

INSTRUCTION MANUAL

CVM-40A

For EDX-100A/EDX-200A/EDX-3000A

STRAIN/VOLTAGE/ACCELERATION MEASUREMENT CARD

Thank you for purchasing KYOWA's product CVM-40A

Strain/Voltage/Acceleration Measurement Card for EDX-100A

Universal Recorders/EDX-200A Universal Recorders

/EDX-3000A Memory Recorder/Analyzers.

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.

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The contents of the Instruction Manual are subjected to change without prior notice.

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STANDARD ACCESSORIES

The following accessories are packed with the CVM-40A Strain/Voltage/Acceleration Measurement Card (hereinafter referred to as the CVM-40A). When unpacking, check the contents to ensure that all accessories are enclosed.

Warranty and Test Data Sheet	1 each
Cross-recessed binding head machine screw $M3 \times 6$	2

SAFETY PRECAUTIONS

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

The CVM-40A is designed to be used according to "4. SPECIFICATIONS." Do not use the CVM-40A in an environment exceeding the range of the above specifications of the EDX-100A/EDX-200A/EDX-3000A. Or, system failure may result in.

PRIOR TO USE

For safe use of the CVM-40A, do not forget to read the "Safety Precautions" prior to use.

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

SAFETY SYMBOLS

For safety operation of the CVM-40A, 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 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**

- **WARNING**
Take special notice of warning items described in the "EDX-100A Universal Recorders Instruction Manual for Hardware", "EDX-200A Universal Recorders Instruction Manual for Hardware", and "EDX-3000A Memory Recorder/Analyzers Instruction Manual for Hardware."

 **CAUTION**

- Take special notice of caution items described in the "EDX-100A Universal Recorders Instruction Manual for Hardware", "EDX-200A Universal Recorders Instruction Manual for Hardware", and "EDX-3000A Memory Recorder/Analyzers Instruction Manual for Hardware."
- The CVM-40A cannot be used with the EDX-2000A/B.
- When installing or removing the CVM-40A in/from the EDX-100A/EDX-200A/EDX-3000A, do not touch any component parts of the CVM-40A. Or, system failure or damage may result in.
- Do not apply any voltage beyond the specified input voltage range. Failure to do so will pose the risk of deteriorated performance and system failure.
- Lay input cables at proper intervals with a certain play so that they may not receive any unreasonable force. Failure to do so will pose the risk of erroneous data, disconnection and connector failure.
- Do not disassemble or remodel the CVM-40A. Failure to do so will pose the risk of electric shock and system failure.
- Avoid installing sensors, EDX-100A/200A/3000A near a welding machine. Failure to do so will pose the risk of erroneous data, malfunction and failure.

LIMITED LIFE PARTS AND PREVENTIVE MAINTENANCE

The CVM-40A consists of various electronic components and those components, if not all, have a useful life. Using them exceeding the years specified according to each part type (useful life) may affect the characteristics of the CVM-40A, resulting in a malfunction or a failure.

Particularly, when aluminum electrolytic capacitor life ends, the signal-noise ratio lowers due to capacity low or smoke is emitted due to liquid leak, resulting in a malfunction of the CVM-40A.

To operate the CVM-40A normally, finding a sign of the CVM-40A failure early by daily/periodic inspections and taking the corrective action are required.

For inspection, contact KYOWA or our representatives.

* Limited life parts used with the CVM-40A are aluminum electrolytic capacitors and relays.

* All components do age and will fail.

CVM-40A 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 CVM-40A. Regardless of the replacement parts, the CVM-40A itself gradually deteriorates with age. Before the expected service life is reached, consider replacing the CVM-40A with a new one or the latest series as preventive maintenance.

NOTATIONS USED IN THE INSTRUCTION MANUAL

INFORMATIONAL NOTES

Certain notations are used as necessary to attract your attention to information that requires special care when handling the CVM-40A, and to information provided for reference purposes.

Examples of Notations

NOTE

Describes essential instructions when handling the CVM-40A.

MEMO

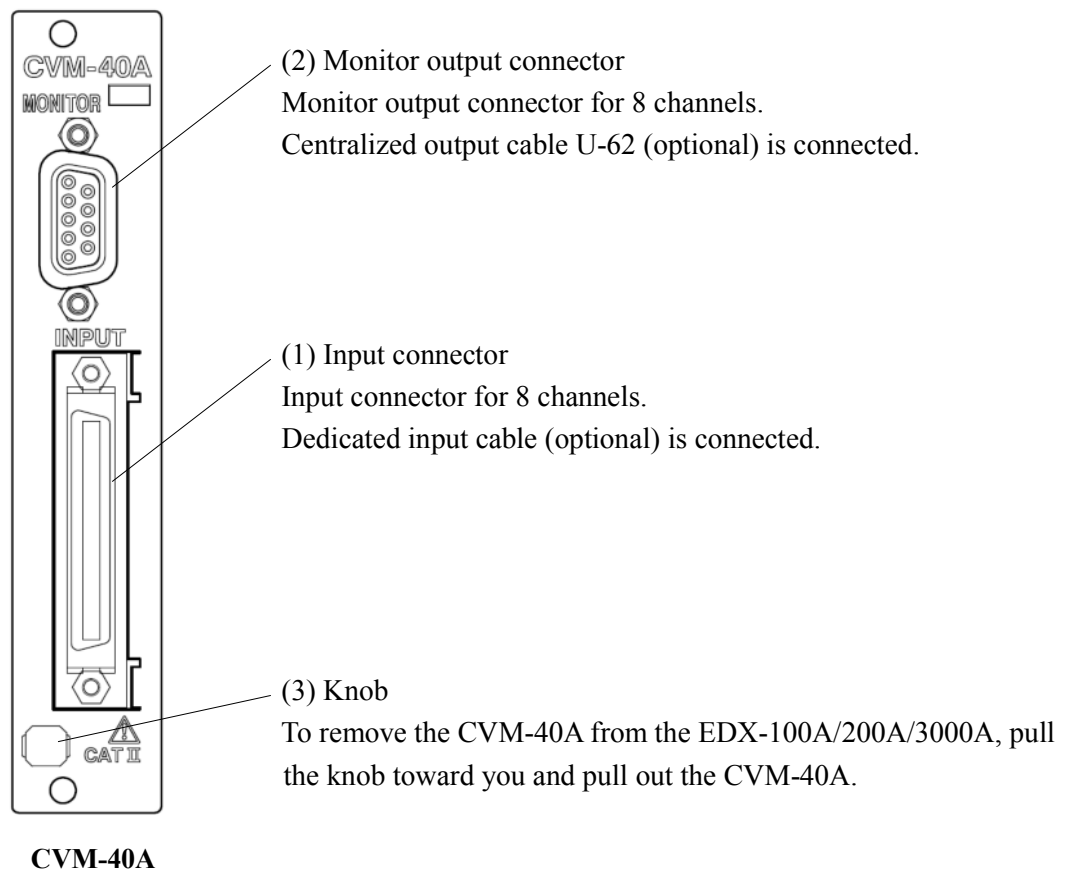
Reference items when handling the CVM-40A.

1. OUTLINE OF THE PRODUCT

1.1 Outline of CVM-40A

- The CVM-40A is a conditioner card for a strain gage, strain gage transducer, voltage, and voltage-output-type piezoelectric accelerometer. The CVM-40A has to be installed in the EDX-100A/200A/3000A.
- Capable of 8-channel measurement with 1 CVM-40A.
- Monitor output of channels is ± 5 V with full scale of each range.
- The CVM-40A can load TEDS built-in sensor information. Based on the loaded sensor information, the CVM-40A automatically sets the most appropriate channel conditions. Before using the TEDS built-in sensor, refer to separate volume of "Instruction Manual for Loading TEDS Sensor Information" and "EDX-100A/200A/3000A Instruction Manual for Hardware" and "DCS-100A Instruction Manual for EDX-100A/200A/3000A."

