

INSTRUCTION MANUAL

DPM-42B/DPM-42B-I

DPM-42B-F/DPM-42B-I-F

DYNAMIC STRAIN AMPLIFIER CARD for EDX SERIES

Thank you for purchasing KYOWA's product

DPM-42B/DPM-42B-I/DPM-42B-F/DPM-42B-I-F Dynamic Strain Amplifier
Card for EDX series.

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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This Manual describes the DPM-42B/DPM-42B-I/DPM-42B-F/DPM-42B-I-F Dynamic Strain Amplifier Card (hereinafter referred to as the DPM cards) for the EDX series.

Differences in specifications among the above cards are described in the following table.

Model	Anti-inverter-noise function	Anti-aliasing filter function
DPM-42B		
DPM-42B-I	✓	
DPM-42B-F		✓
DPM-42B-I-F	✓	✓

✓: Available

STANDARD ACCESSORIES

The following accessories are packed with the DPM cards.

When unpacking, check the contents to ensure that all accessories are enclosed.

Please read first	1
Product Warranty	1

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

The DPM card is designed to be used according to "3. SPECIFICATIONS." Do not use the DPM card in an environment exceeding the range of the above specifications of the EDX series. Or, system failure may result in.

PRIOR TO USE

For safe use of the DPM card, 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 DPM card, 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 Be sure to observe the warning and precautions described in the EDX series Instruction Manual.

 CAUTION
• CAUTION Be sure to observe the caution and precautions described in the EDX series Instruction Manual. • When installing or removing the DPM card in/from the EDX series, do not touch any component parts of the DPM card. Or, system failure or damage may result in. • The DPM card is designed to be used for strain gage and strain gage transducer by installing in the EDX series. Be sure to use strain gages and strain gage transducers only. Or, the DPM card as well as sensors may be damaged. • Use a shielded cable as an input/output cable. • Conduct the internal calibration when changing the Low Pass Filter setting to or from "AUTO".

LIMITED LIFE PARTS AND PREVENTIVE MAINTENANCE

The DPM card 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 DPM card, 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 DPM card.

To operate the DPM card normally, finding a sign of the DPM card 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 DPM card are aluminum electrolytic capacitors and relays.

* All components do age and will fail.

DPM CARD 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 DPM card. Regardless of the replacement parts, the DPM card itself gradually deteriorates with age. Before the expected service life is reached, consider replacing the DPM card 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 SME series and DPM card, and to information provided for reference purposes.

Examples of Notations

NOTE

Essential precautions required when handling the DPM card.

MEMO

Reference items required when handling the DPM card.

1. OUTLINE OF THE PRODUCT

1-1 OUTLINE OF THE DPM CARDS

The DPM card is designed to be used for strain gage and strain gage transducer by installing in the EDX series.

Carrier wave of approximately 12 kHz is used for bridge excitation.

Capable of 4-channel measurement with 1 DPM card.

Monitor output of CHs is $\pm 5V$ with full scale of each range.

The DPM card is isolated between input and output.

The DPM card is isolated between input channels and is not isolated between outputs.

1-2 OUTLINE OF THE DPM-42B-I/42B-I-F

The DPM-42B-I/42B-I-F can measure data precisely by reducing inverter noise.

1-3 OUTLINE OF THE DPM-42B-F/42B-I-F

The DPM-42B-F/-42B-I-F card is a DPM-42B (-I) conditioner card provided with anti-aliasing filter function. Using the anti-aliasing filter function prevents aliasing caused by sampling.

The anti-aliasing filter of the DPM card is composed of eighth order butterworth filter and attenuation obtained by entering 1/2 of sampling frequency is -48 ± 5 dB.

Since the anti-aliasing filter can be switched to ON/OFF, the DPM card can be used without using the anti-aliasing filter.

In addition, since switching ON/OFF of the anti-aliasing filter can be selected for every CH, you can select whether CH is using/ not using the anti-aliasing filter even in the same card.

Cutoff frequency of the anti-aliasing filter automatically changes when setting the sampling frequency of the EDX series. Therefore, it is not required set the low pass filter. In addition, you can also use it when entering the external clock.

Differences in specifications among the above cards are described in the following table.

Model	Anti-inverter-noise function	Anti-aliasing filter function
DPM-42B		
DPM-42B-I	✓	
DPM-42B-F		✓
DPM-42B-I-F	✓	✓

✓ : Available

1-4 PRECAUTIONS FOR USING DPM CARDS

Although the DPM card is correctly installed in the slot of the EDX series, if "DISABLE" or "UNKNOWN" is displayed as the "Card Type" on the system menu screen, it is required to update the EDX series hardware. Contact our representative for updating the EDX series hardware.

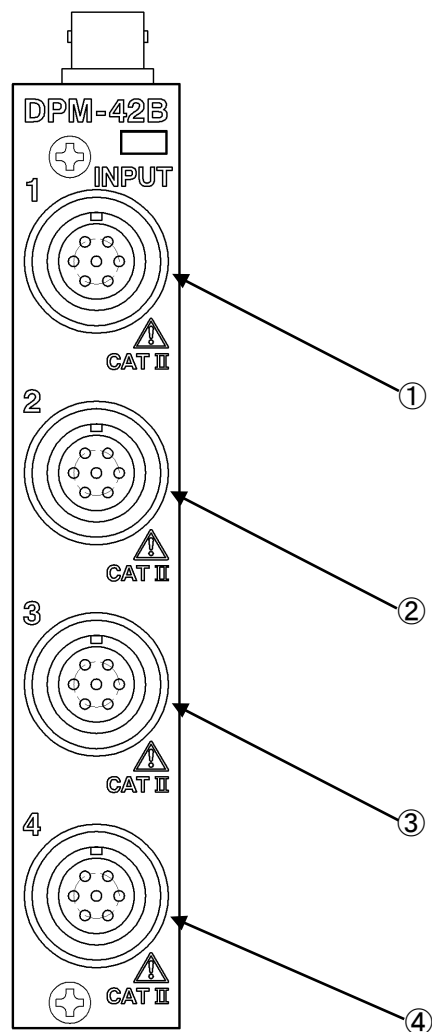
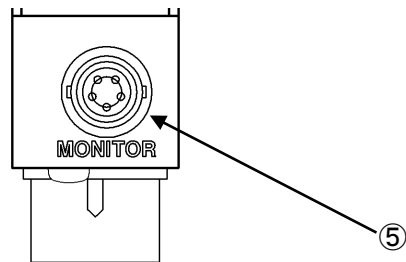
After the power ON, the DPM card requires a certain time to become stable.
To have the stable measurement, preheat for more than 30 minutes.

