***” and subnet mask to 255.255.255.0.”
[Ref.] For operations on and after then, refer to the Instruction Manuals for Control Software/Data Display Software.

Connect the EDS-400A one after another to the PC. Then, set IP addresses and ID Nos. using “Setting Network” of the Control Software. At this time, take care that each of the IP addresses in the EDS-400A do not overlap with each other. Set the ID Nos. sequentially from unit No. 00 followed by unit Nos. 01, 02...

After the IP addresses are changed, restart the EDS-400A power.
For setting procedures, refer to the Software Instruction Manual.

Note

When operating the EDS-400A on Windows XP, it is required to restart the PC every time the IP address of the EDS-400A is changed considering the network setting.

Select **Configuration** from the **File(F)** pull down menu and then, register the number of units as well as the IP addresses of the applicable EDS-400As.

Set all the CH conditions and data recording conditions of the EDS-400A in use.

Set the number of cards to be used in the EDS-400As to the Control Software.

Install CF cards in the card slots of the PC sequentially in due order from the CF card that is installed in the master EDS-400A and write data recording conditions to the CF card.

Note

Set numbers on each of the CF cards before writing data recording conditions so that it is easy to identify which CF card contains settings for the desired EDS-400A. Otherwise, channel-specific settings (such as input range) may not be conducted correctly.

Install the CF card to the EDS-400A

Eject the CF card having recording conditions from the PC and then, install it in the card slot of the EDS-400A.

Turn ON the power to the EDS-400A.

Note

When supplying power to the EDS-400A, sequentially turn ON the power from unit No. 00 followed by unit Nos. 01, 02, 03,07. On the contrary, sequentially turn OFF the power from units with large ID numbers. Take care that incorrect power ON/OFF may cause faulty measurement.

Set required conditions to the EDS-400A.

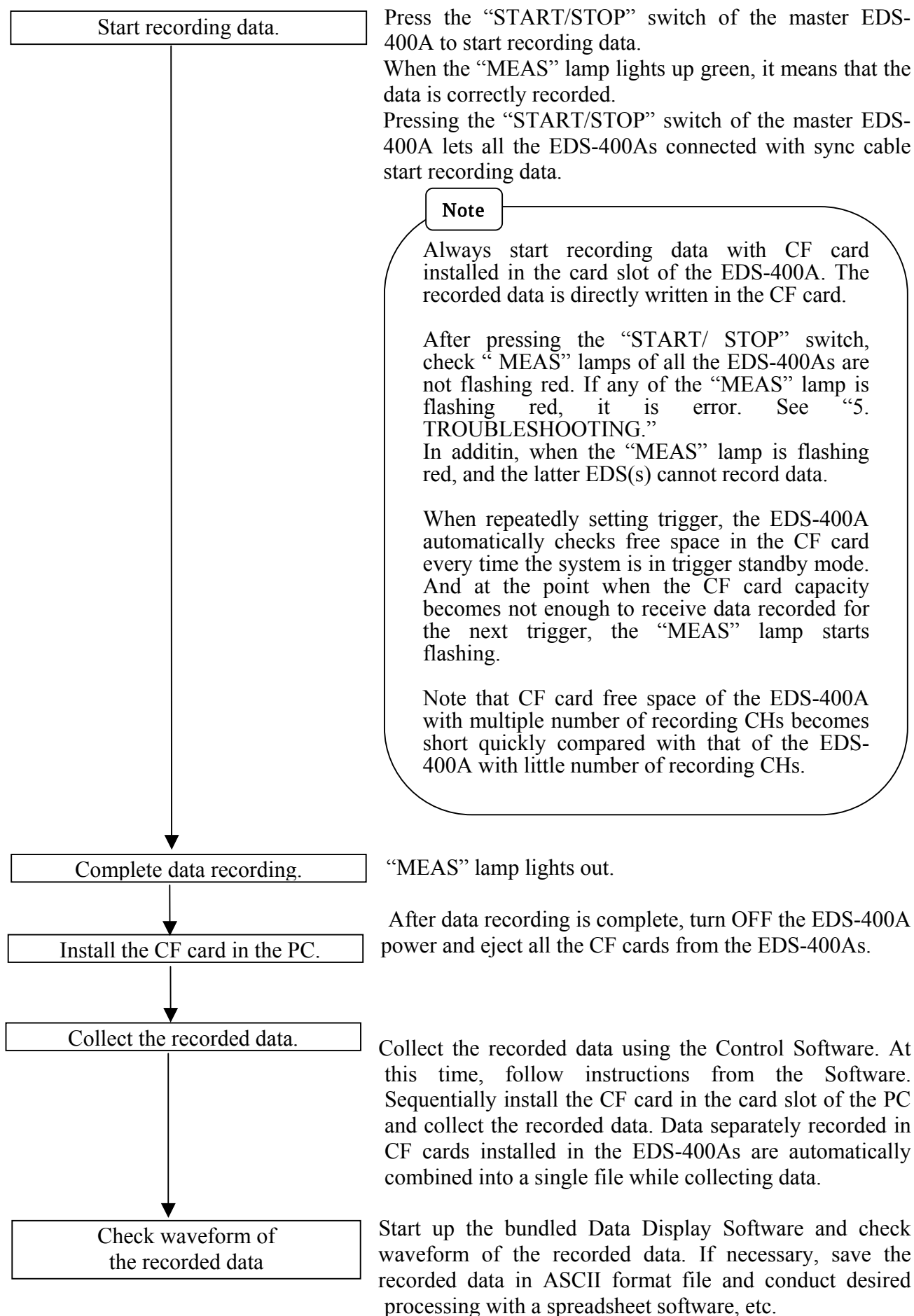
Turn ON the EDS-400A power, press the “READ” switch and set data recording conditions to the EDS-400A. The recording conditions are successfully set if the “READ” lamp lights up in green.