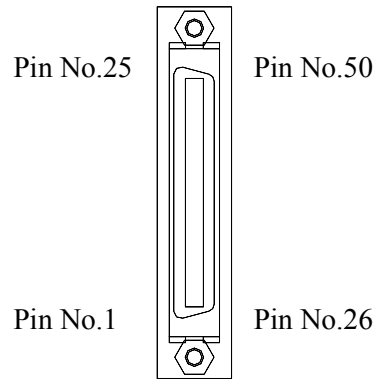
1.2 Parts Names and Functions



1.3 Pin Assignment and Connection of Input Connector

1) Input connector

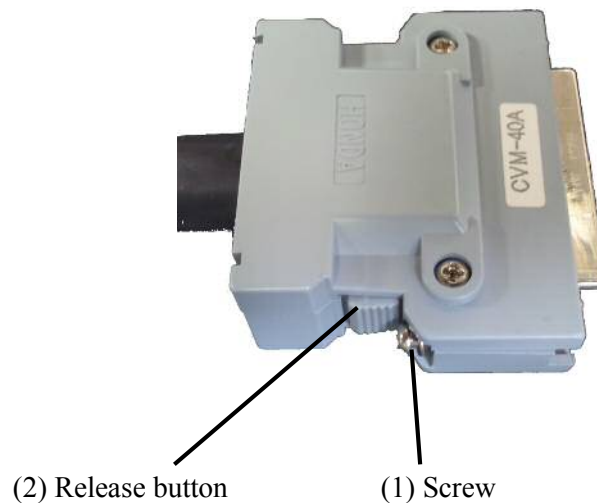
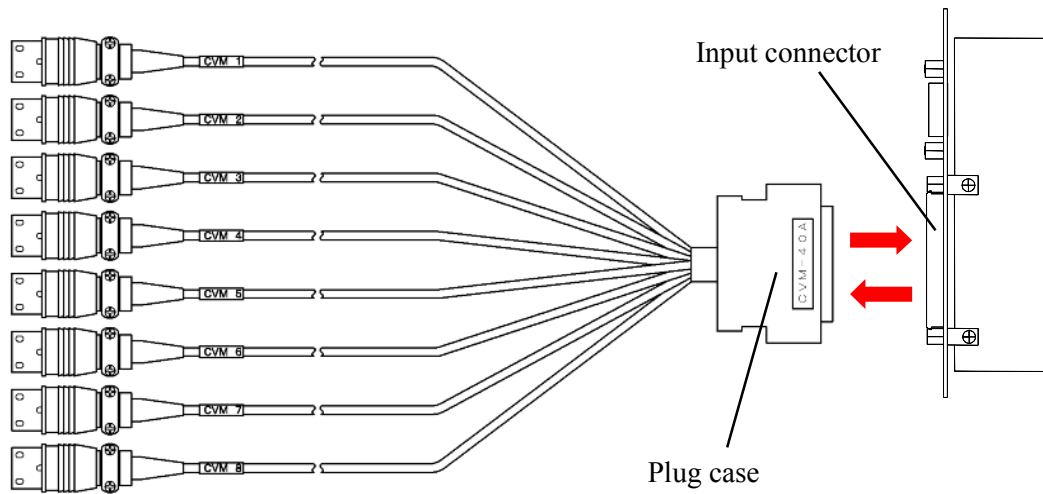
[Pin assignment]



Pin No.	Connection	Pin No.	Connection
25	CH1 A +BV	50	CH1 C -BV
24	CH1 F ID	49	CH1 E,G COM
23	CH1 B -IN	48	CH1 D +IN
22	CH2 A +BV	47	CH2 C -BV
21	CH2 F ID	46	CH2 E,G COM
20	CH2 B -IN	45	CH2 D +IN
19	CH3 A +BV	44	CH3 C -BV
18	CH3 F ID	43	CH3 E,G COM
17	CH3 B -IN	42	CH3 D +IN
16	CH4 A +BV	41	CH4 C -BV
15	CH4 F ID	40	CH4 E,G COM
14	CH4 B -IN	39	CH4 D +IN
13	COM	38	COM
12	CH5 A +BV	37	CH5 C -BV
11	CH5 F ID	36	CH5 E,G COM
10	CH5 B -IN	35	CH5 D +IN
9	CH6 A +BV	34	CH6 C -BV
8	CH6 F ID	33	CH6 E,G COM
7	CH6 B -IN	32	CH6 D +IN
6	CH7 A +BV	31	CH7 C -BV
5	CH7 F ID	30	CH7 E,G COM
4	CH7 B -IN	29	CH7 D +IN
3	CH8 A +BV	28	CH8 C -BV
2	CH8 F ID	27	CH8 E,G COM
1	CH8 B -IN	26	CH8 D +IN

[Connection Method]

CVM input cable: U121 to U-123 (optional)



To connect, hold the plug case, push it into the input connector to be locked. Then, fasten the plug case tightly with the two screws (1).

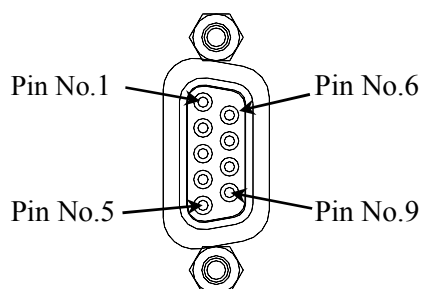
To disconnect, unfasten the two screws (1). Push in the release buttons (2) on the both sides, hold the plug case and pull it.

NOTE

- When you disconnect a cable, do not pull on the cable itself.
Failure to do so will pose the risk of disconnection and connector failure.

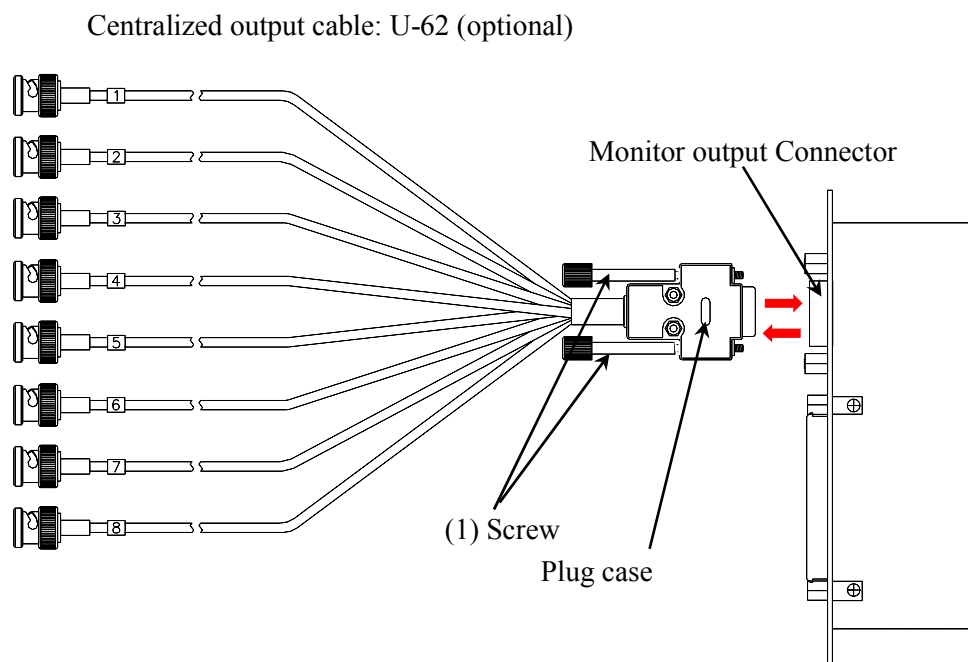
2) Monitor output connector

[Pin assignment]



Pin No.	Signal Name
1	CH1 monitor output
2	CH2 monitor output
3	CH3 monitor output
4	CH4 monitor output
5	CH5 monitor output
6	CH6 monitor output
7	CH7 monitor output
8	CH8 monitor output
9	COM

[Connection Method]



To connect, hold the plug case, push it into the input connector to be locked. Then, fasten the plug case tightly with the two screws (1).