1-5 PRECAUTIONS FOR USING DPM-42B-F/42B-I-F

Cutoff frequency of the anti-aliasing filter is set to 1/4 of the sampling frequency. Set the sampling frequency to at least more than 4 times the predicted input frequency.

Compatible sampling frequency range of the anti-aliasing filter is 100 Hz or more.

1-6 CONTROLS AND INDICATORS



- ① Input connector 1
- ② Input connector 2
- ③ Input connector 3
- ④ Input connector 4
- ⑤ Monitor output connector

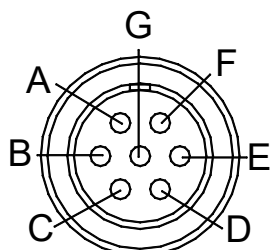
Input connector of the 1st channel.
 Input connector of the 2nd channel.
 Input connector of the 3rd channel.
 Input connector of the 4th channel.
 Monitor output connector.
 Monitor output of CHs is $\pm 5V$ with full scale of each range.
 Monitor output cable is connected.

1-7 PIN ASSIGNMENT AND CONNECTION OF INPUT CONNECTOR

[Pin assignment]

① Input connector

DPM-42B
(TAJIMI ELECTRONICS CO., LTD.)



Pin assignment of input connectors

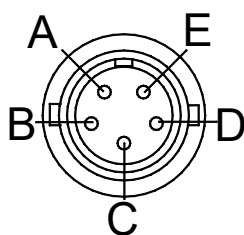
Pin No.	Signal Name
A	+ Bridge Excitation
B	- Input
C	- Bridge Excitation
D	+ Input
E	FG (GND)
F	ID signal +
G	FG (GND)

Channel No. of the input connector shall be as follows according to slot into which the DPM card is installed in the EDX series.

Slot Input connector	1	2	3	4	5	6	7	8
1	CH1	CH9	CH17	CH25	CH33	CH41	CH49	CH57
2	CH2	CH10	CH18	CH26	CH34	CH42	CH50	CH58
3	CH3	CH11	CH19	CH27	CH35	CH43	CH51	CH59
4	CH4	CH12	CH20	CH28	CH36	CH44	CH52	CH60

*Slot No. 1: EDX series power supply connector side.

② Monitor output connector



Pin assignment of monitor output connectors

Pin No.	Signal Name
A	Monitor output of the 1st channel
B	Monitor output of the 2nd channel
C	Monitor output of the 3rd channel
D	Monitor output of the 4th channel
E	Monitor output of COM

When the DPM card is installed in each slot, pin assignment of the monitor output connectors shall be as described in the following table.

Slot Pin No.	1	2	3	4	5	6	7	8
A	CH1	CH9	CH17	CH25	CH33	CH41	CH49	CH57
B	CH2	CH10	CH18	CH26	CH34	CH42	CH50	CH58
C	CH3	CH11	CH19	CH27	CH35	CH43	CH51	CH59
D	CH4	CH12	CH20	CH28	CH36	CH44	CH52	CH60

MEMO

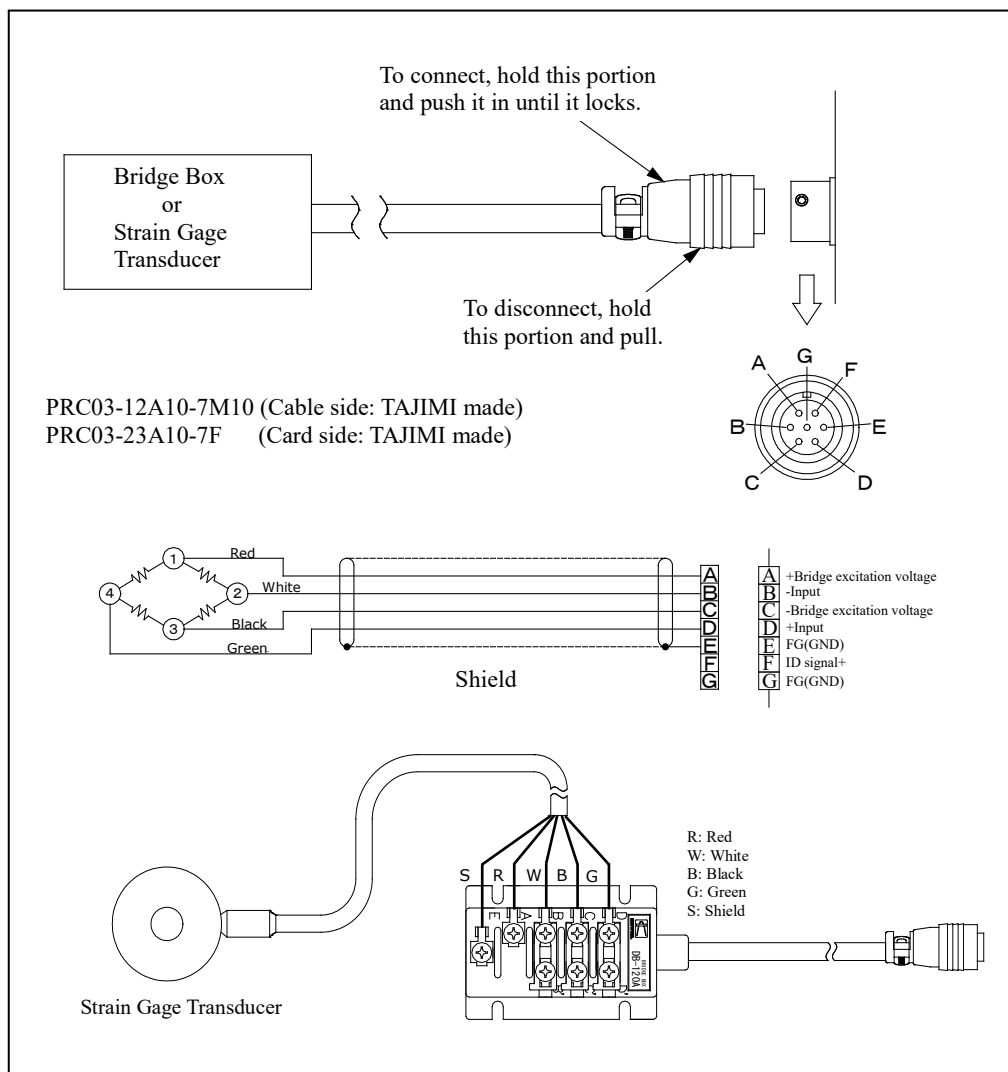
Monitor output cable (H-10296) connected to the monitor output connector is optional accessory.
For details, see "4 OPTIONAL ACCESSORIES."

