

SENSOR INTERFACE

PCD-300B

HARDWARE

INSTRUCTION MANUAL

Thank you for purchasing KYOWA's product PCD-300B SENSOR INTERFACE.

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.

In addition, this Instruction Manual is specified only for handling the PCD-300B Hardware.

For details of the Software, customers are required to refer to the Software Instruction Manual.

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STANDARD ACCESSORIES

The following accessories are enclosed with the PCD-300B Sensor Interface (hereinafter referred to as the PCD-300B). After unpacking, check all the required accessories are correctly prepared.

<PCD-300B, PCD-300B-F, PCD-301B, PCD-301B-F>

Dynamic Data Recording Software DCS-100A	}	 1 (CD-R)
Instruction Manual		
USB Driver File		

USB Cable N-38: 1m	1
AC Adapter UI308-12	1
Ground Wire P-72	1
Inspection Report & Warranty	1
Analog Output Cable (U-64) (For the PCD-301B and PCD-301B-F only).....	1

<PCD-300B-0, PCD-300B-F-0, PCD-301B-0, PCD-301B-F-0>

Simplified Data Recording Software for the PCD	}	 1 (CD-R)
Instruction Manual		
USB Driver File		

USB Cable N-38: 1m	1
AC Adapter UI318-12	1
Ground Wire P-72	1
Inspection Report & Warranty	1
Analog Output Cable (U-64) (For the PCD-301B and PCD-301B-F-0 only)	1

OPTIONALS

Input Adapter for Strain Gage Transducer:	UI-10A (NDIS connector, TEDS compatible)
Input Adapter for Strain Gage:	UI-11A (Clamp type terminal block connector, TEDS compatible)
Input Adapter for Strain Gage with Operating Lever:	UI-15A (Clamp terminal block with operating lever, Not compatible with TEDS)
One-touch Lock Type Input Adapter for Strain Gage: ...	UI-16A (One-touch lock type clamp terminal block, Not compatible with TEDS)
Connection Cable:.....	N-97 (Input terminal ← Cable for connecting sensors with NDIS connector, 0.1 m)
Synchronous Cable:	N-90 (25 cm)
USB Cable:	N-39 (2 m)
DC Power Supply Cable For PCD:	P-73 (2 m)
AC Adapter for 4 PCD-300B units:	SA-34A
Data Analysis Software:	DAS-100A and NI DIAdem

SAFETY PRECAUTIONS

PRIOR TO USE

This Manual describes detailed instructions for installing and setting up the PCD-300B. Always operate the PCD-300B in correct manner for safety.

For safe use of the PCD-300B, 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.

SAFETY SYMBOLS

For safety operation of the PCD-300B, the following **WARNING** and **CAUTION** symbols are used in “Safety Precautions” of this Instruction Manual.

 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, before connecting the AC adaptor, do not forget to check whether power supply voltage currently used is conforming to the specifications of the PCD-300B. ● AC Adaptor To prevent an electric shock or fire hazard, always use the accessory or optional AC adaptor. ● Avoid Using in Environment with Inflammable Gas, etc. To prevent the risk of fire hazard or explosion, do not use the PCD-300B in environment with inflammable gas, vapor or dust. ● If Any Trouble Occurs To prevent a fire hazard, if smoke is emitted from the PCD-300B, immediately disconnect the AC adaptor from the receptacle and stop using the PCD-300B. ● Avoid Measuring Object Applied With High Voltage Although the PCD-300B is insulated, if it is used for measuring objects with excessive high voltage, it may deteriorate its performance and cause trouble. ● Protective Grounding Do not forget to connect the protective ground terminal. Or, electric shock hazard, deteriorated performance, and damage of the product may result. ● Maximum Input Voltage Range The PCD-300B is a measuring instrument specified for strain gage transducers and strain gages. Do not input high voltage. Or, deteriorated performance and damage of the product may result.

 CAUTION

- After turning OFF the power switch, wait more than 5 seconds to turn ON the power once again.
If the power is repeatedly turned ON and OFF within 5 seconds, rush current generated by switching the power ON may blow out the fuse and damage the PCD-300B.
- Use the PCD-300B within temperature ranging from 0 to 40 °C.
Use at temperatures exceeding the specified range may lower the performance and cause trouble.
If use under direct sunlight or in a cold place is inevitable, prepare a sunscreen or take proper measures to keep it warm.
- Use the PCD-300B within relative humidity ranging from 20 to 85% RH.
Use in a humid place exceeding the specified range or where it is exposed to splashing water may lower the performance and cause trouble.
- Immediately stop the PCD-300B if operating environment changes abruptly.
Leave the PCD-300B as it is until it becomes adaptable to the environment.
Abrupt change in ambient temperature due to transportation, etc. may cause dew condensation resulting to deteriorate its performance and cause trouble.
- Avoid using PCD-300B in dusty environment
Always use the PCD-300B in environment with no dust and dirt applicable for personal computers.
- Avoid using PCD-300B in environment affected by vibration or impact.
Always use the PD-300B in environment with no vibration or impact.
If the PCD-300B is continuously affected by vibration or excessive impact, deteriorated performance or damage of the product may result.
- Avoid using PCD-300B in environment with strong electromagnetic field
Always use the PCD-300B in environment applicable for personal computers.
Do not use the PCD-300B in environment close to apparatuses generating strong electric fields, for example, radio, microwave oven, electric furnace, etc. Or, deteriorated performance, malfunction, damage of the product may result.
- Avoid using PCD-300B under poor power supply conditions.
When using the AC adapter : 100 to 240 VAC and 50/60 Hz
When using DC power supply : 11 to 30 VDC
Use power supply with no instantaneous power failure or noise.
- Do not pull connection cables.
Always connect connection cables with a certain play to avoid forced power applying to the connected portions. Pulling or applying unreasonable force may cause trouble or interrupt the measurement.
- Take special care when handling the CD-R.
Do not store the CD-R at a place exposing to direct sunlight or with excessively high temperature or humidity.
Do not put anything on the CD-R or bend or apply stress on it.
Take care not to damage both surfaces of the CD-R with fingerprints, dirt or scratch.
- Preheat the PCD-300B before use.
After the power ON, always preheat the PCD-300B for approximately 30 minutes.

NOTATIONS USED IN THE INSTRUCTION MANUAL

NOTATIONS

Names on the panel face is enclosed with parenthesis [].

INFORMATIONAL NOTES

Certain notations are used as necessary to attract your attention to information that requires special care when handling the PCD-300B, and to information provided for reference purposes.

Examples of Notations

NOTE

Essential precautions required when handling the PCD-300B.

MEMO

Reference items required when handling the PCD-300B.

1. OUTLINE OF THE PRODUCT

1-1 OUTLINE OF THE PRODUCT

The PCD-300B is a measuring instrument that can be used with no difficulty by connecting to the PC via USB interface.

By using the accessory Dynamic Data Recording Software DCS-100A (hereinafter referred to as the DCS-100A), the PCD-300B is capable of measuring strain, stress, force, pressure, acceleration, and displacement by connecting strain gages and strain gage transducers. In addition, customers can prepare your own control software.

Features

- Since the PCD-300B is connected to the PC via the USB interface, it can be used by almost all the PCs.
- Since the PCD-300B has a bridge box built-in, it is capable of conducting 1-gage method experiment for strain gages solely by itself.
- The PCD-300B is provided with input adapters applicable for the sensors.
- Since the PCD-300B is capable of measurement of 4 channels per PCD-300B and maximum 16 channels with 4 PCD-300B units, the PCD-300B is applicable for measurement in a wide range from a simple experiment to advanced measurement.
- When using TEDS compatible sensors, by loading sensor information with TEDS function, the PCD-300B is capable of laborsaving when setting amplifier.
- Data analysis is available with the optional Data Analysis Software (DAS-100A and NI DIAdem).

1-2 SYSTEM CONFIGURATION

PC When using the USB interface, always use PC with Windows2000/XP (32-bit version)/Vista (32-bit version) installed and equipped with USB interface.

In addition, when using the DCS-100A, it is recommended to use the PC with the following specifications or more.

CPU: Pentium4 2 GHz or more

Memory: 1 GB or more

Display: 1024 × 768 dots or more

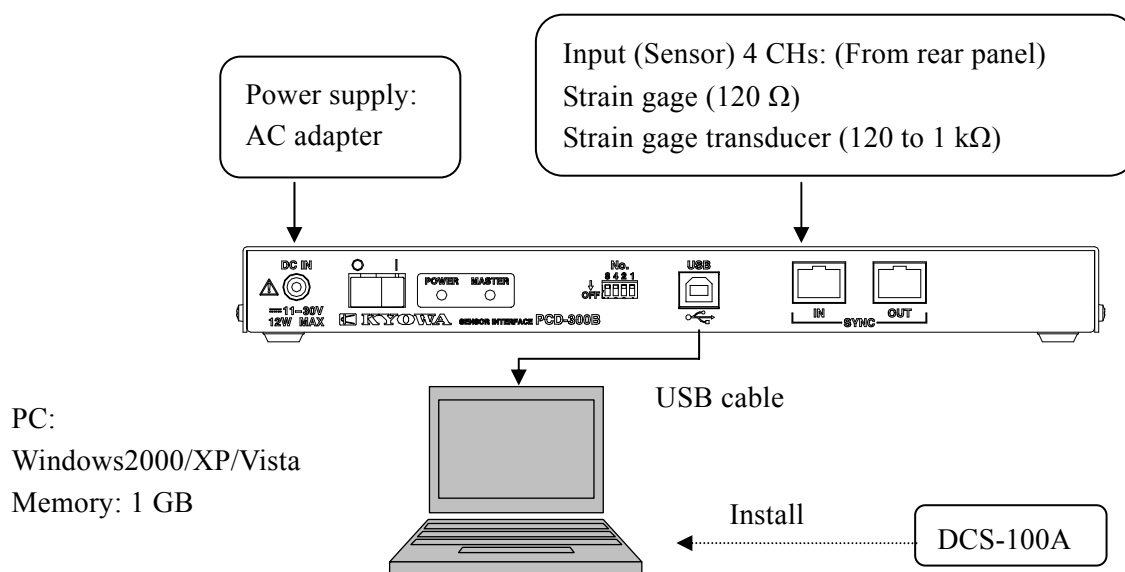
USB Cable Accessory

AC Adapter Use accessory AC adapter.

USB Hub When multiple PCD-300B units are used, customers are required to purchase USB1.1 hub

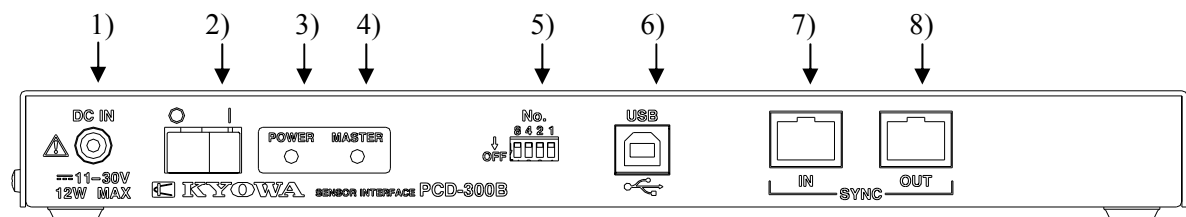
Note: Use the specified USB1.1 hub.