To disconnect, unfasten the two screws (1). Hold the plug case and pull it.

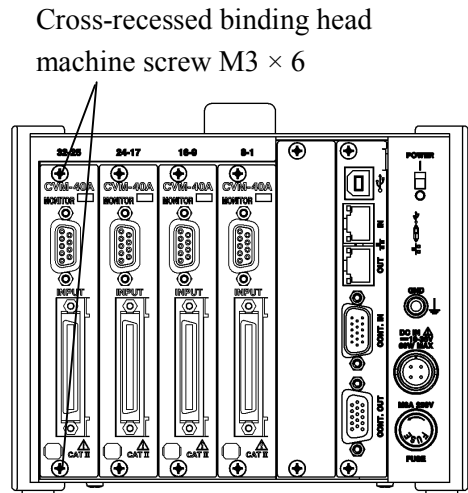
NOTE

- When you disconnect a cable, do not pull on the cable itself.
Failure to do so will pose the risk of disconnection and connector failure.

1.4 Installation of CVM-40A

Always turn OFF the EDX-100A/200A/3000A before installing the CVM-40A.

- (1) Remove the screws at the top and bottom of the already installed card or dummy panel.
- (2) Remove the already installed conditioner card or dummy panel.
- (3) Slowly install the CVM-40A along the guide rail in the EDX-100A/200A/3000A.
- (4) Tighten the screws at the top and bottom of the CVM-40A.



EDX-200A

NOTE

- Always turn OFF the EDX-100A/200A/3000A before installing/removing the CVM-40A.
Or, damage on the CVM-40A or EDX-100A/200A/3000A may result in.
- When installing or removing the CVM-40A in/from the EDX-100A/EDX-200A/EDX-3000A, do not touch any component parts of the CVM-40A.
Or, system failure or damage may result in.
- Always used screwd at the top and bottom of the CVM-40A.

2. CONNECTING SENSORS

The CVM-40A is a conditioner card for a strain gage, strain gage transducer, voltage, and voltage-output-type piezoelectric accelerometer.

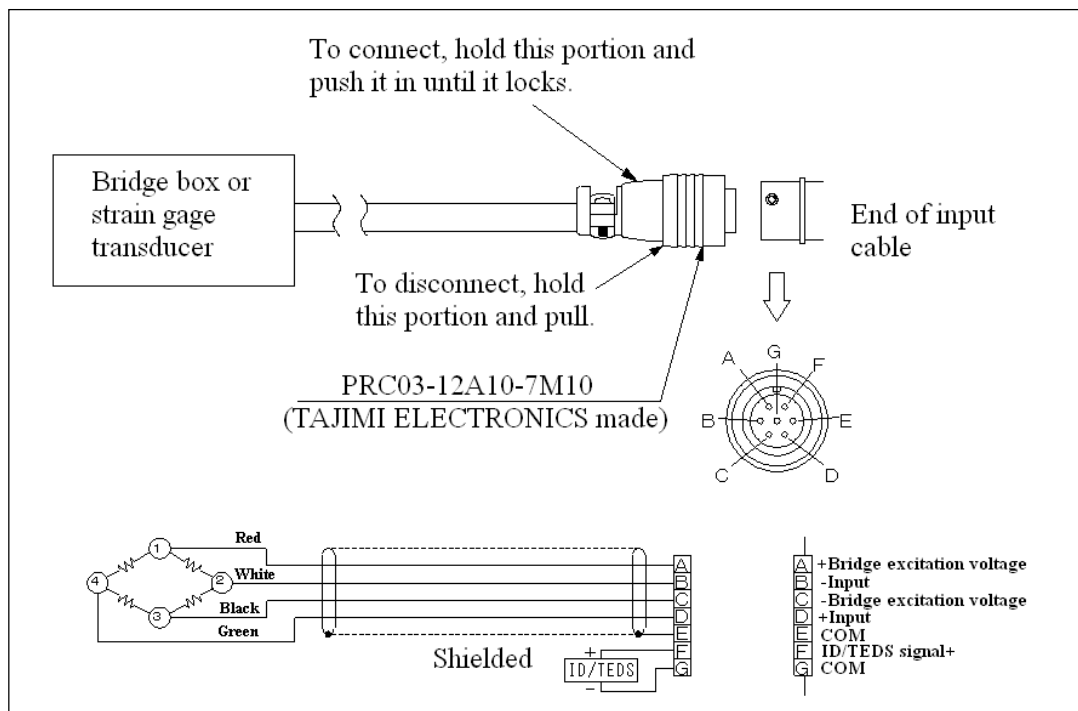
The input cable should be connected as described below.

2.1 When Using a Strain Gage or Strain Gage Transducer

When measuring the output of the strain gage, connect the bridge box to the CVM input cable U-121 to U-123 (optional) as shown in the following figure.

When measuring the strain gage transducer, connect the output connector of the strain gage transducer to the CVM input cable U-121 to U-123 (optional) as shown in the following figure.

Before recording 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-100A/200A/3000A, whichever results in less noise.

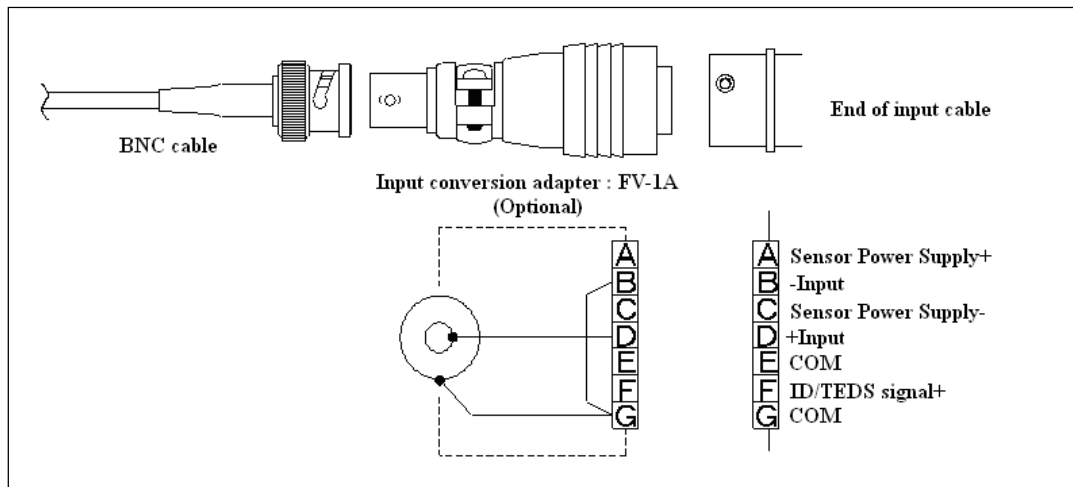


NOTE

- The F terminal (channel input) of the CVM-40A is intended for sensor ID signals (TEDS). Connecting any other signal to this terminal may prevent the EDX-100A/200A/3000A from recognizing all conditioners installed in the system.
- Strain generator: CAB-120E, CAB-350E and WDS-10 are not available because the F and A terminals are short-circuited.
- Transducer with a remote sensing function are not available. It should be noted that when using a transducer with a remote sensing function, always connect by locating the optional connection cable (N-81 to N-85) between the EDX-100A/200A/3000A and the transducer.
- For using an extension cable between an input cable and bridge box or between an input cable and strain gage transducer, use the optional connection cable from N-81 to N-85.

2.2 When Applying an Input Voltage

When measuring the voltage, connect the FV-1A input conversion adapter (optional) to a CVM input cable U-121 to U-123 (optional) as shown in the following figure.