[Connection Method]

(1) When connecting a bridge box or strain gage transducer to the input connector.

For how to connect the DPM card to a bridge box, see "Measurement Memo: How to Assemble a Bridge Gage Bridge" in KYOWA's union catalog or bridge box instruction manual.

When one end of the strain gage transducer is equipped with no plug, there are 2 ways for connecting the strain gage transducer to the DPM card. One is to connect conductors to a plug in advance and the other is to connect by using a bridge box. How to connect conductors is described in the following figure.



NOTE

The DPM card is designed to be used for strain gage and strain gage transducer by installing in the EDX series. Be sure to use strain gages and strain gage transducers only.

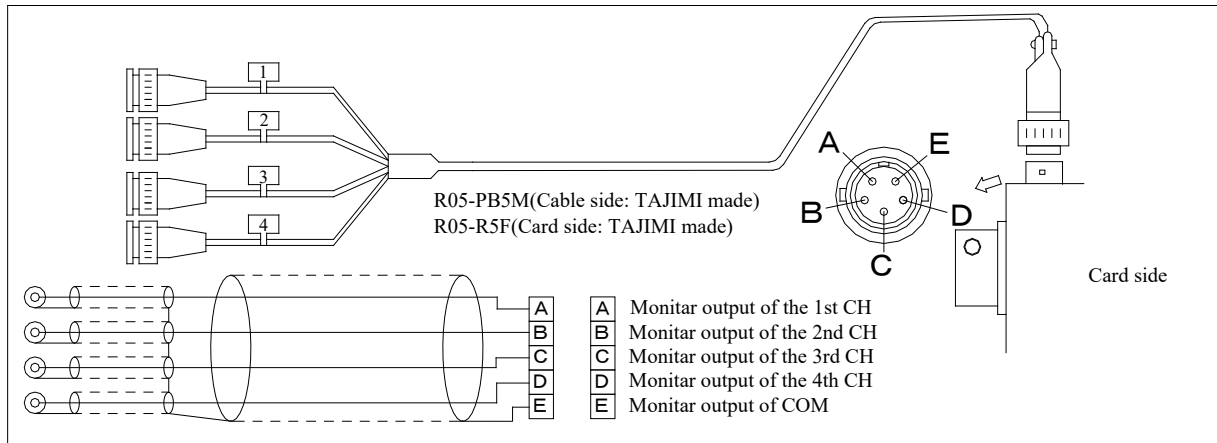
When connecting a sensor for the first time or when the sensor is re-connected, do not forget to execute internal sensitivity compensation. (For details, see appropriate "Setting Internal Sensitivity Compensation" section.)

(2) When connecting a monitor output cable to a monitor output connector

Connect the optional monitor output cable [H-10296].

How to connect the monitor output cable is described in the following figure.

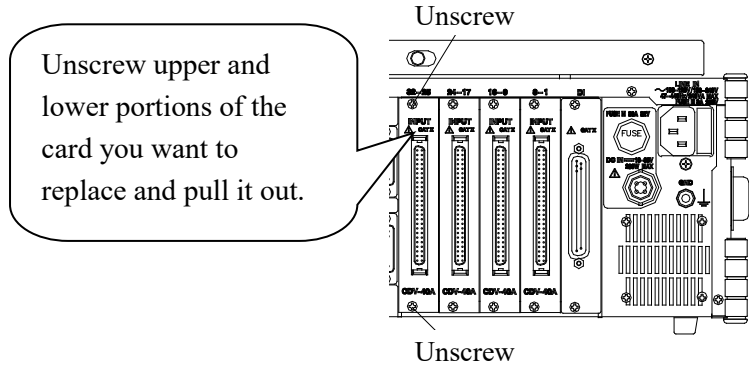
The output connector is BNC connector.



1-8 INSTALLATION OF DPM CARDS

Always turn OFF the power before installing the DPM card.

- (1) Unscrew upper and lower portions of the already installed card or dummy panel.



- (2) Remove the already installed conditioner card or dummy panel.
- (3) Slowly insert the DPM card in the EDX series along the guide rail and tightly fasten the upper and lower screws.
- (4) With the EDX-2000A/B, after replacing the card, turn ON the power switch and confirm the startup screen. If the "Card Type" is displayed in the Slot No. column, the card is correctly installed. With the other EDX series, after replacing the card, turn ON the power switch. Click the Set Connection Configuration... button (see every "Environment" in chapter 2) on the Dynamic Data Acquisition Software DCS-100A. If the "Card Type" is displayed in the Slot No. column, the card is correctly installed.

Although the DPM card is correctly installed in the slot of the EDX series, if "DISABLE" or "UNKNOWN" is displayed as the "Card Type" on the system menu screen, it is required to update the EDX series hardware. Contact our representative for updating the EDX series hardware.

Slot No.	Card Type
1	DPM-42B
2	DPM-42B
3	* * *
4	* * *

DPM cards are installed in slot No. 1 and 2.

NOTE

When installing or removing the DPM card, do not touch any component parts of the DPM card. Or, system failure or damage may result in.

2. HOW TO SET THE DPM CARDS

2-1 BY USING THE EDX-2000A/B

With the EDX-2000A/B, settings are executed by using the EDX-2000A/B.

2-1-1 Environment

Set an oscillator for carrier wave that is used for the DPM card. The carrier wave frequency is approximately 12 kHz.

When the DPM card is installed, do not forget to confirm the setting of the oscillator. There are 2 types of oscillators, internal and external. Normally, when the EDX series is solely used in stand-alone form or when it is used as synchronous master, setting of the oscillator is internal side.

MEMO

When the external oscillator is used instead of EDX-2000A/B internal oscillator, input the external oscillator from 9 pin (- side) and 10 pin (+ side) of CONT IN connector on the EDX-2000A/B rear face. Set the external oscillator to have frequency 12 kHz and sinewave of amplitude 2 Vrms. When switching to the external oscillator, do not forget to execute internal sensitivity compensation. (For details, see 2-1-3 Setting Internal Sensitivity Compensation.)

Set items in the following procedures.