DCS-100A Install the DCS-100A into the PC. Or customers can prepare your own control software.



2.PARTS NAMES AND PRINCIPAL FUNCTIONS

2-1 FRONT PANEL



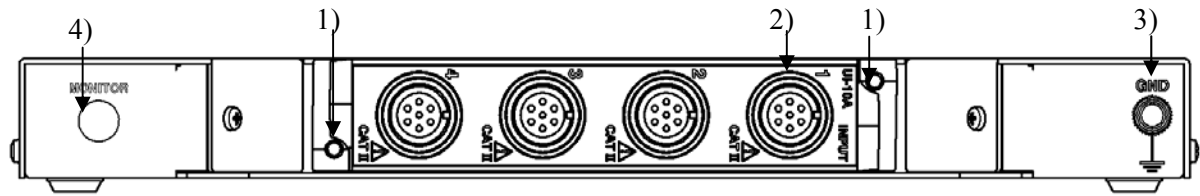
- 1) [DC IN] Connector Connect the accessory AC adapter.
Power supply voltage range of the PCD-300B is 11 to 30 VDC. Polarity center is plus (+) and exterior is minus (-). Power supply voltage range of the AC adapter is from 100 to 240 VAC, 50/60Hz. See “3-1 CONNECTING AC POWER SUPPLY” and “3-2 CONNECTING DC POWER SUPPLY.”
- 2) Power Supply Switch Turn this switch to the [○] side to power OFF and, [|] side to power ON.
- 3) [POWER] Lamp Lights up with the power ON.
- 4) [MASTER] Lamp Lights up when stand-alone type and master PCD-300B are operating and turns OFF when slave PCD-300Bs are operating. For details of the slave PCD-300B, see “3-3 SETTING PCD NO.”
- 5) [No.] Switch A switch to set the PCD No. Channel is determined by the PCD No. Turn up this switch to ON and turn down, to OFF. See “3-3 SETTING PCD NO.”
Relations between PCD setting, PCD No, and CH No. are described in the following table.

Configuration	PCD Setting State	[No.] Switch				PCD No.	CH No.
		8	4	2	1		
Stand-alone	Stand-alone	OFF	OFF	OFF	ON	1	1 to 4
Synchronous Operation	Master	OFF	OFF	OFF	ON	1	1 to 4
	Slave 1	OFF	OFF	ON	OFF	2	5 to 8
	Slave 2	OFF	OFF	ON	ON	3	9 to 12
	Slave 3	OFF	ON	OFF	OFF	4	13 to 16

- 6) [USB] Connector Connect the accessory USB cable.
- 7) [SYNC IN] Connector When using multiple PCD-300B units, connects synchronous cables N-90 (Optional).
Connected to the master PCD-300B to input signals into the master PCD-300B.
- 8) [SYNC OUT] Connector When using multiple PCD-300B units, connects accessory synchronous cables.
Connected to slave PCD-300B units to output signals to the slave PCD-300B units.

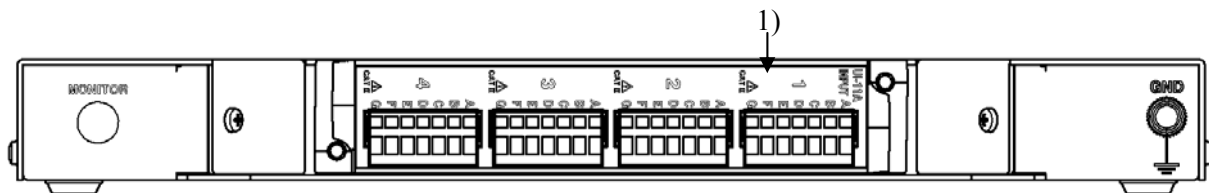
2-2 REAR PANEL

With Input Adapter UI-10A



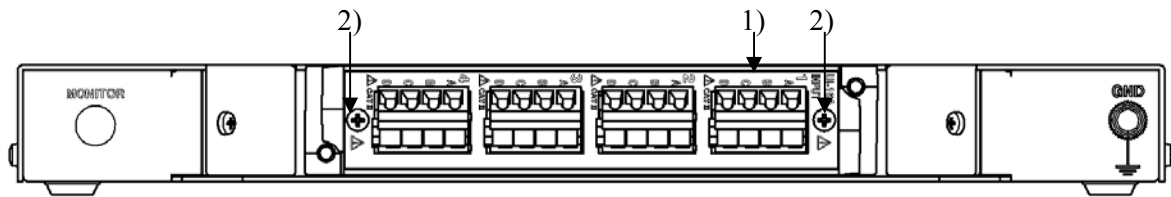
- 1) Jackscrew Loosen the jackscrews to remove the input adapter. When mounting the input adapter, fasten the jackscrews. Tightly fasten the jackscrews with a flathead screwdriver. It is in common with all input adapters.
- 2) Input Connector Connects a strain gage transducer.
- 3) [GND] Terminal Protective ground terminal.
- 4) Analog Output Terminal The analog output cable (U-64) is equipped to the PCD-301B.
(PCD-301B/PCD-301B-F only) Connect the analog output cable to the Analog Output Terminal and apply an input equivalent to the range. An analog output $\pm 5\text{ V} \pm 0.05\text{ V}$ can be obtained.

With Input Adapter UI-11A



- 1) Input Terminal Block Terminal block for connecting strain gages or strain gage transducers. Use a UI-11A accessory small flathead screwdriver for connection. When connecting the strain gage transducers, use optional connection cable N-97.

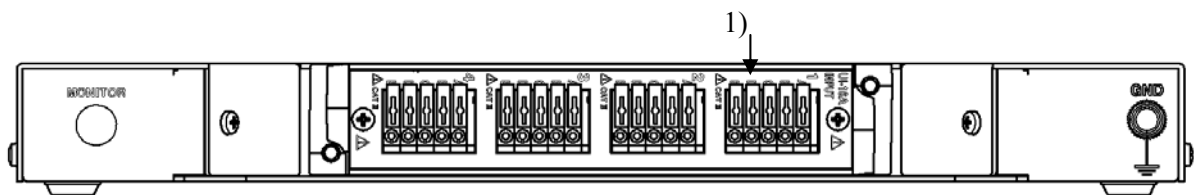
With Input Adapter UI-15A



1) Input Terminal Block with Operating Lever

Terminal block for connecting strain gages or strain gage transducers. Push the operating lever for connection. When connecting the strain gage transducer, use an optional connection cable N-97. In addition, if a shield wire is attached to the sensor cable, connect it to item 2) with a screw.

With Input Adapter UI-16A



1) One-touch Lock Type Input Terminal Block

Terminal block for connecting strain gages or strain gage transducers. Use a UI-16A accessory small flathead screwdriver for connection. When connecting the strain gage transducers, use an optional connection cable N-97.

3. SYSTEM INSTALLATION

3-1 CONNECTING AC POWER SUPPLY



Use accessory AC adaptor for supplying power to the PCD-300B.

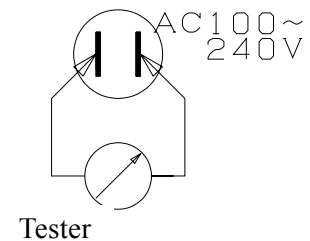
Before connecting the AC adapter to the AC power outlet, check the power supply voltage.

Operating power supply voltage range of the accessory AC adapter is 100 to 240 VAC (50/60 Hz).

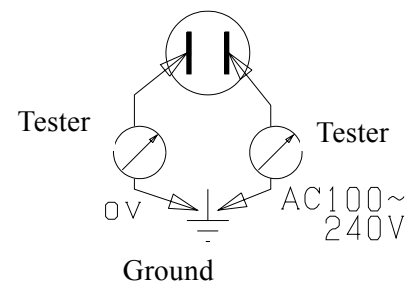
If the power supply voltage is outside the above specified range or if the power voltage terminal has potential with excessive power voltage against the ground, do not connect the AC adapter. Or, it may cause trouble or damage to the PCD-300B.

Method for checking the power supply voltage is described in the following.

- 1) Measure voltage between AC power plug terminals with a tester and check the voltage is 100 to 240 VAC.



- 2) Measure voltage between the ground and each one end of the AC power plug with a tester and check one end has 0 V and the other, 100 to 240 V.



- 3) If the PCD-300B is used at site using noise generating devices such as induction motors, electric welding machines, etc., power supply condition may be deteriorated due to the excessive noise. Take appropriate measures against the noise by using an insulation transformer (Optional: UTP-300B) or commercially available noise-cut transformers.

3-2 CONNECTING DC POWER SUPPLY



Check the power supply voltage before connecting the DC power supply from the exterior side.

Operating power supply voltage range: 11 to 30 VDC

When the power supply voltage exceeds the above voltage range, never connect the PCD-300B. Or, the PCD-300B may be damaged or cause trouble.

In addition, use the P-73 (Optional) to connect the DC power supply.

3-3 SETTING PCD NO.

Set the PCD No. of the PCD-300B with [No.] switch on the front panel.

Relations between [No.] switch, PCD No., and Channel is described in the following table.

Configuration	PCD Setting State	[No.] Switch				PCD No.	CH No.
		8	4	2	1		
Stand-alone	Stand-alone	OFF	OFF	OFF	ON	1	1 to 4
Synchronous Operation	Master	OFF	OFF	OFF	ON	1	1 to 4
	Slave 1	OFF	OFF	ON	OFF	2	5 to 8
	Slave 2	OFF	OFF	ON	ON	3	9 to 12
	Slave 3	OFF	ON	OFF	OFF	4	13 to 16

MEMO

Stand-alone When using only 1 PCD

Master 1st PCD (PCD No. 1) when using multiple PCD units for synchronous operation.

Slave 1 2nd PCD (PCD No. 2) when using multiple PCD units for synchronous operation.

Slave 2 3rd PCD (PCD No. 3) when using multiple PCD units for synchronous operation.

Slave 3 4th PCD (PCD No. 4) when using multiple PCD units for synchronous operation.

NOTE

- Before setting the PCD No., turn OFF the power.
- Do not set PCD Nos. other than mentioned in the table in the previous page. Or, proper operation is not available.
- When setting a PCD No. as a stand-alone or a master PCD, numeric '1' is fixed. Therefore, turn ON only No. '1' of the [No.] Switch.
- The PCD-300B reads the PCD No. when the power is turned ON.

* When the PCD-300B is mixedly connected with PCD-300A or PCD-320A for synchronous operation, always set the PCD-300B to a master unit. When multiple PCD-300B units are connected, set the PCD Nos. of the PCD-300B units to smaller Nos. than those of the PCD-300A or PCD-320A.

Ex. 1) When combining PCD-300A: 1, PCD-320A: 1, and PCD-300B: 1

Master (PCD No. 1) PCD-300B (* Set the PCD-300B as the master unit.)