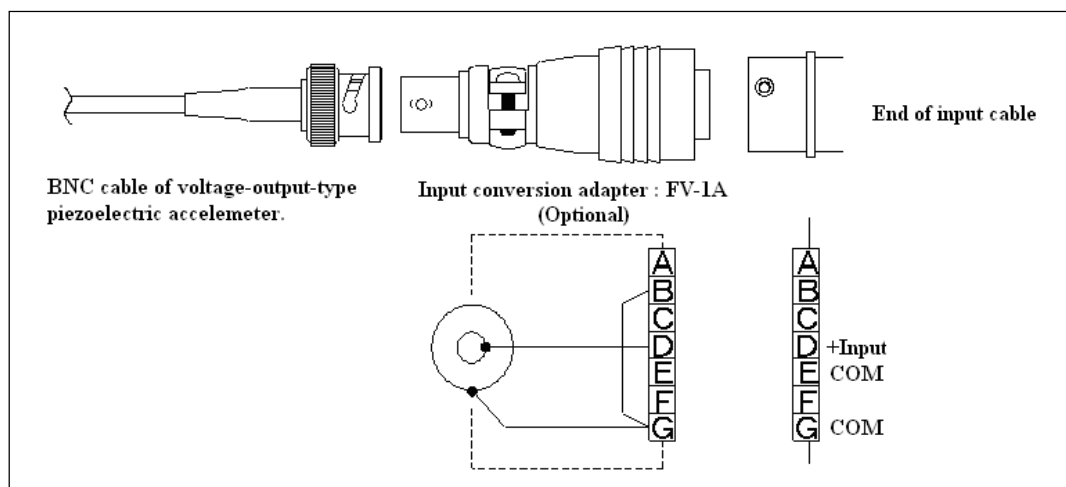


WARNING

- Do not apply any voltage beyond the specified input voltage range.
The specified input voltage range of the CVM-40A is ± 50 V. Failure to do so will pose the risk of electric shock, deteriorated performance and system failure.
- Precautions when measuring the DC voltage of a battery, power supply, etc.
 - 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.
 - Confirm that the voltage between the negative side of the DC voltage and the GND terminal of the EDX-100A/200A/3000A is approximately 0 V.
 - 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 (e.g. DC power supply) of the measuring target in the CVM-40A, thus causing system failure and a fire hazard.

2.3 When Using a Voltage-output-type Piezoelectric Accelerometer

When measuring the voltage-output-type piezoelectric accelerometer, connect the FV-1A input conversion adapter (optional) to a CVM input cable U-121 to U-123 (optional) as shown in the following figure.

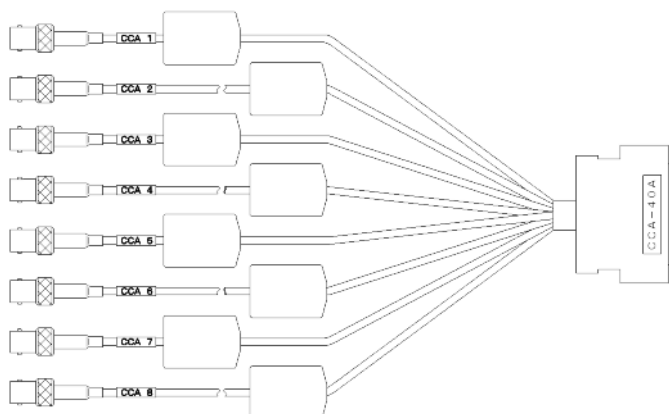


NOTE

- Applicable sensor for the CVM-40A is a voltage-output-type piezoelectric accelerometer. No measurement is allowed if an electric charge output type piezoelectric accelerometer is directly connected.
- The specifications of the sensor power supply is constant-current: 4 mA, applied voltage: approx. 23 V. Take care and always connect appropriate sensors conforming to the specifications. Or, sensor failure may result in.

MEMO

For connecting a voltage-output-type piezoelectric accelerometer, the CCA input cable U-111 (optional) is also available.

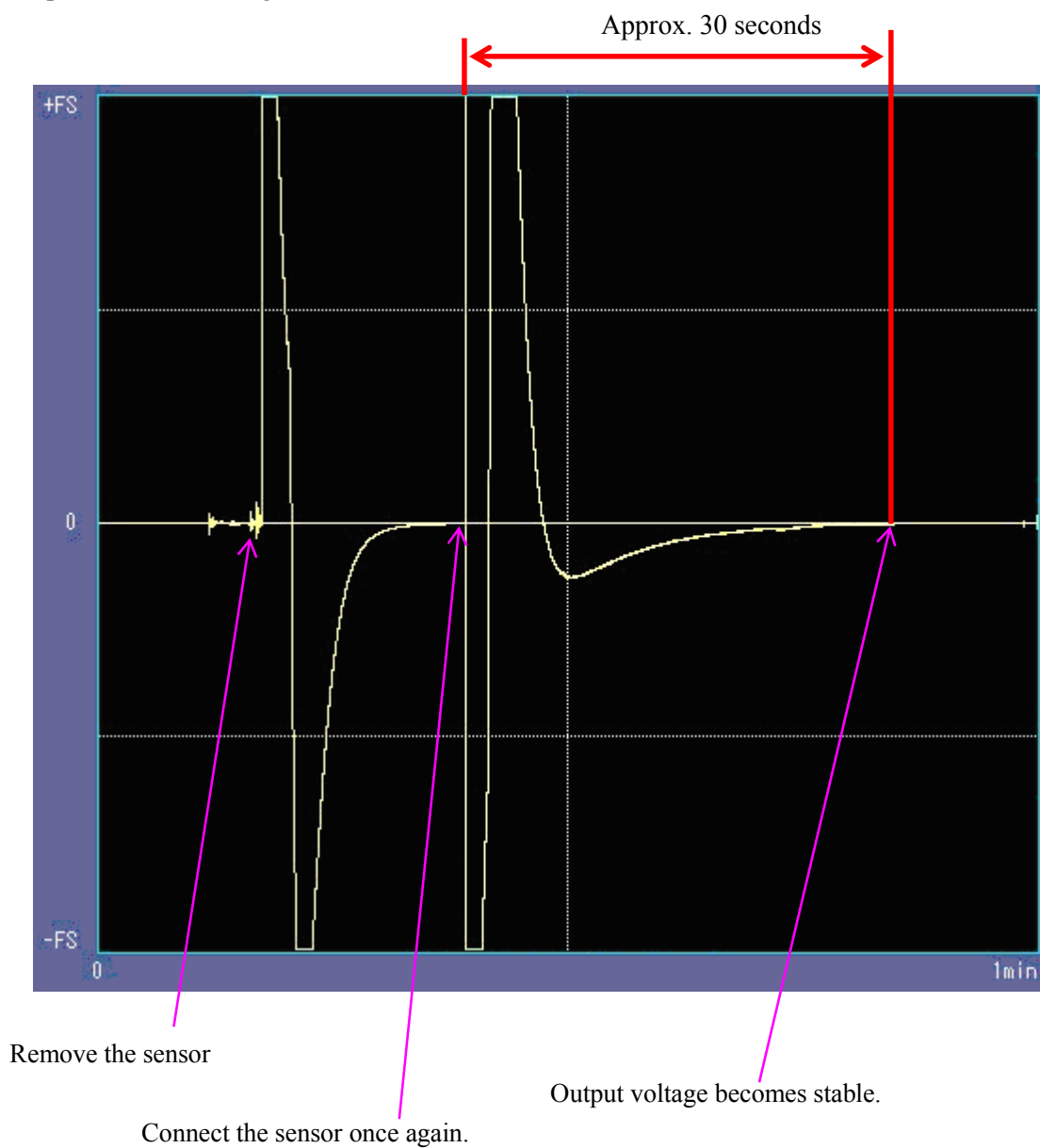


NOTE

With measuring the voltage-output-type piezoelectric accelerometer, when the CVM-40A power is ON, when the input connector is disconnected, when the sensor is removed, when the measuring range is changed, or when excess signal is entered, the output voltage may largely varies. But it is not faulty.