Initial Screen



5) Environment



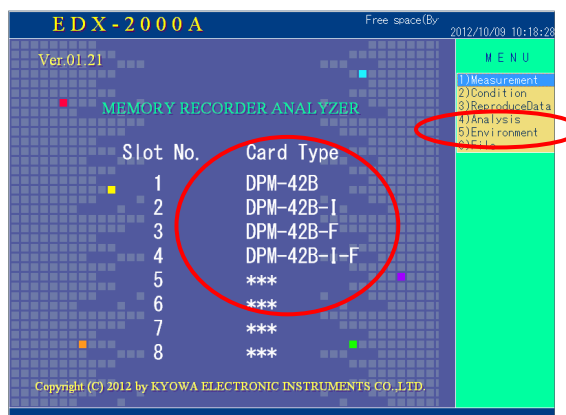
9) Oscillator



Initial Screen

<Oscillator setting>

Initial Screen



When the DPM card is correctly installed in the EDX-2000A/B, "DPM-42B" appears on the initial screen. (The following screen shows that '4' DPM cards are installed.)

First slot: DPM-42B

Second slot: DPM-42B-I

Third slot: DPM-42B-F

Forth slot: DPM-42B-I-F

Put the cursor to menu item 5)

<Environment> and press the **ENTER** key.

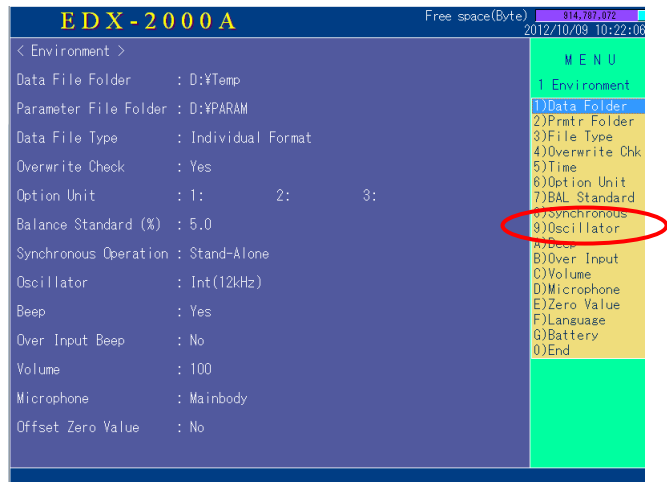
MEMO

If no conditioner card is installed, "Card Type" in the "Slot No." column is indicated with "***."

Environment

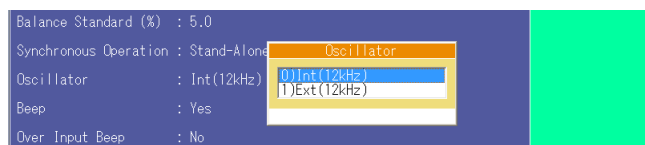
Select item 5) <Environment> from the main menu of the initial screen to display the right screen.

Put the cursor to menu item 9) <Oscillator> and press the **ENTER** key.



Oscillator

An "Oscillator" setting window appears as shown at the right. Put the cursor to the target and press the **ENTER** key.



NOTE

- The DPM card would not operate unless the external oscillator has frequency of 12 kHz and sinewave of amplitude 2 Vrms. At this time, "OSC:NG" appears on the "Measurement" lower screen.



- When the EDX series mainbody is set to a slave EDX, since it is automatically set to the external oscillator, always execute internal sensitivity compensation (for details, see 2-1-3 Setting Internal Sensitivity Compensation). Oscillator of the slave EDX is provided from the master EDX. For connecting multiple EDX series units, use synchronous cables [N-94] (optional accessory). For details, see EDX-2000A Instruction Manual (Synchronous Operation).
- When the external oscillator instantly stops during the measurement, abnormal data may continuously generate. Stop the external oscillator once and check "OSC:NG" is shown on the "Measurement" lower screen and then, input the external oscillator once again.

2-1-2 Setting Channels

Set channels.

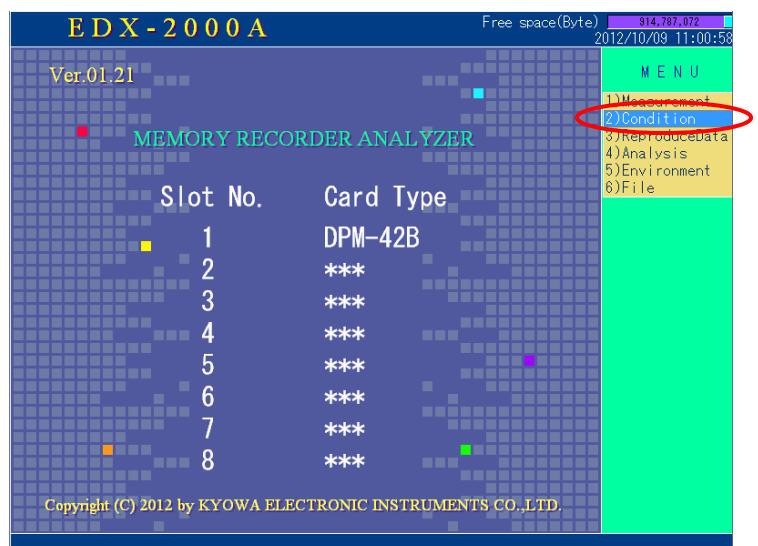
Set items in the following procedures.

Initial Screen							
↓							
2) Condition							
↓							
1) Channel Cond							
Item	① MEAS Channel	② Mode	③ Range (note)	④ Lo Pass	⑤ BAL	⑥ CAL	⑦ CAL Range
<u>Selections</u>	Measure Not measure	BV (2.0V) BV (0.5V)	200 μm/m 500 μm/m 1k μm/m 2μ m/m 5k μm/m 10k μm/m 20k μm/m 50k μm/m OFF	FLAT 1kHz 300Hz 100Hz 30Hz 10Hz AUTO*	ON OFF	ON OFF	100% 50% SHUNT
↓							
Initial Screen *Displayed on the DPM-42B-F/42B-I-F. (Note) Selectable range varies with Mode.							
↓							
1) Measurement							

<Channel settings>

Initial Screen

Put the cursor to menu item 2) <Condition> and press the **ENTER** key.



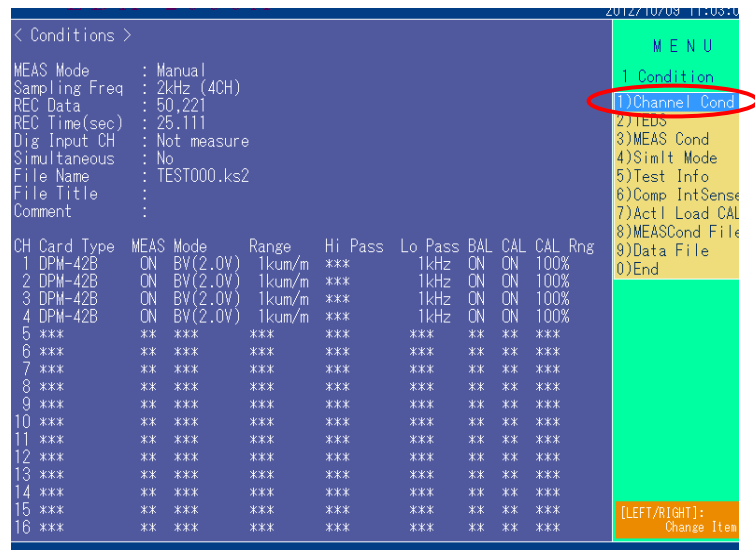
Conditions Screen

Select item 2) <Condition> from the main menu of the initial screen to display the right screen.