Slave 1 (PCD No. 2) PCD-300A (or PCD-320A)

Slave 2 (PCD No. 3) PCD-320A (or PCD-300A)

Ex. 2) When combining PCD-300A: 1, PCD-320A: 1, and PCD-300B: 2

Master (PCD No. 1) PCD-300B (* Set the PCD-300B as the master unit.)

Slave 1 (PCD No. 2) PCD-300B (Set the PCD No. of the PCD-300B to a smaller number than those of the PCD-300A/320A.)

Slave 2 (PCD No. 3) PCD-300A (or PCD-320A)

Slave (PCD No. 4) PCD-320A (or PCD-300A)

Ex. 3) When combining PCD-300A: 1 and PCD-300B: 3

Master (PCD No. 1) PCD-300B (* Set the PCD-300B as the master unit.)

Slave 1 (PCD No. 2) PCD-300B (Set the PCD No. of the PCD-300B to a smaller number than that of the PCD-300A.)

Slave 2 (PCD No. 3) PCD-300B (Set the PCD No. of the PCD-300B to a smaller number than that of the PCD-300A.)

Slave 3 (PCD No. 4) PCD-300A

3-4 CONNECTING SENSORS.

3-4-1 Input Adapter Types and Features

UI-10A: Input adapter equipped with NDIS one-touch connector used for connecting a strain gage transducer. It is a TEDS compatible input adapter. For 1-gage/2-gage method measurement, connect KYOWA's bridge box (Optional).

UI-11A: Input adapter equipped with clamp type terminal block. Connect with an accessory screwdriver. In addition, mounting and demounting the terminal block portion is available. It is a TEDS compatible input adapter.
For 1-gage/2-gage/4-gage connection, see "3-4-2 Input Adapter Connection Method."

UI-15A: Input adapter equipped with an operating lever and no tool is necessary for connection. Press down the operating lever for connecting the lead wire. It is not compatible with the TEDS.
For 1-gage/2-gage/4-gage connection, see "3-4-2 Input Adapter Connection Method."

NOTE

Press the UI-15A operating lever straight against the lever. While pressing the operating lever, insert the lead wire. After the lead wire is inserted into the operating lever, do not abruptly release your fingers from the operating lever. Or, damage of the lead wire and trouble in the operating lever may result. The operating lever may break due to the above erroneous operation as well as due to aged deterioration of the product. At this time, contact KYOWA or our representative for repair.

UI-16A: Input adapter equipped with one-touch lock type terminal block. Press in the lock button with an accessory tool or fine tool and after inserting the lead wire, pull back the lock button to the original portion with fingers. It is not compatible with TEDS.
For 1-gage/2-gage/4-gage connection, see "3-4-2 Input Adapter Connection Method."

MEMO

- Operation available range of input adapters
 - UI-11A Single wire 0.50 to 1.5 mm², twisted wire 0.13 to 1.4 mm², 26 to 14 AWG (UL)
 - UI-15A Single wire 0.08 to 2.5 mm², twisted wire 0.08 to 1.5 mm², 28 to 12 AWG (UL)
 - UI-16A Single wire 0.13 to 1.1 mm², twisted wire 0.2 to 0.75 mm², 26 to 16 AWG (UL)For wires with small wire diameter, twist them by holding twofold or threefold before connecting the AC adapter.
- When connecting NDIS connector equipped sensors to input adapters UI-11A, UI-15A, and UI-16A, use optional connection cable N-97.

3-4-2 Input Adapter Connection Method

When connecting sensors to the PCD-300B, connect the sensors for every input adapter.

Input Adapter	Applicable Gage	Connection Method	Remarks
UI-10A	Specified for 4-gage method (For strain gage transducer) Gage resistance 120 to 1000 Ω		A: +BV B: -SIG C: -BV D: +SIG E: Shield F: +TEDS G: -TEDS TEDS compatible
UI-11A	1-gage method (3-wire system connection) Gage resistance 120 Ω		A: +BV B: -SIG C: -BV D: +SIG E: Shield F: +TEDS G: -TEDS TEDS compatible
	1-gage method (2-wire system connection) Gage resistance 120 Ω		
	2-gage method Gage resistance 120 Ω		
	4-gage method Gage resistance 120 to 1000 Ω		

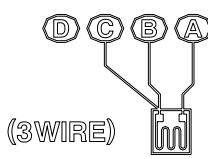
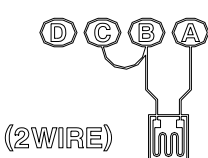
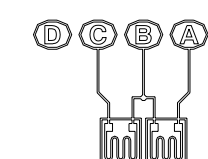
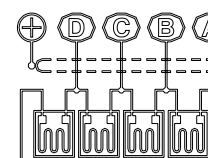
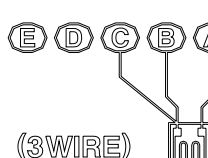
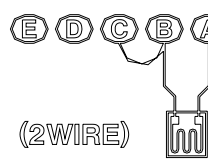
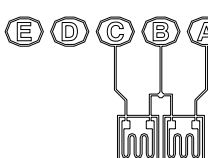
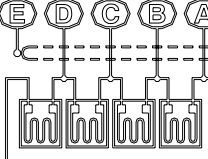
NOTE

For 1-gage method, it is recommended to adopt a 3-wire system connection that has little error factor affected by temperature difference, balance dislocation, etc. on gage lead wires.

For wiring, use KYOWA's low-noise lead wire (Model: L-13/14/15/16) with shield and 4-conductor shielded wire. In addition, set them apart from power line wiring and wiring with excessive interfering noise.

MEMO

If the measurement is unstable, it may be solved by grounding the [GND] terminal on the PCD-300B rear panel.

Input Adapter	Applicable Gage Method	Connection Method	Remarks
UI-15A	1-gage method (3-wire system connection) Gage resistance 120 Ω	 (3WIRE)	A:+BV B:-SIG C:-BV D:+SIG ⊕ : Shield Not compatible with TEDS sensor.
	1-gage method (2-wire system connection) Gage resistance 120 Ω	 (2WIRE)	
	2-gage method Gage resistance 120 Ω		
	4-gage method Gage resistance 120 to 1000 Ω		
UI-16A	1-gage method (3-wire system connection) Gage resistance 120 Ω	 (3WIRE)	A:+BV B:-SIG C:-BV D:+SIG E: Shield Not compatible with TEDS sensor.
	1-gage method (2-wire system connection) Gage resistance 120 Ω	 (2WIRE)	
	2-gage method Gage resistance 120 Ω		
	4-gage method Gage resistance 120 to 1000 Ω		

3-4-3 Connection Method

To connect strain gages, etc. with no connectors equipped on the lead wire head, peel off coating from the lead wire head about 9 to 10 mm in advance and then, connect.

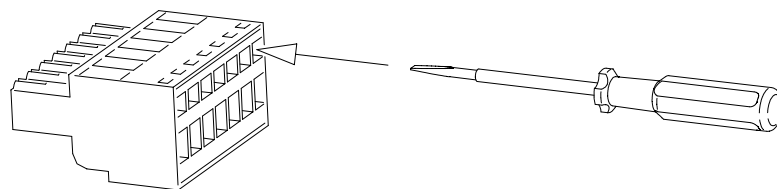
When connecting strain gage transducers, external bridge box, etc. that is equipped with NDIS connector on the head, the following 2 methods are available.

- Use input adapter UI-10A
- When using input adapters UI-11A, UI-15A, and UI-16A, use a connection cable (Receptacle with lead wire N-97: Optional) for connection.

When connecting a lead wire to input terminal using input adapters UI-11A and UI-16A, use accessory small screwdriver.

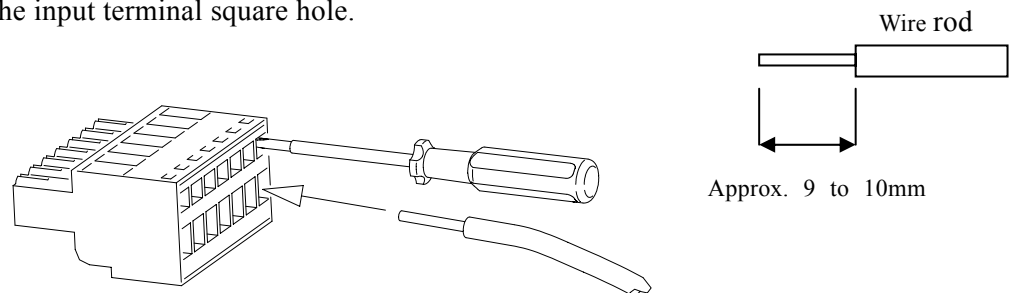
UI-11A

- 1) Insert the small screwdriver straight into the square hole of the input terminal. Terminal block portion of the UI-11A can be mounted or demounted for convenience.

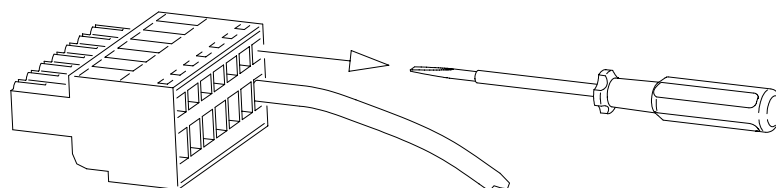


If the small screwdriver is correctly inserted all the way to the end, the screwdriver is left inserted even if your hand is released. In this state, the clamp in the square hole is opened.

- 2) With the screwdriver inserted into the square hole, insert a lead wire with its coating peeled off about 10 mm into the input terminal square hole.



- 3) While holding the lead wire, extract the screwdriver from the square hole.



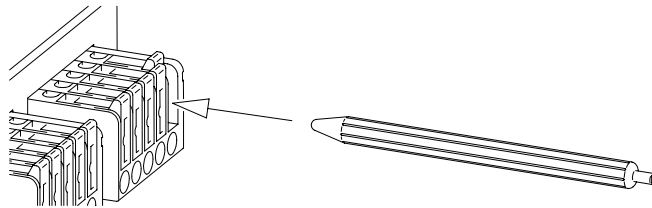
- 4) Gently pull the lead wire to check if it is securely inserted.

NOTE

For connection, always use the accessory small screwdriver or a screwdriver of the same size. When inserting or extracting the screwdriver, do not move it up and down more than required. Or, it may cause damage to the UI-11A.

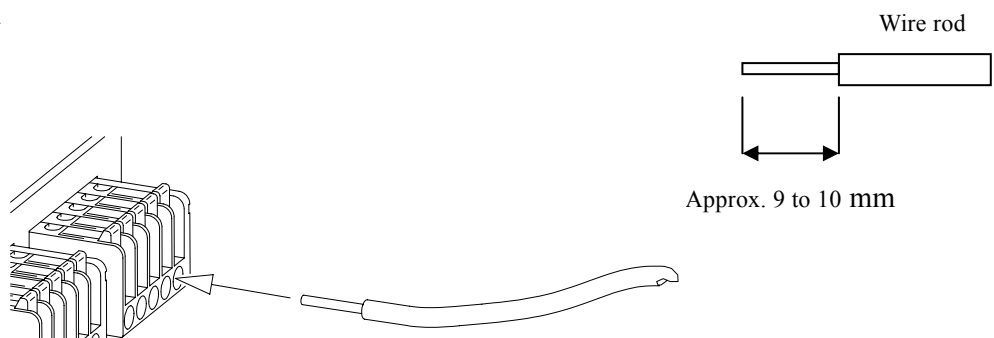
UI-16A

- 1) Push the button of the input terminal until it is locked with the accessory screwdriver.