Although the time required until the output voltage becomes stable varies according to sensors in use or CVM-40A measuring range, the output voltage becomes stable in approximately 20 to 40 seconds. Wait for a while until it becomes stable before starting the measurement.

Example: When removing sensors.



3 SETTING CHANNEL CONDITIONS

For the EDX-100A/200A, use the DCS-100A in your PC for settings. For the EDX-3000A, use the EDX-3000A itself or DCS-100A in your PC for settings.

For details, refer to "DCS-100A Instruction Manual for EDX-100A/200A/3000A" and "EDX-3000A Instruction Manual for Hardware."

3.1 List of Channel Conditions

Set the following channel conditions from the item 1) to item 8) on the "Set CH Condition" window.

For items not described in the following table, refer to "DCS-100A Instruction Manual for EDX-100A/200A/3000A" and "EDX-100A/200A/3000A Instruction Manual for Hardware."

Item	1) Measurement ON/OFF	2) Mode	3) Range	4) High Pass Filter	5) Low Pass Filter	6) Balance	7) CAL	8) CAL Range
Selections	ON	Strain (2 V)	5000 $\mu\text{m}/\text{m}$ 10 $\mu\text{m}/\text{m}$ 50 $\mu\text{m}/\text{m}$ 100 $\mu\text{m}/\text{m}$ 500 $\mu\text{m}/\text{m}$ OFF	OFF 0.2 Hz 1 Hz	FLAT 3 kHz 1 kHz 300 Hz 100 Hz 30 Hz AUTO	OFF ON NONE	ON OFF	100 % 50 % SHUNT
		Strain (5 V)	5000 $\mu\text{m}/\text{m}$ 10 $\mu\text{m}/\text{m}$ 50 $\mu\text{m}/\text{m}$ 100 $\mu\text{m}/\text{m}$ 200 $\mu\text{m}/\text{m}$ OFF					
		Voltage Voltage (2 V) Voltage (5 V)	1.0 V 5.0 V 10.0 V 50.0 V OFF					100 % 50 %
		Acc.	100 mV 500 mV 1000 mV 5000 mV OFF					DC100% DC50%
	OFF							

3.2 Details of Channel Conditions

1) Measurement ON/OFF

Select the measurement ON/OFF for each channel.

ON ☒ : Measure

OFF ☐ : Not measure

2) Mode

Select the mode that matches the target.

Strain (2 V) : For strain measurement with excitation voltage 2 V

Strain (5 V) : For strain measurement with excitation voltage 5 V

Voltage : For voltage measurement with sensor power supply OFF

Voltage (2 V) : For voltage measurement with sensor power supply 2 V

Voltage (5 V) : For voltage measurement with sensor power supply 5 V

Acc. : For voltage-output-type piezoelectric accelerometers

NOTE

The applicable bridge resistance of the CVM-40A is as follows.

120 to 1000 ohm (when the excitation voltage: 2 V)

350 to 1000 ohm (when the excitation voltage: 5 V)

Take care and always connect appropriate sensors conforming to the specifications. Or, damage on the CVM-40A or sensors may result in.

3) Range

Select an appropriate measuring range according to the rated output of the sensor, estimated maximum output, etc.

- For the strain (2 V) mode
5000μm/m, 10kμm/m, 50kμm/m, 100kμm/m, 500kμm/m, OFF
- For the strain (5 V) mode
5000μm/m, 10kμm/m, 50kμm/m, 100kμm/m, 200kμm/m, OFF
- For the voltage, voltage (2 V), and voltage (5 V) mode
1.0V, 5.0V, 10.0V, 50.0V, OFF
- For the Acc. mode
100mV, 500mV, 1000mV, 5000mV, OFF

MEMO

- It is required to select an appropriate measuring range according to the magnitude of the input signal. In addition, set the measuring range by considering the following.
 - When the input signal is exceedingly smaller than the preset measuring range, measuring accuracy may decrease.
 - When the input signal is larger than the preset measuring range, both recording data and monitor output signal become saturated.
 - The smaller the measuring range is, the higher becomes the gain of the CVM-40A. Therefore, the noise tends to become larger.
- Set the “Range” to OFF. The excitation voltage and sensor power supply are automatically set to OFF (0 V). The measured value indicates 0 as well.

4) High Pass Filter

Select the high pass filter ON (AC coupling)/OFF (DC coupling) for each channel.

For the strain measurement and voltage measurement.

OFF : High Pass Filter OFF

0.2 Hz : High Pass Filter ON with the cutoff frequency 0.2 Hz

1 Hz : High Pass Filter ON with the cutoff frequency 1 Hz

5) Low Pass Filter

Select the cutoff frequency of the low pass filter of the fifth order Butterworth type.

FLAT : Low-Pass Filter OFF

3 kHz : Low Pass Filter ON with the cutoff frequency 3 kHz

1 kHz : Low Pass Filter ON with the cutoff frequency 1 kHz

300 Hz : Low Pass Filter ON with the cutoff frequency 300 Hz

100 Hz : Low Pass Filter ON with the cutoff frequency 100 Hz

30 Hz : Low Pass Filter ON with the cutoff frequency 30 Hz

AUTO : Low Pass Filter ON with the cutoff frequency set to 1/4 of the sampling frequency.

Resulting to turn ON the antialiasing filter.

* Usable cutoff frequency range is 30 Hz or more.

MEMO

Using the low pass filter enables to remove high frequency component in the sensor output signal.

It is especially effective for output signal with exceeding noise.

When the input signal sinusoidally (sin functionally) varies, set the low-pass filter to around 2 to 5 times as large as the input signal frequency. If the input signal rapidly changes, set the low-pass filter to approximately 10 times as large as the input signal frequency.

6) Balance

Select the auto-balancing ON/OFF/NONE (or zero-suppress ON/OFF/NONE) for each channel.

When the strain mode and Balance ON (or OFF) are selected, the input unbalance is (not) balanced utilizing the analog circuit. When the strain mode and Balance NONE are selected, the auto-balancing function is invalid. Thus the input unbalance is not balanced. The ZERO balance value of the transducer, strain gage bridge, etc. can be checked.

When the voltage mode and Balance ON (or OFF) are selected, the input voltage is (not) balanced utilizing the analog circuit. When the voltage mode and Balance NONE are selected, the zero-suppress function is invalid. Thus the input voltage is not unbalanced. The input voltage appears as the measured value.

OFF : The auto-balancing function is not conducted (auto-balancing function is valid.)

When conducting the BAL, the auto-balancing function is not conducted and the measured value appears.

ON : Auto-balancing function is conducted (auto-balancing function is valid.)

When conducting the BAL, the auto-balancing function is conducted, the measured value is balanced and 0 appears.

NONE : Auto-balancing function is invalid.

7) CAL

Select the CAL ON/OFF for each channel.

ON ☒ : Allowed for outputting the CAL value.

When conducting the CAL, the CAL value pre-set in the CAL range is output.

OFF ☐ : Not allowed for outputting the CAL value.

8) CAL Range

- For the strain (2 V) mode and strain (5 V) mode
 - 100% : When conducting the CAL, DC volt of $\pm 100\%$ of the measuring range is output.
 - 50 % : When conducting the CAL, DC volt of $\pm 50\%$ of the measuring range is output.
 - SHUNT : Connect a fixed resistance between the [+BV] and [+IN] of the strain gage bridge. A certain value based on the fixed resistance appears.
- For the voltage, voltage (2 V), and voltage (5 V) mode
 - 100% : When conducting the CAL, DC volt of $\pm 100\%$ of the measuring range is output.
 - 50 % : When conducting the CAL, DC volt of $\pm 50\%$ of the measuring range is output.
- For the Acc. mode
 - DC 100% : When conducting the CAL, DC volt of $\pm 100\%$ of the measuring range is output.
 - DC 50 % : When conducting the CAL, DC volt of $\pm 50\%$ of the measuring range is output.