Put the cursor to menu item 1) <Channel Cond> and press the **ENTER** key.

MEMO

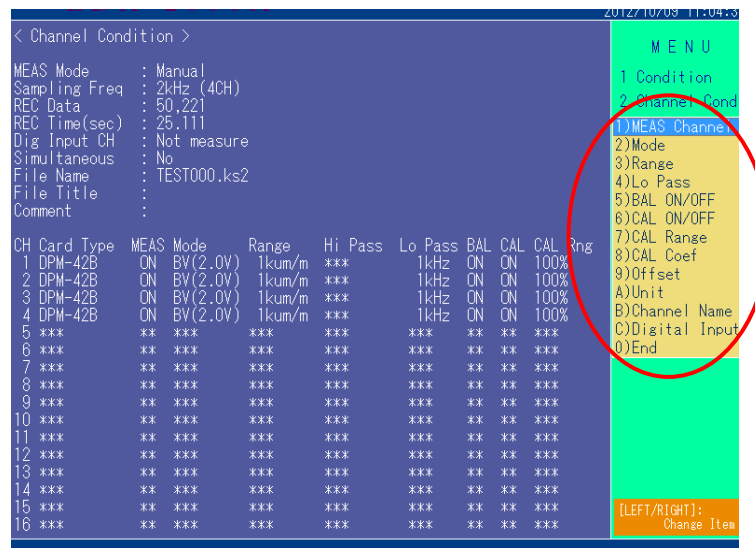
If no conditioner card is installed, channel column and items that are not available for setting are indicated with "*".



Channel Cond

Select item 1) <Channel Cond> of the Conditions Screen to display the right screen.

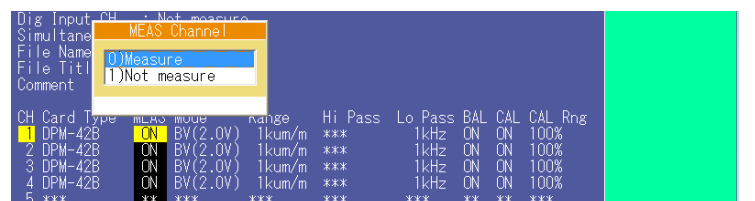
Put the cursor to the target menu item and press the **ENTER** key.



MEAS Channel

Select item 1) <MEAS Channel> from the <Channel Cond> menu. An "MEAS Channel" setting window appears as shown at the right.

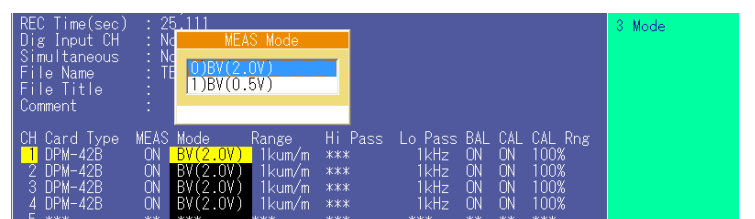
Put the cursor to either "Measure" or "Not measure" for every channel and press the **ENTER** key.



Mode

Select item 2) <Mode> from the <Channel Cond> menu. An "MEAS Mode" setting window appears as shown at the right.

Put the cursor to either "BV (2.0V)" or "BV (0.5V)" for every channel and press the **ENTER** key.



Range

Select item 3) <Range> from the <Channel Cond> menu.

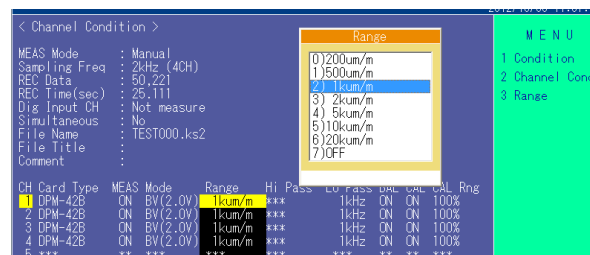
An "Range" setting window appears as shown at the right.

BV (2.0 V): 200 μ m/m, 500 μ m/m, 1k μ m/m, 2k μ m/m,

5k μ m/m, 10k μ m/m, 20k μ m/m, or OFF

BV (0.5 V): 1k μ m/m, 2k μ m/m, 5k μ m/m, 10k μ m/m,

20k μ m/m, 50k μ m/m, or OFF



It is required to select an appropriate "Range" according to the magnitude of the input signal. In addition, set the "Range" by considering the following.

- When the input signal is exceedingly smaller than the preset "Range", measuring accuracy may decrease.
- When the input signal is larger than the preset "Range", both recording data and monitor output become saturated.
- The smaller the "Range" is, the higher becomes the gain of the DPM card. Therefore, the noise tends to become larger.
- Set the "Range" to OFF. Then, the monitor output would not change and remain to be approximately 0 V.

Next, examples of setting "Range" when using a strain gage and a strain gage transducer are described in the following.

○ Using a strain gage

- ① Estimate the magnitude of the strain to be measured. Estimate the magnitude of the strain by considering the material or structure of the target to be measured.
- ② Set the "Range" to a larger than and most approximate value to the magnitude of the estimated strain.

○ Using a strain gage transducer

By referring to an equivalent strain output written on the Test Data Sheet of the strain gage transducer, estimate the magnitude of the strain obtained in the measurement and set the "Range" to a larger than and most approximate value to the magnitude of the estimated strain.

[Example]

By using data of the strain gage transducer in the right Test Data Sheet, when a strain output of approximately 30% of rated output is predicted, strain output is obtained by the following expression.

Equivalent strain output $\times 0.3 \approx 1200 \mu\text{m/m}$. Therefore, set the "Rang" to 2000 $\mu\text{m/m}$ that is 2k $\mu\text{m/m}$.