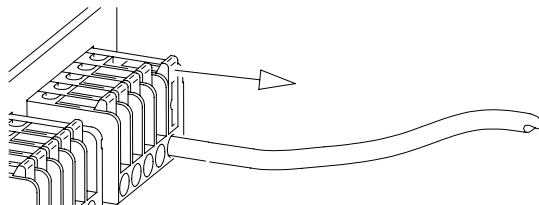


If it is securely pushed, the button is locked and maintained.

- 2) Insert the lead wire with its coating peeled off about 10 mm into the round hole all the way to its end of the input terminal.



- 3) While holding the lead wire, set back the button to the original position with your finger.



- 4) Gently pull the lead wire to check if it is securely inserted.

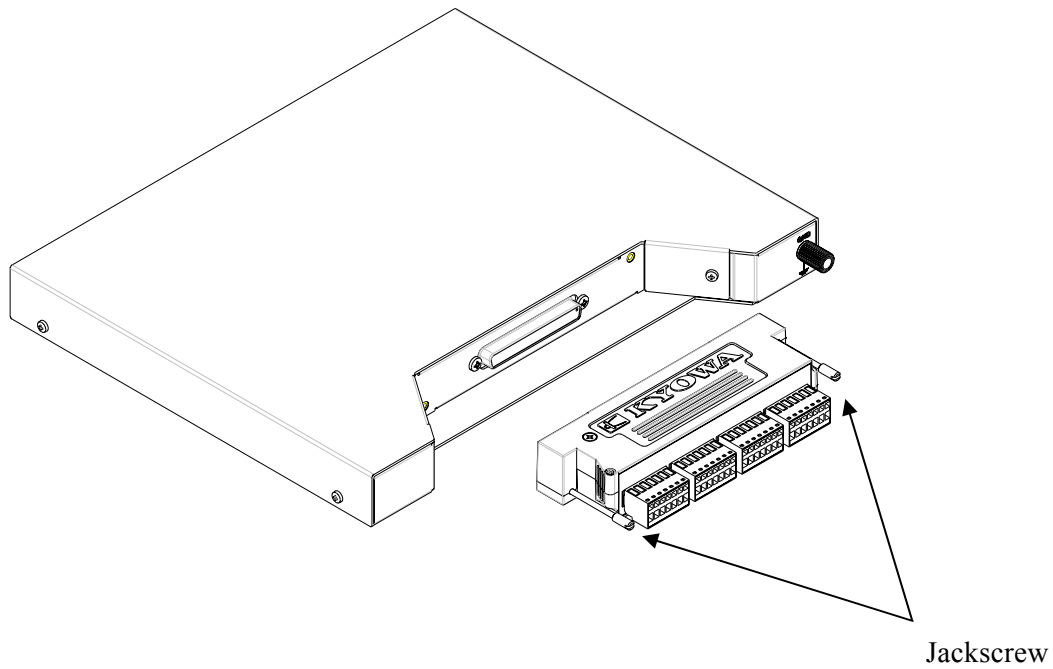
NOTE

For connection, always use the accessory small screwdriver or a screwdriver with a fine head.

3-5 MOUNTING/DEMOUNTING INPUT ADAPTER

Loosen the jackscrews of the input adapter to demount the terminal portion of the input adapter.

When mounting the input adapter, firmly fix connectors of the PCD and input adapter sides and fasten the jackscrews. For tightly fastening the jackscrews, use a flathead screwdriver.



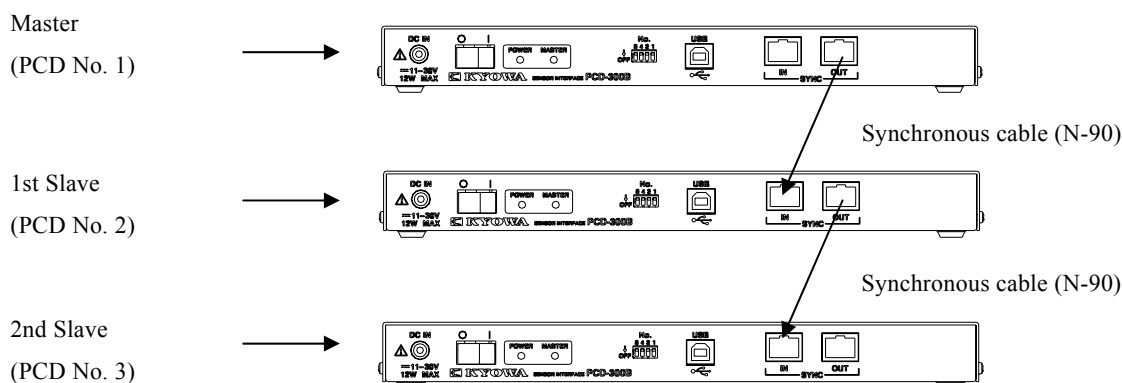
3-6 CONNECTING MULTIPLE PCD-300B UNITS

This system is capable of conducting measurement of maximum 16 channels using four PCD-300B units.

When using multiple PCD-300B units, use the specified synchronous cables (N-90: Optional).

Connect in due order from master [SYNC OUT] connector to the 1st slave [SYNC IN] connector, and from the 1st slave [SYNC OUT] connector to the 2nd slave [SYNC IN] connector.

Connection relation of the synchronous cables are described in the following figure.



NOTE

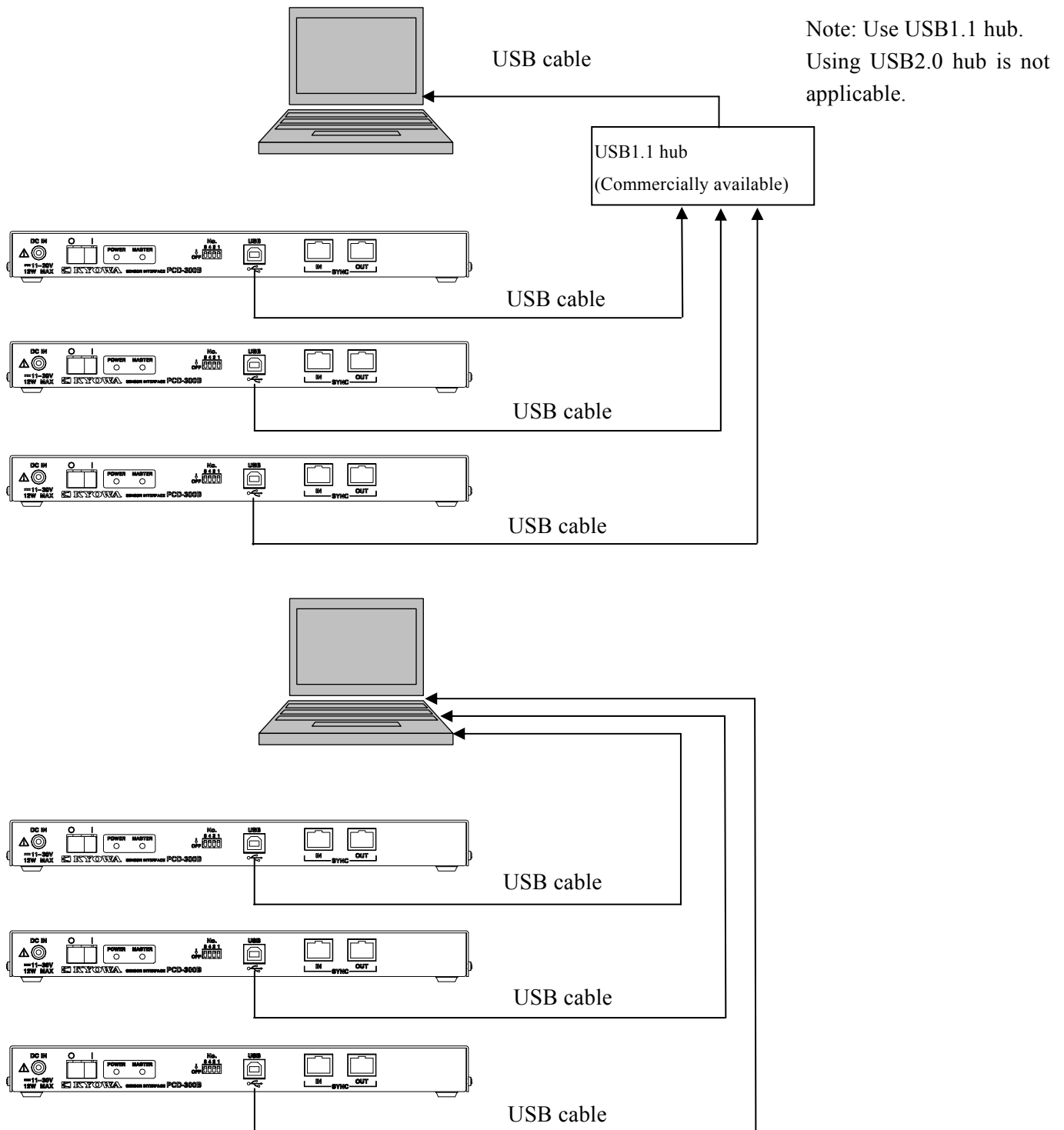
- When connecting multiple PCD-300B units, take care not to duplicate PCD Nos. Or, no proper operation is available.
- Take care and correctly connect the synchronous cables. Or, the PCD-300B may become operation failure.
- Always turn ON the PCD-300B that is connected by the synchronous cable. If the synchronous cable is connected to the PCD-300B with no power turned ON, correct operation is not available. Do not forget to power OFF the PCD-300B before disconnecting the synchronous cable.
- Do not connect the PCD-300B with no power turned ON. Or, correct measurement may not be available.

3-7 CONNECTING TO THE PC

Connect the USB connector on the front panel and PC's USB connector with a USB cable.

Use the accessory USB cable or commercially available USB cable. When using the commercially available USB cable, it is recommended to mount ferrite cores at both ends of the USB cable to prevent from noise.

When using multiple PCD-300B units, use a commercially available USB hub (USB1.1). Or, if the PC is equipped with multiple USB ports, directly connect the USB cable to the PC's USB port.



3-8 POWER ON/OFF

This section describes power switch of the PCD-300B. Turn the power switch on the front panel to the [I] side to power ON and, to [O] side to power OFF.

Turn ON and if the PCD-300B is correctly operating, the POWER lamp on the front panel lights up.

NOTE

After turning OFF the power, wait more than 5 seconds to power ON once again.