NOTE

When SHUNT is selected

Connect a fixed resistance between the [+BV] and [+IN] of the strain gage bridge. A certain value based on the fixed resistance appears.

The output value is determined by the bridge resistance of the strain gage bridge irrespective of the Range and CAL range.

$$\text{Output value}[\mu\text{m/m}] = \frac{\text{Bridge Resistance}[\text{ohm}]}{1360 \times 10^3} \times 10^6$$

Output value for each bridge resistance is described in the following.

Bridge Resistance [ohm]	Output value [$\mu\text{m/m}$]*
120	Approx. 88
240	Approx. 176
350	Approx. 257
700	Approx. 515
1000	Approx. 735

* The +CAL and -CAL output the same value. The accuracy is approx. $\pm 5\%$

4. SPECIFICATIONS

4.1 Hardware Specifications

Item	Strain measurement	Voltage measurement	Acceleration measurement
Number of measuring channels	8		
Measuring Items	Strain gage Strain Gage Transducer	Voltage	Voltage-output-type Piezoelectric accelerometer (with built-in amplifier)
Input Form	Balance differential input	Balance differential input * ¹ * ²	Unbalance differential input * ³
Input Impedance	—	Within (1 Mohm + 1 Mohm) $\pm 10\%$ * ⁴	—
Excitation Voltage Sensor Power Supply	Constant-voltage Excitation voltage 2 V: 2 VDC $\pm 0.5\%$ Excitation voltage 5 V: 5 VDC $\pm 0.5\%$	Constant-voltage 2 VDC, 5 VDC, or OFF 20 mA/CH or less	Constant-current: 4 mA Applied voltage: Approx. 23 VDC Load: 1 kohm or less
Applicable gage factor	2.00 fixed	—	—
Applicable Bridge Resistance	Excitation voltage 2 V: 120 to 1000 ohm Excitation voltage 5 V: 350 to 1000 ohm	—	—
Auto-balancing Function (zero-suppress function)	[Auto-balancing function is valid: ON and OFF] The input unbalance is balanced utilizing the analog circuit, the measured value is balanced and 0 appears. [Auto-balancing function is invalid: NONE] The input unbalance is not balanced. (The ZERO balance value of the transducer, strain gage bridge, etc. can be checked.)	[Zero-suppress function is valid: ON and OFF] The input voltage is balanced utilizing the analog circuit, the measured value is balanced and 0 appears. [Zero-suppress function is invalid: NONE] The input voltage is not balanced utilizing the analog circuit. (The input voltage appears.)	—
Auto-balancing Function Range (Zero-suppress function range)	Excitation voltage 2 V: Resistance $\pm 10\%$ ($\pm 50000 \mu\text{m/m}$) Excitation voltage 5 V: Resistance $\pm 4\%$ ($\pm 20000 \mu\text{m/m}$)	$\pm 5 \text{ V}$	—
Measuring Range	Excitation voltage 2 V: 5 steps of 5k, 10k, 50k, 100k, and 500k $\mu\text{m/m}$ Excitation voltage 5 V: 5 steps of 5k, 10k, 50k, 100k, and 200k $\mu\text{m/m}$	4 steps of 1, 5 10, and 50 V	4 steps of 100, 500, 1000, 5000 mV
Range Accuracy	Within $\pm 0.2\%$ FS		Within $\pm 1.0\%$ FS
CAL Value SHUNT CAL	$\pm 100\%$, $\pm 50\%$ of each range and SHUNT * ⁵	$\pm 100\%$, $\pm 50\%$ of each range	
Nonlinearity	Within $\pm 0.1\%$ FS		Within $\pm 0.2\%$ FS

Item	Strain measurement	Voltage measurement	Acceleration measurement
Frequency response range	DC coupling: DC to 5 kHz, Deviation: +1 dB or -3 dB AC coupling: 0.2, 1 Hz to 5 kHz (Refer to the high-pass filter.)		0.5 Hz to 5 kHz Deviation: +1 dB or -3 dB
Low Pass Filter	Fifth order Butterworth Cutoff frequency: 7 steps of 30, 100, 300, 1k, 3k Hz, F (Flat) and AUTO * ⁶ Cutoff accuracy: Within -3 $\pm$ 1 dB, Attenuation: -30 $\pm$ 3 dB/oct.		
High Pass Filter	Cutoff frequency: 2 steps of 0.2 Hz or 1 Hz Attenuation: -6 dB/oct.		—
Resolution	24 bits * ⁷		
Distortion	—		1% or less
Monitor Output	Accuracy: Within ± 5 V $\pm 0.5\%$ (for full scale in plus and minus directions), Nonlinearity Within $\pm 0.5\%$ FS		
Dimensions	22(W) $\times$ 119(H) $\times$ 213(D)mm Protruded portion not included		
Weight	Approx. 400 g		
Additional Function	Reading information of TEDS-installed sensor		

*1 When using the FV-1A input conversion adapter, the input form is unbalance differential input.

*2 Input common-mode voltage: ± 20 VDC, absolute input voltage: ± 50 V

*3 The input conversion adapter FV-1A is available.

*4 When using the FV-1A input conversion adapter (input form: unbalance differential input), the input impedance is within 1 Mohm $\pm 10\%$.

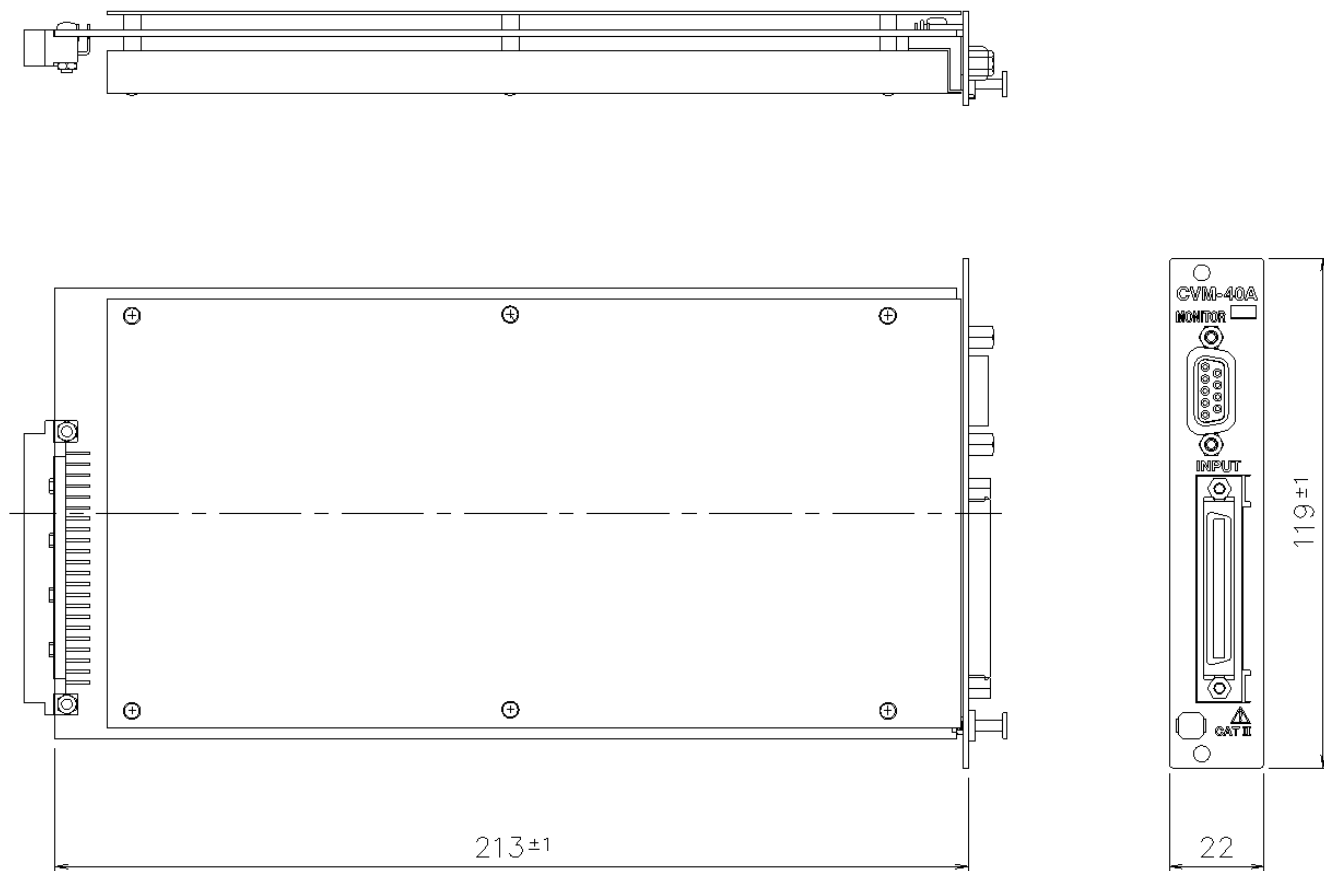
*5 When connecting the fixed resistance of 350 ohm, the SHUNT CAL outputs approx. 257 $\times \mu\text{m/m}$.