If necessary, press the “ZERO” switch of the master EDS-400A to conduct zero suppression. Pressing the “ZERO” switch of the master EDS-400A conducts zero suppression for all the EDS-400As connected with sync cables.

MEMO

If “READ” lamp is flashing red, it is error. See “5. TROUBLESHOOTING.”

If the “ZERO” switch of the slave EDS-400A is pressed, zero suppression is conducted only for the above unit.



5 TROUBLESHOOTING

Problem	Check items
Power doesn't turn ON (the "POWER" lamp doesn't light).	• Is the supply voltage within the range of 10 to 16 VDC? • Are the polarities of power connection correct? • Does the power supply have sufficient capacity? • Is the power switch properly turned on?
Operation stops and the system doesn't accept operation commands.	• Is the EDS-400A (or EDS-450A) operating abnormally due to external noise, etc? → Turn OFF the power and power ON once again. If the problem is caused by external noise, eliminate the noise by taking measures on noise surrounding area, power supply, etc.
Measured values fluctuate	• Is the EDS-400A (or EDS-450A) operating abnormally due to external noise, etc? → Eliminate any noise. • Is the input cable properly connected? → Connect the cable properly and secure it to prevent loosening.
The measured values are abnormal.	• Are the sensor and cable connected to the input normal? → Use a normal sensor and set/wire it correctly.
Measurement cannot be performed on multiple units.	• Are the sync cables connected properly? → Connect the cables properly. • Are the ID numbers set correctly? → Set the ID numbers correctly.
Size of record data file is 0	• Was the power instantaneously turned OFF while recording data? → Use a stable power supply that is free from momentary power failure.
Recording error occurred (the "MEAS." lamp is flashing red).	• Is the CF card correctly set in the card slot? → Set the card correctly. • Does the CF card have enough available space? → Replace the CF card with the one having larger capacity. → Reformat the CF card.
The condition setting using a CF card failed (the "READ" lamp is flashing red).	• Are the setting conditions saved in the CF card? → Write the setting conditions to the CF card before placing it in the card slot.
Cannot communicate with the PC	• Is the LAN cable connected correctly? → To directly connect the EDS-400A (or EDS-450A) to the PC, use a cross cable and connect it properly. → To connect the EDS-400A to the PC via a hub, use a straight cable and connect it properly. • Are the communication ports shut down? → When routers or fire walls etc. are used for communication, if the communication ports of "21","1010","30400"are shut down, communication is failed. Make above ports open. • Is the LAN in the PC set correctly? → Perform setting by referring to the Software Instruction Manual. • Is the IP address set correctly? → Set the IP address correctly by referring to the Software Instruction Manual. → Try establishing communication again after performing the procedure specified in 6-2, "INITIALIZATION," of this manual.