Test Data Sheet					
Test Data Sheet					
Model name	LC-5TG	Data of Inspection	2005.9. 7	Production number	
Rated Capacity	50kN	Temperature	23℃	Humidity	50%
1. Rated output			2000.1 $\mu\text{V/V}$		
Rated output			4000.2 $\times 10^{-6}$		
2 Nonlinearity			0.01 %RO		
Equivalent strain output					

MEMO

If the desired "Range" is not displayed on the "Range" setting window, check the "Mode."

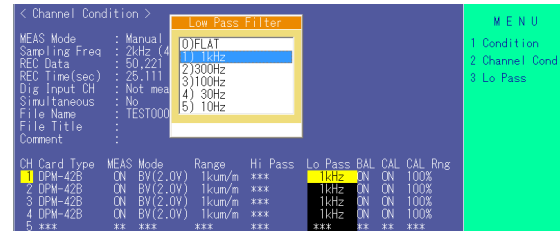
Low Pass Filter

Select item 4) <Lo Pass> from the <Channel Cond> menu.
An "Low Pass Filter" setting window appears as shown at the right.

DPM-42B (-I): FLAT, 1kHz, 300Hz, 100Hz, 30Hz, or 10Hz

DPM-42B (-I)-F: FLAT, 1kHz, 300Hz, 100Hz, 30Hz, 10Hz, or AUTO

When AUTO is selected, the anti-aliasing filter becomes "ON" and cutoff frequency is set to 1/4 of the sampling frequency. (For details, see 1-5 PRECAUTIONS FOR USING DPM-42B-F/42B-I-F.)



The low pass filter removes high frequency component from the sensor output signal. The low pass filter is especially effective for output signal with exceeding noise. When the input signal sinusoidally (sin functionally) varies, set the low pass filter 2 to 5 times large the input signal frequency. If the input signal rapidly changes, set the low pass filter to approximately 10 times larger than the signal frequency.

NOTE

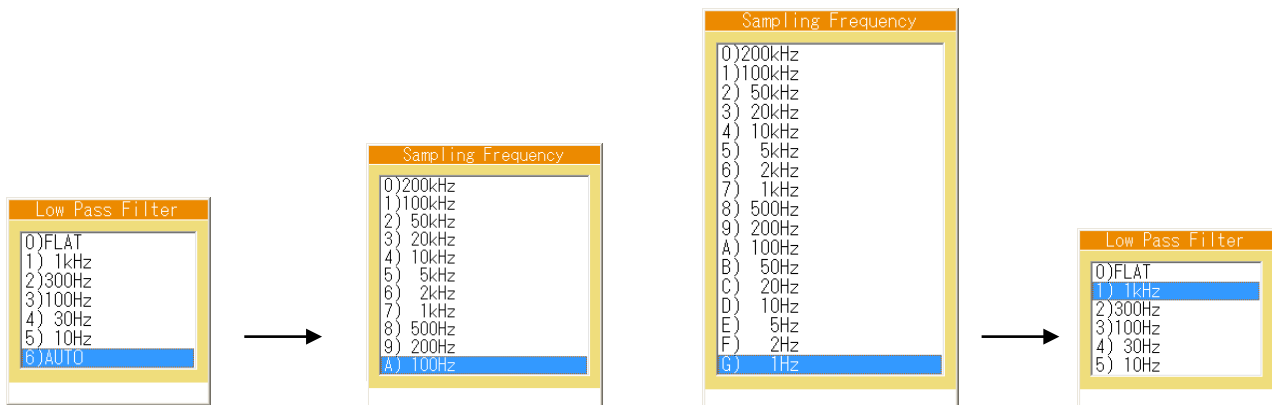
Compatible sampling frequency range of the anti-aliasing filter is 100 Hz or more.

Although the card is DPM-42B-F/42B-I-F, if "AUTO" is not displayed on the "Low Pass Filter" setting window, check whether or not the sampling frequency is set to less than 100 Hz.

If "Low Pass Filter" is set to "AUTO" with one channel, sampling frequency of less than 100 Hz would not appear on the "Sampling Frequency" setting window. (See the left figure.)

When setting the sampling frequency of less than 100 Hz, set the low pass filter to other than "AUTO."

On the contrary, if the sampling frequency is set to less than 100 Hz, "AUTO" would not appear on the "Low Pass Filter" setting window. (See the right figure.)

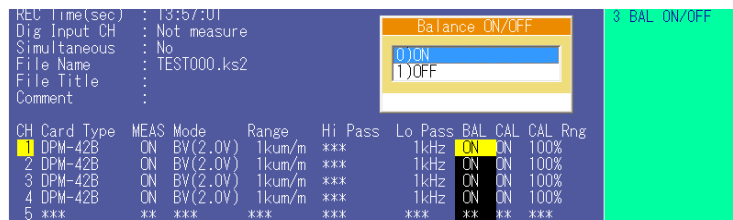


If "Low Pass Filter" is set to "AUTO", sampling frequency of less than 100 Hz would not appear.

If sampling frequency is set to less than 100 Hz, "AUTO" would not appear.

Balance ON/OFF

Select item 5) <BAL ON/OFF> from the <Channel Cond> menu. An "Balance ON/OFF" setting window appears as shown at the right.

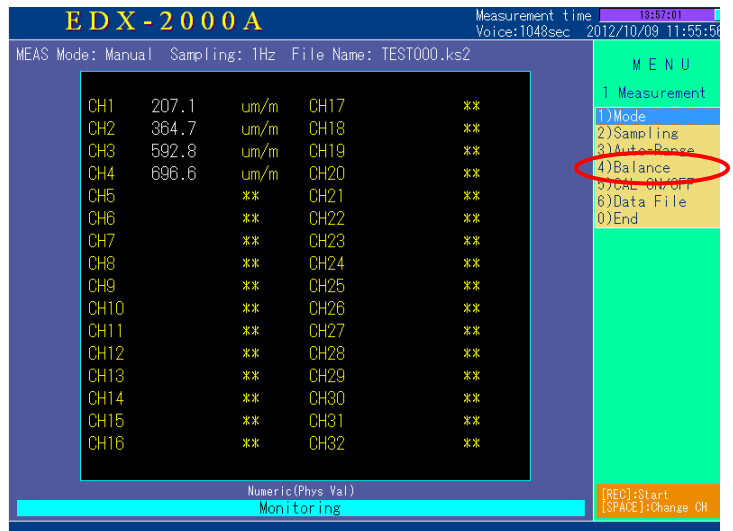


Put the cursor to either "ON" or "OFF" and press the **ENTER** key. Only channels that are set to "ON" are allowed for executing initial balance during measurements.

To execute balance, put the cursor to item 4) <Balance> in <Measurement> menu and press the **ENTER** key.