When the power is turned ON, the PCD-300B reads the PCD No. Set the PCD No. with the power turned OFF.

Turn ON the power and the PCD-300B is ready for operation. However, electric devices used inside would not be in a thermally stable state immediately after the power ON. Preheat approximately 30 minutes to obtain stable operation.

3-9 INSTALLING USB DRIVER

Read carefully the enclosed “PCD Series Instruction Manual for USB Driver Installation” and follow instructions for installing the USB driver.

3-10 SELF TEST

Checks whether or not the PCD-300B measuring operation is normal. Checked results are displayed as ‘OK (Normal)’ or ‘NG (Abnormal)’ for every channel. When ‘NG’ appears, see “4 TROUBLE SHOOTING.”

4.TROUBLESHOOTING

Phenomenon	Check Items
No power is ON. [POWER] lamp would not turn ON.	• Is the specified voltage applied to the AC power plug? • Is the AC adapter input/output plug securely connected? • Is the power switch securely turned ON without fail?
[POWER]: lamp flickers.	→ Failure. Immediately stop the operation. • Contact KYOWA or our representative.
PCD-300B operation stops and accepts no operation.	• The PCD-300B operation failed due to external interfering noise. → Turn ON the power once again. If any phenomenon generates caused by external interfering noise, take countermeasures against noise from operating environment, power supply, etc.
Measured value varies and not stable.	• Operation of the PCD-300B failed due to external interfering noise. → Take appropriate measures against noise. • Are input adapter and input cable correctly connected? → Correctly connect and fix them not to dislocate. • Is the ground cable connected? → Please connect the ground cable.
Measured value is faulty.	• Are gage method and connection method correct? → Correctly set the gage method and correctly connect cables. • Is the ground cable connected? → Please connect the ground cable.
Measurement of multiple PCD-300B units is not available.	• Is the synchronous cable correctly connected? → Correctly connect the cable. • Is the PCD No. correctly set? → Correctly set the PCD No.
Self-test, 'NG' is displayed.	• The PCD-300B operation is faulty due to external interfering noise. → Turn OFF and ON the power and conduct the self check once again. If fault phenomenon occurs caused by external interfering noise, take countermeasures against noise generated from operating environment, power supply, etc. When the above phenomenon still appears, the PCD-300B may be damaged. Contact KYOWA or our representatives.

5. TECHNICAL INFORMATION

5-1 USING STRAIN GAGE HAVING GAGE FACTOR OTHER THAN 2.00

Measured value is compensated with the following expression.

$$\varepsilon = (2.00/K_s) \times \varepsilon_0$$

$$\sigma = E \times \varepsilon = E \times (2.00/K_s) \times \varepsilon_0$$

Where, ε : Strain after compensation

ε_0 : Measured value

E : Young's modulus of the specimen (Modulus of longitudinal elasticity)

σ : Stress

K_s : Gage factor

5-2 USING EXTENSION CABLE

In some cases, when distance from the sensor to a measuring device is considerably long, an extension cable may be used and connected for the measurement. However, it should be noted that measured value obtained at that time is always added with error due to the use of the extension cable. To compensate the above error, multiply the measured value by the compensation coefficient (calibration coefficient). The following table describes compensation coefficient obtained by using KYOWA's extension cable (4-conductor shielded cable (0.5mm²), Model: N-81 to N-85)

In addition, the above compensation method corresponds to errors due to types of extension cable, ambient temperature, etc.

(Use the sensor connection cable with cable length 30 m or less.)

Extension Cable Bridge Resistance	5 m	25 m
	1.000	1.012
120 Ω	1.000	1.012
350 Ω	1.000	1.004

5-3 SPECIAL TERMS

Wheatstone Bridge	A circuit structured by connecting 4 resistors in series with each other and then connecting power supply and ammeter (galvanometer) on the respective two relative connecting points. It is used for detecting minute change in resistance value other than low resistance.
1-Gage Method	A measuring method conducted using a bridge of which one side is composed of a strain gage.
2-Gage Method	A measuring method conducted using a bridge of which two sides next to each other are composed of strain gages.
4-Gage Method	A measuring method conducted using a bridge of which 4 sides are composed of strain gages.
Unbalance	Voltage generated by deviation in resistance and capacity of the strain gage bridge.
Balance Adjustment Range	A range capable of compensating resistance and capacity deviations in gage bridge circuit. Resistance adjustment range is expressed in percentage of the gage resistance, and capacity adjustment range, in capacity value.
Gage Factor: K_s	Ratio of change in resistance against varying strain added to the strain gage. As for the metal foil strain gage, the ratio is generally about 2.
Carrier	An alternating signal that transfers the strain signals. It is also called as a carrier wave. Generally, it has frequency more than twice as much as the strain frequency of the measuring target.
Bridge Exciter	A power supply voltage connected to the wheatstone bridge. Power supply has both AC and DC types.

6. SPECIFICATIONS

6-1 SPEIFICATIONS

1) Model

Model Name	Maximum analog input (CH)	Low pass filter function	Analog Output
PCD-300B	4	Without	Without
PCD-300B-F	4	With	Without
PCD-301B	4	Without	With
PCD-301B-F	4	With	With

2) Measuring Target Strain gage and Strain gage transducer

3) Number of Input Channels 4 CHs

4) Applicable Gage 1-gage method, 2-gage method: 120 Ω
 4-gage method: 120 to 10000 Ω

5) Input Adapter

Input adapter for strain gage transducer (NDIS standard connector): UI-10A
 Input adapter for strain gage (Clamp type terminal block): UI-11A
 Input adapter for strain gage with operating lever (Clamp type terminal block): UI-15A
 One-touch lock type input adapter for strain gage (Clamp type terminal block): UI-16A

6) Bridge Excitation Voltage 2 Vrms, 1 kHz sine wave

7) Gage Factor 2.00 fixed

8) Balance Adjustment Range Resistance: $\pm 2\%$ ($\pm 10000 \mu\text{m/m}$) or more
 Capacity: 5000 pF or more

9) Balance Adjustment Method Resistance: True electron type auto-balance method
 Capacity: CST method (Auto-tracking)

10) Nonlinearity Within $\pm 0.1\%$ FS

11) Range Step: 8 steps: 200, 500, 1000, 2000, 5000, 10000, 20000 $\mu\text{m/m}$ and OFF
 Accuracy: Within $\pm 0.5\%$ FS

12) Frequency Response DC to 200 Hz, Deviation: $\pm 10\%$

13) Sampling Frequency Maximum 10 kHz (4-CH simultaneous sampling)
 1, 2, 5, 10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10 kHz

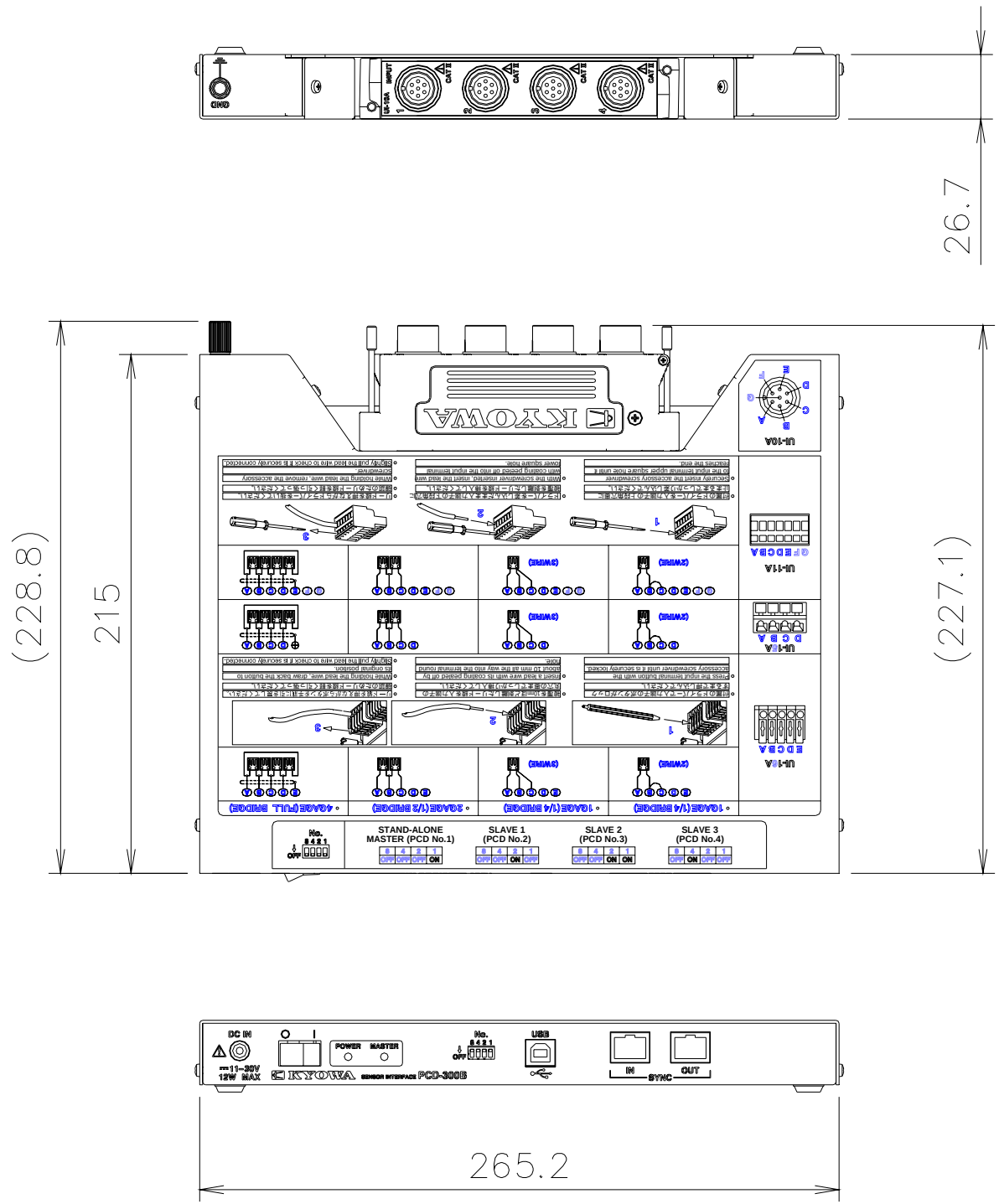
- 14) Low Pass Filter (Applicable only for PCD-300B-F)
 Secondary Butterworth
 Cutoff frequency: 4 steps of 10, 30, 100 Hz and FLAT
 Amplitude ratio at cutoff point: -3 dB $\pm$ 1 dB
 Attenuation: -12 dB/oct. $\pm$ 1 dB/oct.
- 15) A/D Converter Maximum 24 bits
- 16) Memory Stores range, balance adjustment value, etc. in internal non-volatile memory.
- 17) TEDS Function TEDS loading circuit built-in
- 18) Interface USB1.1
- 19) Synchronous Operation Maximum 4 PCD-300B units, up to 16 CHs *1
- 20) Stability Temperature: Zero point $\pm$ 0.2 μ m/m/ $^{\circ}$ C
 Sensitivity: $\pm$ 0.05%/ $^{\circ}$ C
 Time: Zero point $\pm$ 1.0 μ m/m/8h
 Sensitivity $\pm$ 0.3%/8h
- 21) Withstand Voltage Between measuring bridge and chassis: 250 VAC for 1 min
- 22) Operating Temperature & Humidity Range
 0 to 40 $^{\circ}$ C, 20 to 80% RH (Noncondensing)
- 23) Vibration Proof $\pm$ 29.42 m/S² (3G), 5 to 200 Hz
 (12 cycles for each axis, 10 minutes/cycle)
- 24) Power Supply 100 to 240 VAC, 50/60 Hz (Using AC adapter) *2
- 25) Consumption Current Approx. 0.7 A (12 VDC When 4 CHs full loaded)
- 26) Dimensions 265.2(W) $\times$ 26.7 (H) $\times$ 215(D) mm
 (Protruded portion not included)
- 27) Weight Approx. 1.1 kg (With UI-10A installed)
- 28) EMC standard IEC61326-1 (EN61326-1) Class A equipment *3

29) Analog output(PCD-301B and PCD-301B-F only)
 $\pm 5 \text{ V} \pm 0.05 \text{ V}$
(One analog output cable (U-64) is equipped.)