6 TECHNICAL INFORMATION

6-1 DATA FILE NAME

The data file name "nnnnnnnnnniissrrr.ks2" consists of the following parts:

- (1) nnnnnnnnnn: A file name consisting of a maximum of 10 single-byte characters, which can be set by the user in the Control Software
- (2) ii: ID number set for each unit in the Control Software
[Reference] Each unit is set as the master or a slave, depending on its ID number.
00: Master
01 to 07: Slave (Only EDS-400A)
- (3) sss: The initial value of this number is 000, which is incremented by one each time recording is started.
- (4) rrr: The initial value of this number is 000, which is incremented by one each time a trigger is input in the trigger mode.
- (5) ks2: Extension indicating the ks2 format, which is Kyowa's standard file format.

6-2 INITIALIZATION

Settings in the EDS-400A (or EDS-450A) can be initialized via hardware operation through the following procedure:

- (1) Initialization procedure
 - [1] Turn OFF the power switch.
 - [2] Turn ON the power switch while simultaneously pressing and holding the "ZERO" and "READ" switches on the panel.
 - [3] The "1," "2," "3," "4" and "READ" lamps will light in orange.
In around five seconds, the "1," "2," "3," "4" and "READ" lamps will turn red.
 - [4] In this condition, release the fingers from the "ZERO" and "READ" switches.
The "SYNC" lamp will light in green and all other lamps will turn OFF.
The settings in the EDS-400A (or EDS-450A) are now initialized.

- (2) Settings after initialization

When the initialization is complete, set the EDS-400A (or EDS-450A) as follows:

System ID	0 (Master)
IP address	192 . 168 . 0 . 1
Gateway	0 . 0 . 0 . 0
Subnet mask	255 . 255 . 255 . 0

Title	None
File name	LOG

Sampling frequency	1 Hz
Number of data/channels	0
Operation mode	Manual

Range	OFF
Low-pass filter	20 Hz
Zero suppression	OFF
Calibration coefficient	1
Offset	0

Unit	None
Channel name	None
Trigger channel	OFF
Trigger level	0
Trigger slope	OFF
Number of pre-triggers	0
Number of record data	0
Number of repetitions	0
Balance	0

6-3 RECORDING TIME WITH 128-MB CF CARD (REFERENCE)

The maximum continuous recording time with the 128-MB CF card supplied with the EDS-400A (or EDS-450A) is shown in the table below:

Sampling frequency	Measurement channels			
	1	2	3	4
100 kHz	8 minutes			
50 kHz	16 minutes	8 minutes		
20 kHz	40 minutes	20 minutes	13 minutes	10 minutes
10 kHz	80 minutes	40 minutes	26 minutes	20 minutes
5 kHz	160 minutes	80 minutes	53 minutes	40 minutes
2 kHz	6.6 hours	3.3 hours	133 minutes	100 minutes
1 kHz	13 hours	6.6 hours	4.4 hours	3.3 hours
500 Hz	26 hours	13 hours	8.8 hours	6.6 hours
200 Hz	2.7 days	33 hours	22 hours	16 hours
100 Hz	5.5 days	2.7 days	44 hours	33 hours
50 Hz	11 days	5.5 days	3.7 days	2.7 days
20 Hz	27 days	13 days	9.2 days	6.9 days
10 Hz	55 days	27 days	18 days	13 days
5 Hz	111 days	55 days	37 days	27 days
2 Hz	277 days	138 days	92 days	69 days
1 Hz	555 days	277 days	185 days	138 days

NOTE

Each maximum continuous data-recording time shown above is a reference value measured in a condition when nothing was recorded in the CF card.