NOTE

During recording measured data, since <Balance> menu is not shown on the menu, executing balance is not available.



An "Balance" window appears as shown at the right.

Execute balance → **ENTER** key

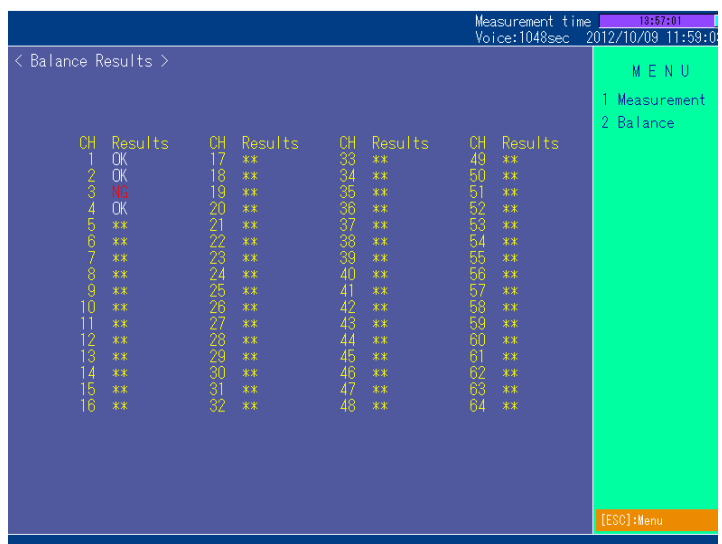
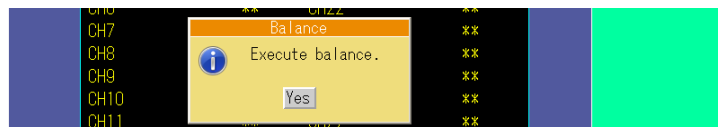
Stop balance → **ESC** key

After a while, it automatically ends balancing and the balanced results are displayed on the screen. (See the right figure.)

Channels indicated with "NG" mean that the bridge balance adjust results are exceeding the balance standard value.

Re-check sensors and connection cable of the relevant channels, remove the cause and execute balance once again.

Confirm balance results of all the channels with sensors connected are all "OK" and then, return to the monitor screen by pressing the **ESC** key.



MEMO

For the balance standard value, see "10 ENVIRONMENT" of the EDX-2000A Instruction Manual.

NOTE

When balance is executed to the DPM card, not only initial balance is adjusted when sensors are connected or changed but also offset value is calculated when standard equivalent strain (CAL) is entered. When the following conditions are changed, re-execute the balance once again.

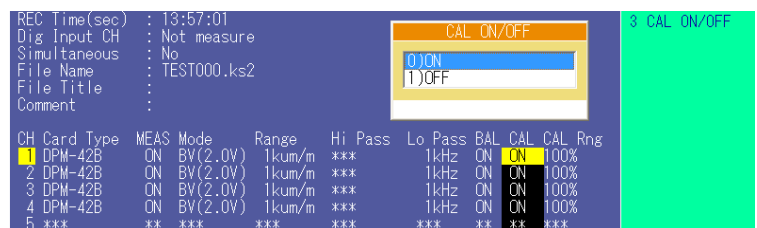
- "Mode"
- "Range"
- "Anti-aliasing filter"

Always execute balance to all the channels that are used for the measurement.

CAL ON/OFF

Select item 6) <CAL ON/OFF> from the <Channel Cond> menu. An "CAL ON/OFF" setting window appears as shown at the right.

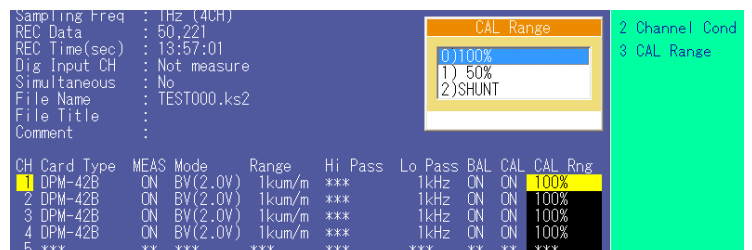
Put the cursor to either "ON" or "OFF" and press the **ENTER** key. Only channels that are set to "ON" are allowed for entering the standard equivalent strain (CAL) during measurements.



CAL Range

Select item 7) <CAL Range> from the <Channel Cond> menu.

Put the cursor to either "100%", "50%", or "SHUNT" and press the **ENTER** key.



- When 100% (50%) is selected

When +CAL is executed, +100% (+50%) of range value, and when -CAL is executed, -100% (-50%) of range value is added to the current output and displayed.

- When SHUNT is selected

Input fixed resistance between [+ Bridge excitation] and [- Input] of the strain gage bridge and add a certain value to the current output and display the obtained value. The output value is determined by the bridge resistance of the strain gage bridge irrespective of the CAL range.

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

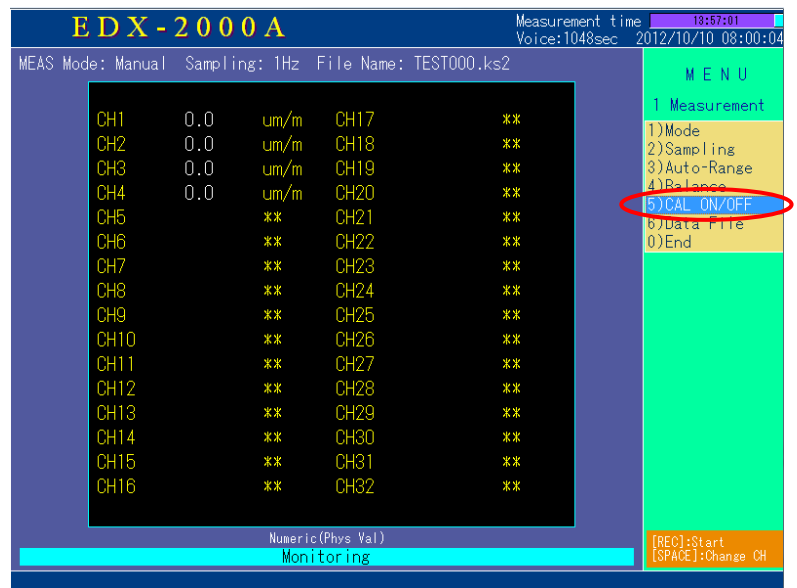
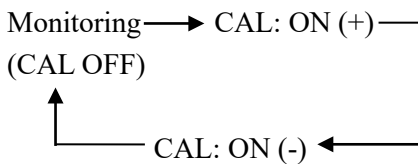
Bridge Resistance (ohm)	Output value [$\mu\text{m/m}$]
120	Approx. 88
240	Approx. 176
350	Approx. 257
700	Approx. 515
1000	Approx. 735

Calculation formula

$$\text{Output value} = \frac{\text{Bridge Resistance}}{1.36} \quad [\mu\text{m/m}]$$

To execute CAL, put the cursor to item 5) <CAL ON/OFF> in <Measurement> menu.