*6 AUTO: Low-Pass Filter ON with the cutoff frequency set to 1/4 of the sampling frequency.

Resulting to turn ON the antialiasing filter function.

*7 When the CVM-40A is installed into the EDX-200A/3000A. (When the CVM-40A is installed into the EDX-100A, the resolution is 16 bits.)

4.2. Outside Drawings



5 OPTIONAL ACCESSORIES

CVM input cable: U-121, U-122, U-123

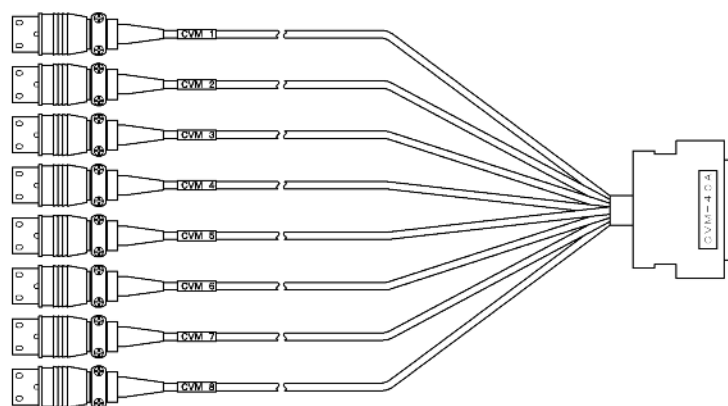
The input connector is connected.

For how to connect the centralized input cable, see “1-3 PIN ASSIGNMENT AND CONNECTION OF CONNECTORS.”

U-121···Cable length: Approx. 0.5 m

U-122···Cable length: Approx. 1.0 m

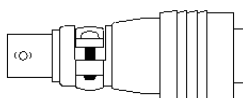
U-123···Cable length: Approx. 1.5 m



Input conversion adapter:FV-1A

For connecting a BNC connector, connect the input conversion adapter FV-1A into the input connector (one-touch type).

Used for measuring voltage and voltage-output-type piezoelectric accelerometers.

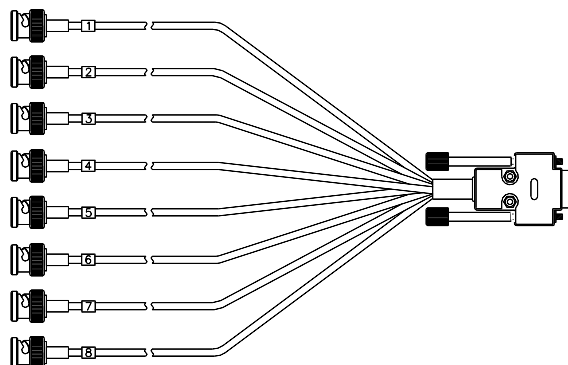


Centralized output cable: U-62

By connecting a centralized output cable U-62 into a monitor output connector, monitoring data is allowed for every BNC connector.

For how to connect the centralized output cable, see “1-3 PIN ASSIGNMENT AND CONNECTION OF CONNECTORS.”

Cable length: Approx. 1.0 m

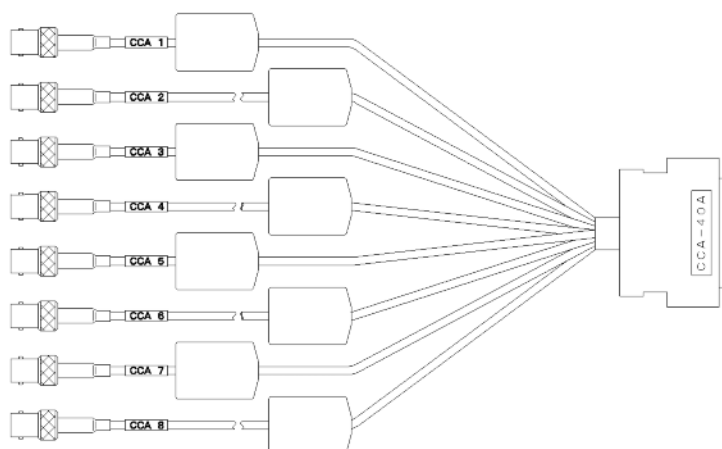


CCA input cable: U-111

The input connector is connected.

Capable of connecting a BNC connector for measuring voltage and voltage-output-type piezoelectric accelerometers.

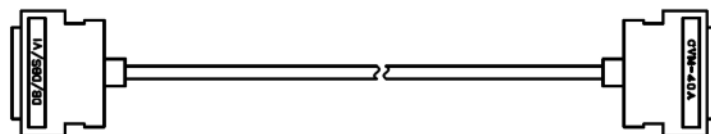
Cable length: Approx. 1.0 m



CVM concentrated input cable: N-118

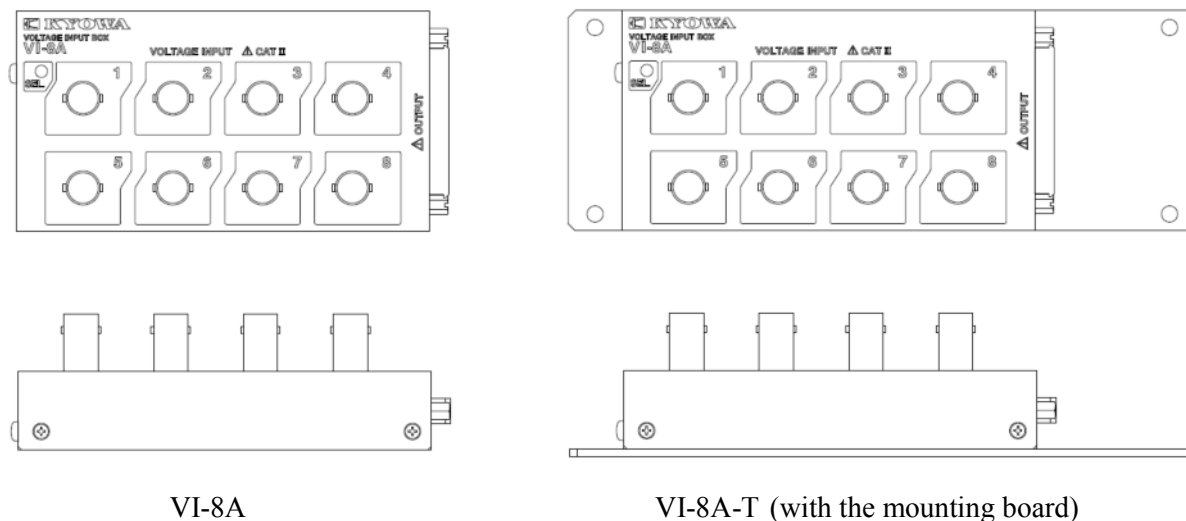
For connecting the voltage input box VI-8A, small-sized bridge box for 1-gage system DBS-120A-8/-350A-8, or one-touch lock type bridge box DB-120V-8/-350V-8 into the CVM-40A.