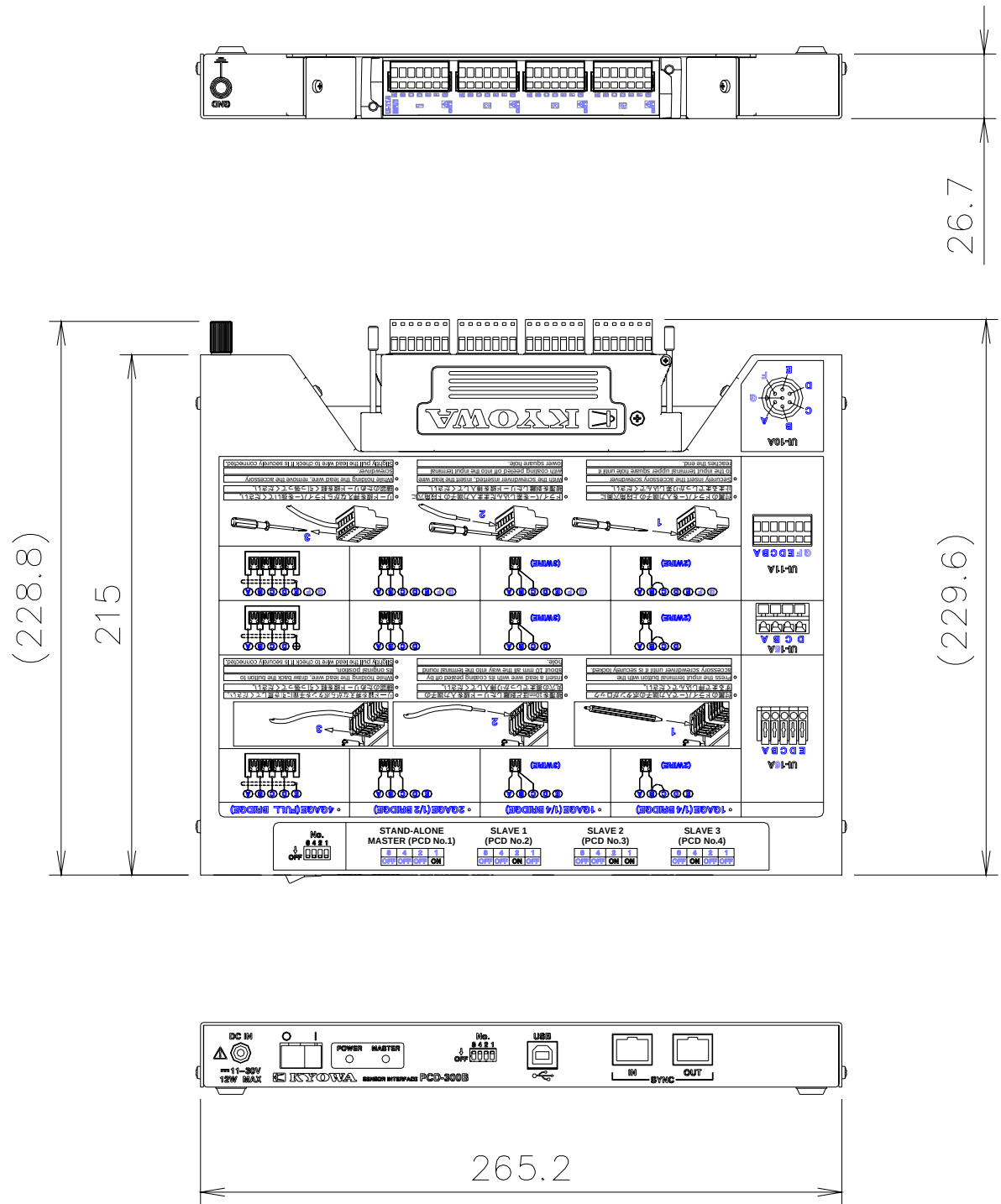
- *1 When more than two PCD-300B units are used, it is required to use synchronous cable N-90 (Optional) and the PC having the number of USB ports for the connected units or commercially available USB1.1 hub.
- *2 As for the AC adapter, always use the standard accessory UI318-12 or SA-34A (Optional).
- *3 For application, use the PCD-300B with the following conditions.
 - Use a standard attached AC adapter (UI318-12).
 - Ground a GND terminal.
 - Use a BNC coaxial cable for applying voltage.
 - USB cable connected to the PCD side should be used indoors.
 - Use a synchronous cable N-90 (Optional).
 - When activating the PCD-300B by using the exterior DC power supply, use a P-73 (Optional).
 - The PCD-301B and PCD-301B-F are not applicable.