The actual data recording time may be shorter, depending on the condition of the CF card.

7 SPECIFICATIONS

7-1 OVERALL SPECIFICATIONS

- | | |
|--------------------------------------|--|
| (1) Operating temperature range..... | 0 to 50°C |
| (2) Operating humidity range..... | 20 to 90%RH (no dew condensing) |
| (3) Vibration resistance..... | 49.03 m/s ² (5 G) (5 to 55 Hz) |
| (4) Power supply..... | 10 to 16 VDC, approx. 0.6 A (when 12 VDC is supplied) |
| | Connector type RM12BRD-4PH (Hirose Electric) |
| (5) Storage temperature range..... | -10 to 60°C |
| (6) Operating environment..... | Free from dust or induction noise generated by large-capacity motors, etc. |
| (7) External dimensions..... | 100 (W) x 50 (H) x 110 (D) mm (excluding projections) |
| (8) Weight..... | EDS-400A Approx. 500 g |
| | EDS-450A Approx. 670 g |

7-2 HARDWARE SPECIFICATIONS

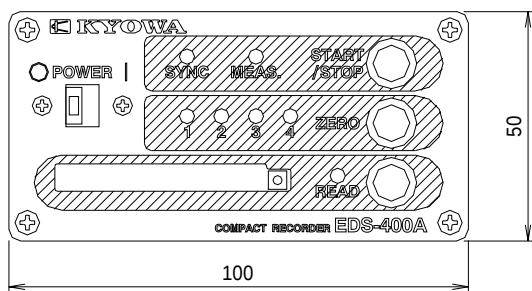
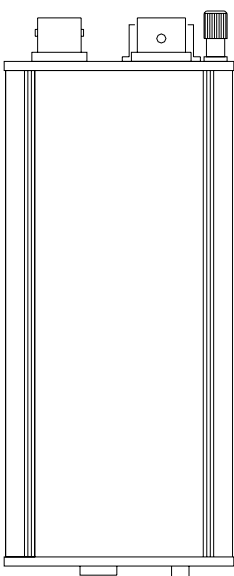
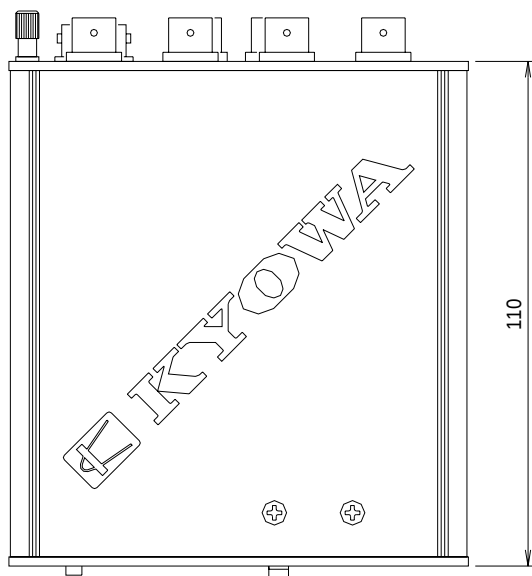
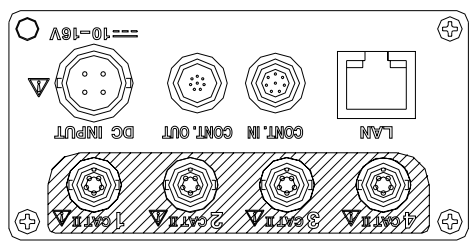
- | | |
|---|--|
| (1) Number of measurement channels | 4 |
| | Connector type R05-R5F (Tajimi Electronics) |
| | Applicable plug type R05-PB5M (Tajimi Electronics) |
| (2) Measuring targets | Strain gage (4-gage bridge) |
| | Strain gage type transducer |
| | Voltage |
| (3) Applicable bridge resistance range | 120 to 1000 Ω (4-gage bridge) |
| (4) Gage factor | 2.00, fixed |
| (5) Bridge voltage | 2 VDC |
| (6) Input mode | Strain measurement Balanced differential input |
| | Voltage measurement Unbalanced input |
| (7) Measurement range | Strain measurement 1000, 2000, 5000, 10000, |
| | 20000 x 10 ⁻⁶ strain, and OFF |
| | Voltage measurement 1, 2, 5, 10, 20 V, and OFF |
| (8) Accuracy | Within ±0.5%FS (when zero point is subtracted) |
| (9) Balance adjustment (zero suppression).... | Enabled/disabled for each channel. |
| | Adjustment method Electronic adjustment (saved in non-volatile memory) |
| | Adjustment range |
| | Strain input Resistance ±2% |
| | |
| | |
| | Voltage input ±10 V or more |
| (10) Frequency response range (*)..... | DC to 20 kHz (Deviation: +1dB, -3dB) |
| (11) Low-pass filter (*)..... | Transfer characteristics 2-pole (secondary) Butterworth characteristics |
| | Cutoff frequency 20 Hz, 200 Hz, 2 kHz, and flat |
| | Cutoff frequency accuracy -3 dB ± 1 dB |
| | Attenuation characteristics -12 dB ± 1 dB/oct |
| (12) AD conversion resolution..... | 16 bits |
| (13) Sampling method | Simultaneous sampling of all channels |