Cable length: Approx. 1.5 m



Voltage Input Box: VI-8A

Capable of gathering signals from 8 BNC connectors into one for measuring voltage and voltage-output-type piezoelectric accelerometers.



Small-sized bridge box for 1-gage system: DBS-120A-8, DBS-350A-8

Small-sized 8-channel bridge box for strain measurements

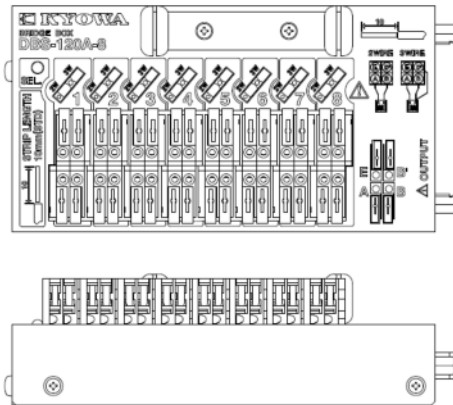
For the 1-gage 2-wire system and 1-gage 3-wire system.

DBS-120A-8···For the gage resistance of 120 ohm

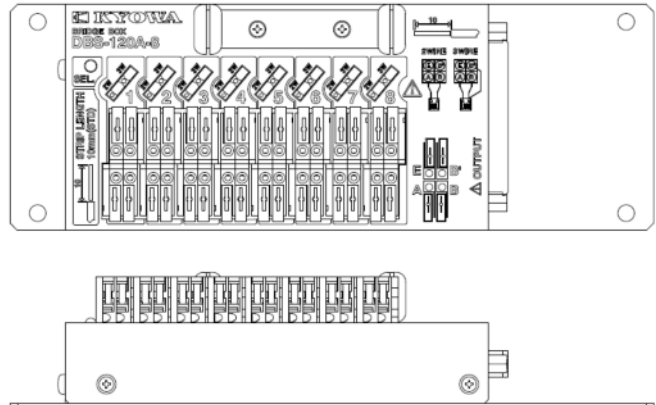
DBS-120A-8T···For the gage resistance of 120 ohm with the mounting board

DBS-350A-8···For the gage resistance of 350 ohm

DBS-350A-8T···For the gage resistance of 350 ohm with the mounting board



DBS-120A-8/350A-8



DBS-120A-8T/350A-8T (with the mounting board)

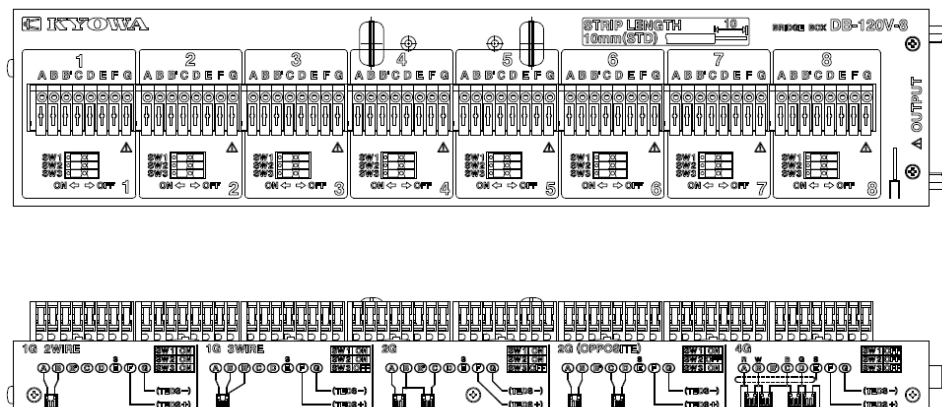
One-touch lock type bridge box: DB-120V-8, DB-350V-8

8-channel bridge box for strain measurements

For the 1-gage 2-wire system, 1-gage 3-wire system, 2-gage system, opposite side 2-active-gage system, and 4-gage system.

DB-120V-8···For the gage resistance of 120 ohm

DB-350V-8···For the gage resistance of 350 ohm



6 APPENDIX

6.1 Time Lag between Conditioner Cards

When inputting the same strain signal or the same voltage signal into the CVM-40A and CDV-40B/A at the same time, time lag occurs between the data of the CVM-40A and that of the CDV-40B/A. Time lag occurs due to the difference of the frequency response, low-pass filter circuit, and A/D converter included in every conditioner card. Time lag also occurs when inputting the same acceleration signal into the CVM-40A and CCA-40A (-F).

Note:

No time lag occurs since the CVM-40A and CCA-40A (-F) has the same low-pass filter circuit and A/D converter. No time lag occurs between channels in one conditioner card.

The low-pass filter, time lag between the CVM-40A and CDV-40B/A (-F) and time lag between the CVM-40A and CCA-40A (-F) are as follows.

(1) For the strain mode and voltage mode

Table 6-1 The low-pass filter and time lag between the CVM-40A and CDV-40B/A (-F)

Low-pass filter of the CVM-40A, CDV-40B/A (-F) [Hz]	Sampling Frequency (Hz)	Frequency response of the CVM-40A [Hz] (*1)	Time lag of the CVM-40A [μsec]
FLAT		5k	Approx. +436
3k		3k	Approx. +464
1k		1k	Approx. +657
300		300	Approx. +1828
100		100	Approx. +3759
30		30	Approx. +15515
AUTO	50k or more	5k	Approx. +369 (*2)
	20k	5k	Approx. +284 (*2)
	10k	2.5k	Approx. +224
	5k	1.25k	Approx. +104
	2k	500	Approx. -311
	1k	250	Approx. -570
	500	125	Approx. -1776
	200	50	Approx. -5921
	100	25	Approx. -11930
	32768 or more	5k	Approx. +337 (*2)
	16384	4096	Approx. +265
	8182	2048	Approx. +186
	4096	1024	Approx. -7.7
	2048	512	Approx. -307
	1024	256	Approx. -545
	512	128	Approx. -1726
	256	64	Approx. -4612
	128	32	Approx. -5833

*1 The frequency of the input waveform (sine wave) is 1/10 of the frequency response.

*2 With the same frequency response (5k Hz), the time lags are different due to the sampling frequency.

(2) For the Acc. mode

Table 6-2 The low-pass filter and time lag between the CVM-40A and CCA-40A (-F)

Low-pass filter of the CVM-40A, CCA-40A (-F) [Hz]	Sampling Frequency (Hz)	Frequency response of the CVM-40A [Hz] (*1)	Time lag of the CVM-40A [μsec]
FLAT		5k	Approx. +436
3k		3k	Approx. +464
1k		1k	Approx. +657
300		300	Approx. +1828
100		100	----- (*2)
30		30	----- (*2)
AUTO	50k or more	5k	Approx. +369 (*3)
	20k	5k	Approx. +284 (*3)
	10k	2.5k	Approx. +224
	5k	1.25k	Approx. +104
	2k	500	Approx. -311
	1k	250	Approx. -570
	500	125	Approx. -1776
	200	50	Approx. -5921
	100	25	Approx. -11930
	32768 or more	5k	Approx. +337 (*3)
	16384	4096	Approx. +265
	8182	2048	Approx. +186
	4096	1024	Approx. -7.7
	2048	512	Approx. -307
	1024	256	Approx. -545
	512	128	Approx. -1726
	256	64	Approx. -4612
	128	32	Approx. -5833