6-2 OUTSIDE DRAWING

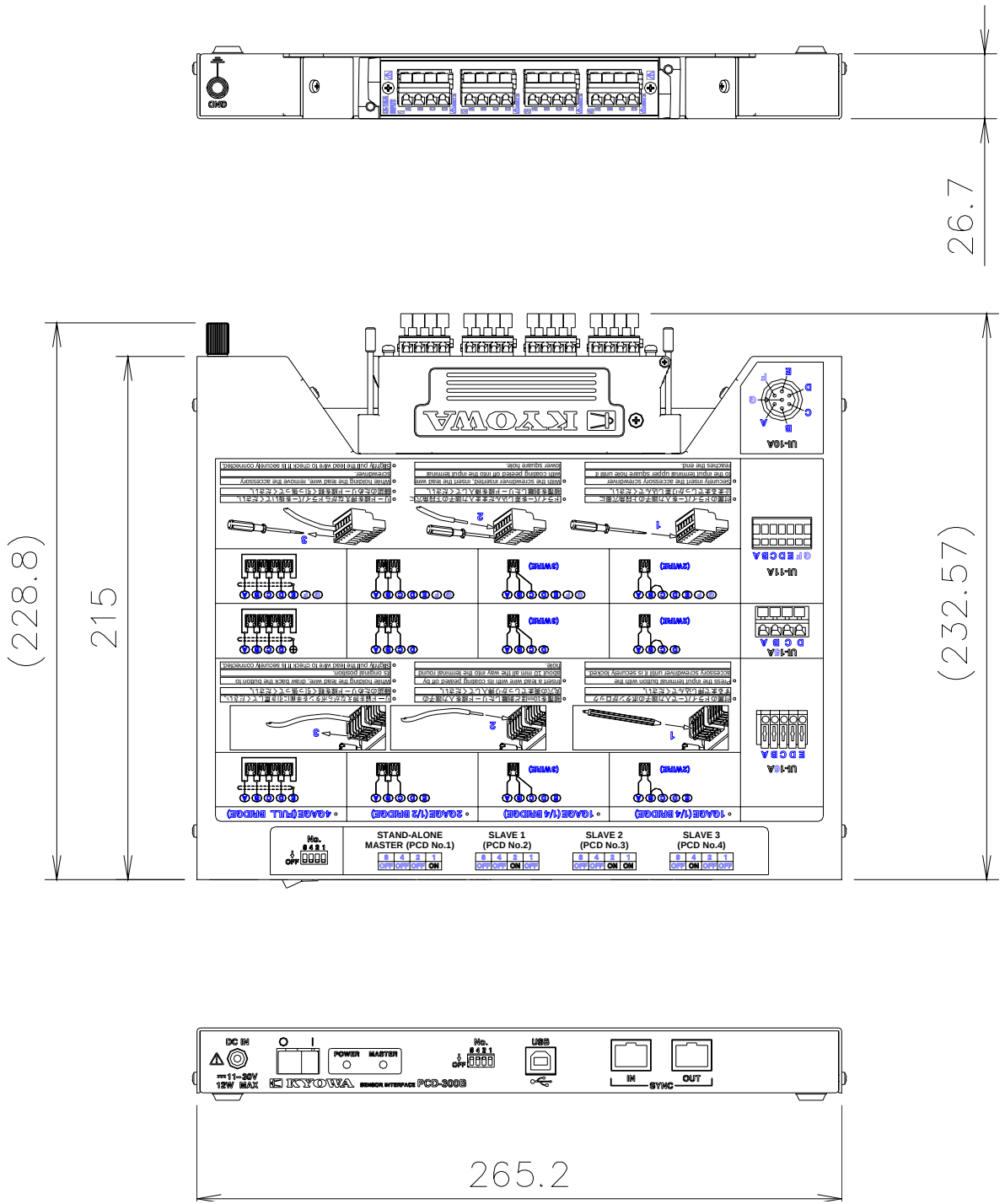
PCD-300B with UI-10A



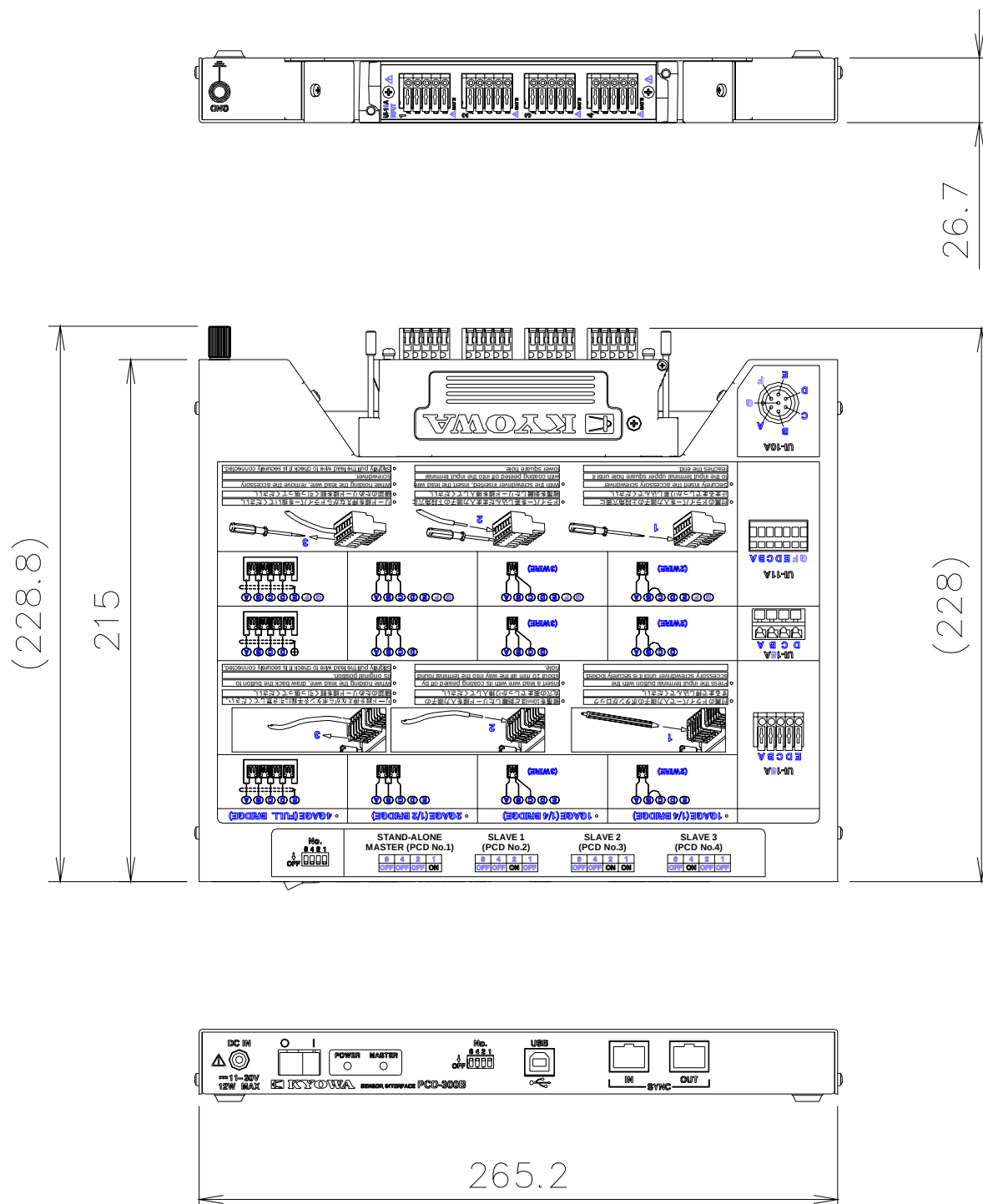
PCD-300B with UI-11A



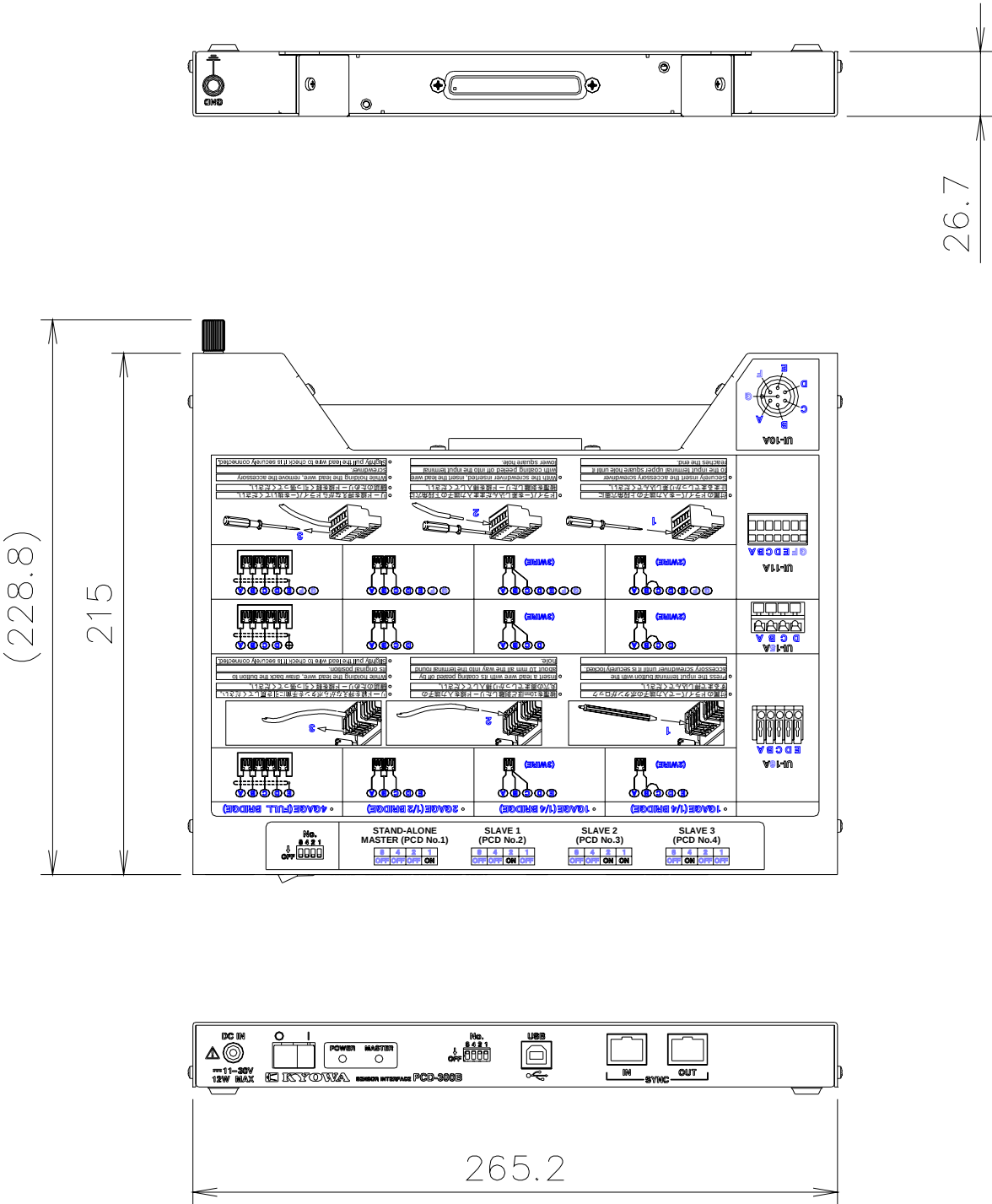
PCD-300B with UI-15A



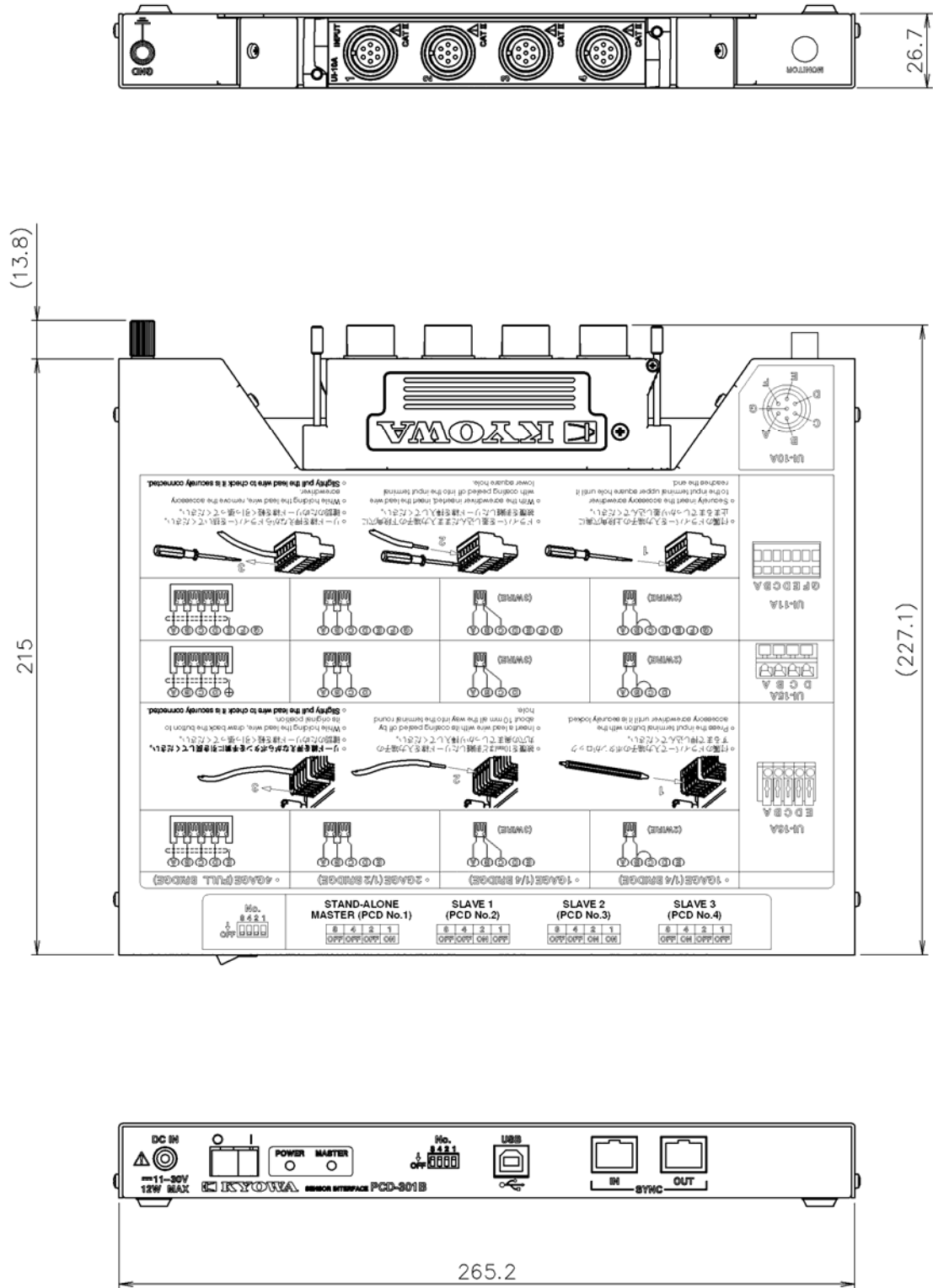
PCD-300B with UI-16A