* : The characteristics of analog portion.

(14) Sampling frequency	1, 2, 5, 10, 20, 50, 100, 200, 500 Hz, 1, 2, 5, 10, 20, 50, 100 kHz (16 levels) [Note] If 50 kHz is selected, a maximum of two channels can be used. If 100 kHz is selected, only one channel can be used.
(15) Operation switches	3 switches (START/STOP, ZERO and READ)
(16) Condition setting modes.....	Setting on a PC, or setting by a CF card containing the settings
(17) Start/stop recording	Recording can be started/stopped using a personal computer, panel screen switch or external contact.
(18) Balance adjustment operation	Balance adjustment can be performed using a personal computer, panel screen switch or external contact (zero suppression).
(19) LED indications	POWER Indicates the power status SYNC Indicates the synchronization status MEAS Indicates the recording status 1,2,3,4 Indicates the status of each channel READ Indicates the status of measurement condition settings
(20) Operating modes	Manual mode Recording starts the moment a start command is issued and stops when the specified number of data has been recorded or a stop command is issued. Trigger mode When a start command is issued, the system enters the trigger standby mode. Recording will start when a trigger is activated by the specified trigger source per the specified trigger condition, after which the specified number of data (post-data) is recorded. The number of specified pre-trigger data (pre-data) is recorded.
(21) Trigger function	Trigger source External trigger signal (Only EDS-400A), analog input Trigger level Can be set only in the analog trigger mode in the $\pm$ FS range Trigger slope Set rise, fall or both Number of pre-trigger data Set the number of pre-trigger data to be recorded.
(22) Backup function	Setting conditions, balance adjustment data
(23) LAN interface.....	10BASE-T/100BASE-TX Connector type RJ-45 modular jack
(24) Monitor display	Waveform, bar graph and numeric values can be monitored on a LAN-connected PC.
(25) Data storage device	CF card (128 MB to 1 GB)
(26) Synchronized operation (Only EDS-400A)	A maximum of 8t units can be cascaded using dedicated sync cables (to perform synchronized recording). Recorded data are stored as separate files in the CF cards set in the respective units. The data can be collected from the respective units to the PC and combined into a single file.

7-3 EXTERNAL VIEW

EDS-400A



EDS-450A