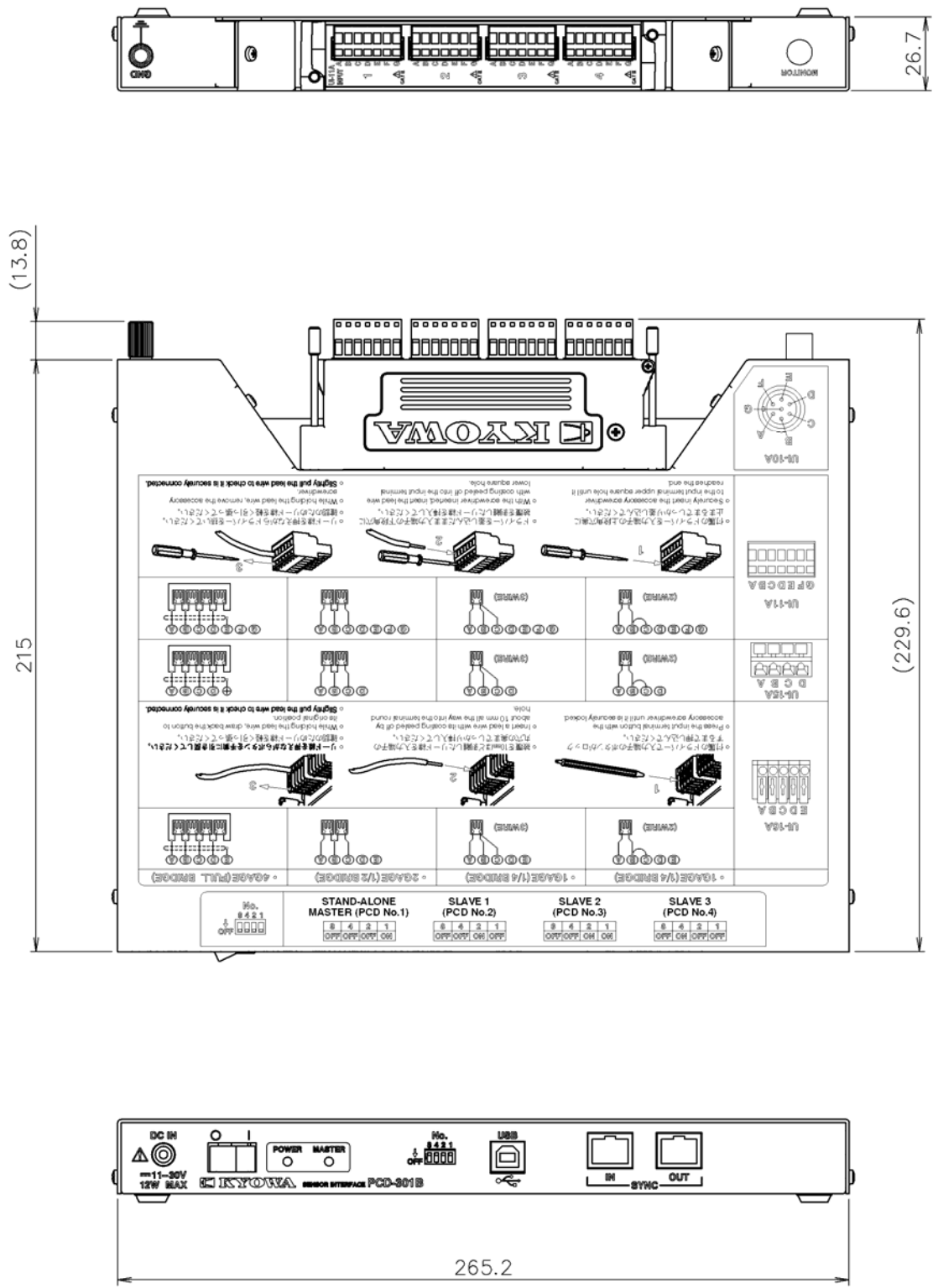
PCD-300B with no input adapter



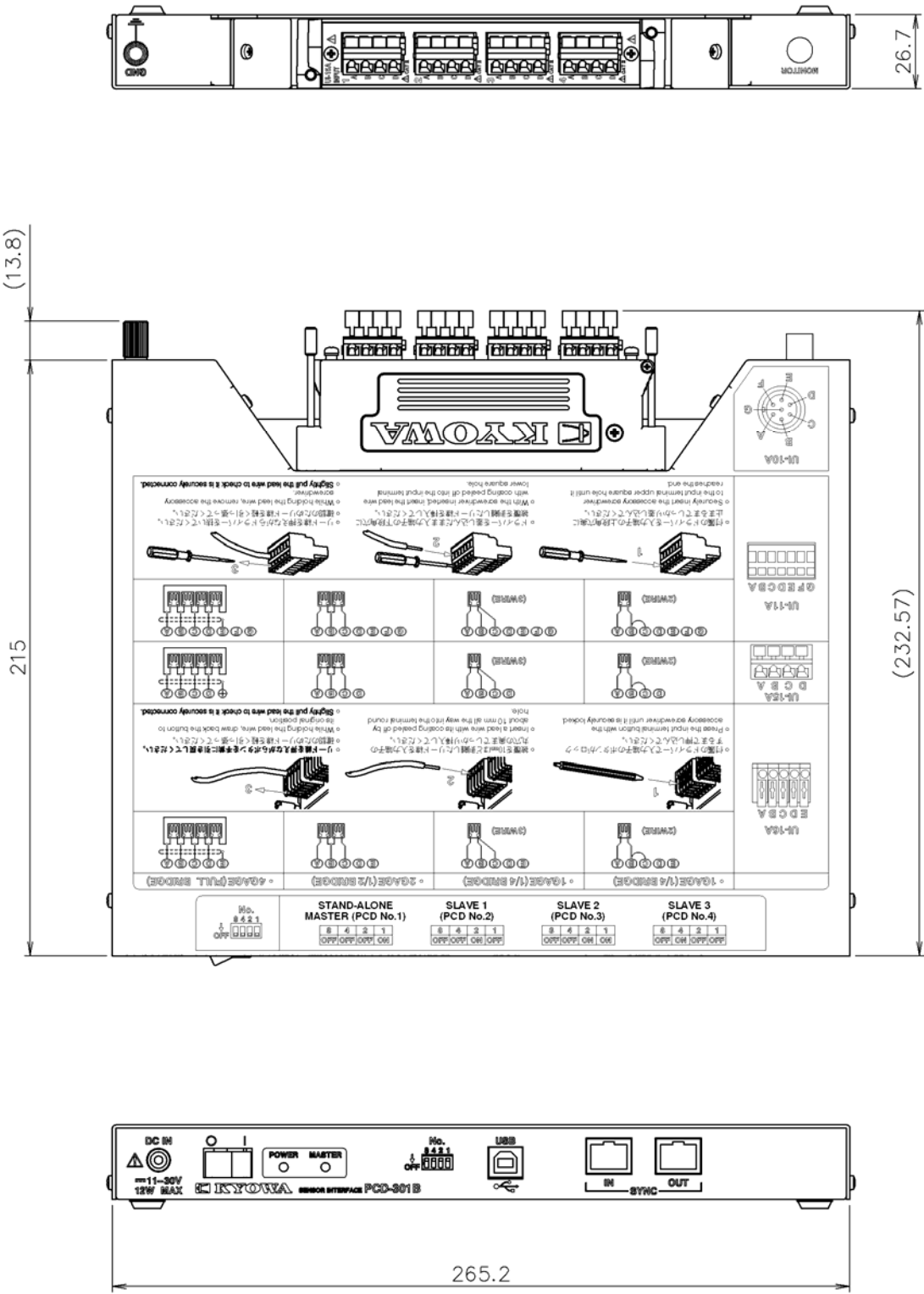
PCD-301B with UI-10A



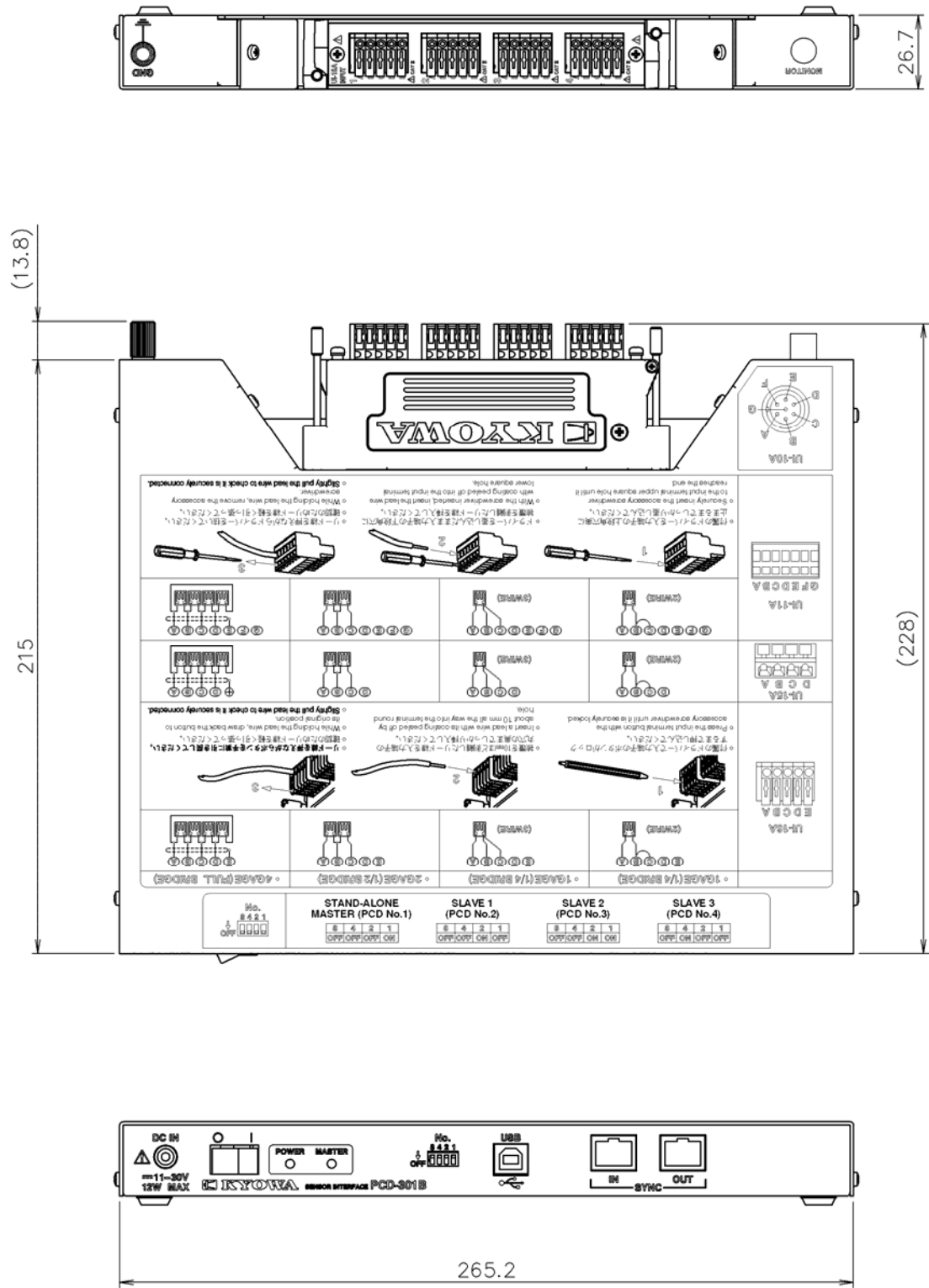
PCD-301B with UI-11A



PCD-301B with UI-15A



PCD-301B with UI-16A



PCD-301B with no input adapter