The following operations are repeated every time the **ENTER** key is pressed.



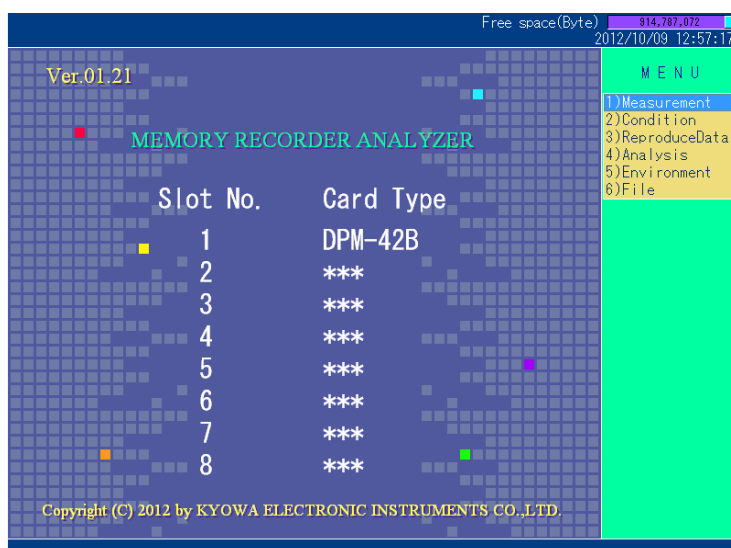
MEMO

- When "SHUNT" is selected, the same output with both +CAL and -CAL and accuracy is around $\pm 5\%$.
- Executing CAL, during recording measured data, is only available in manual measurement mode.

Measurement

After all the settings are complete, select item 0) <End> from the <Channel Cond> menu to return to the initial screen as shown at the right.

Select item 1) <Measurement> from the main menu to start the measurement with the determined channel conditions.



NOTE

For details, see EDX-2000A Instruction Manual and EDX-2000B Instruction Manual.

2-1-3 Setting Internal Sensitivity Compensation

Internal sensitivity compensation is a function used in the following case.

- When setting the oscillator to the "external oscillator."
- When compensating sensitivity
- When the input cable is long.
- When connecting a sensor for the first time.
- When changing the "Range".

When compensating the internal sensitivity, the sensitivity is finely adjusted by the internal CAL.

When an extension cable[N-81 to 85, 100](cable core cross-section area: 0.5mm²) is used, after compensating the internal sensitivity, multiply the recording data by the value in the following table. Error (sensitivity decrease) caused by the extension cable is compensated.

Extension cable Bridge resistance	5 m	25 m	50 m	75 m	100 m	200 m
120 ohm	1.0043	1.0182	1.0314	1.0517	1.0664	1.1057
350 ohm	1.0019	1.0085	1.0153	1.0244	1.0316	1.0497

NOTE

Prior to internal sensitivity compensation, do not forget to connect the actually using sensor. In addition, after compensating the internal sensitivity, when the sensor is replaced with a different one, since the results of the previous sensitivity compensation is effective, always initialize and reset the EDX series or execute the internal sensitivity compensation once again. Take care that internal sensitivity compensation is executed in a state with no change in sensor input.

Set items in the following procedures.

Initial Screen

↓

2) Condition

↓

6) Comp IntSense

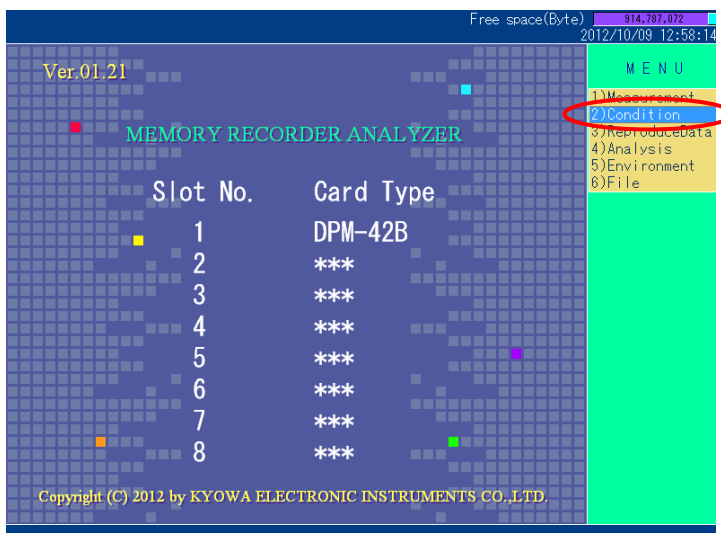
↓

Initial Screen

<Internal sensitivity compensation settings>

Initial Screen

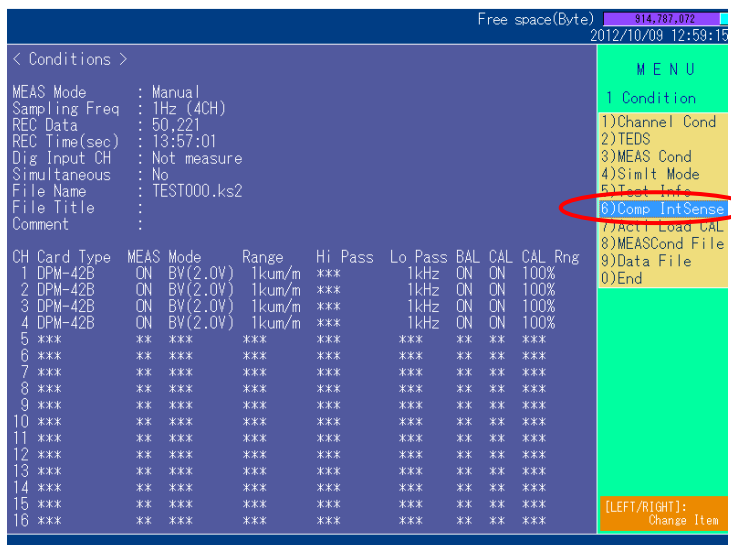
Put the cursor to menu item 2) <Condition> and press the **ENTER** key.



Conditions Screen

Select item 2) <Condition> from the main menu of the initial screen to display the right screen.

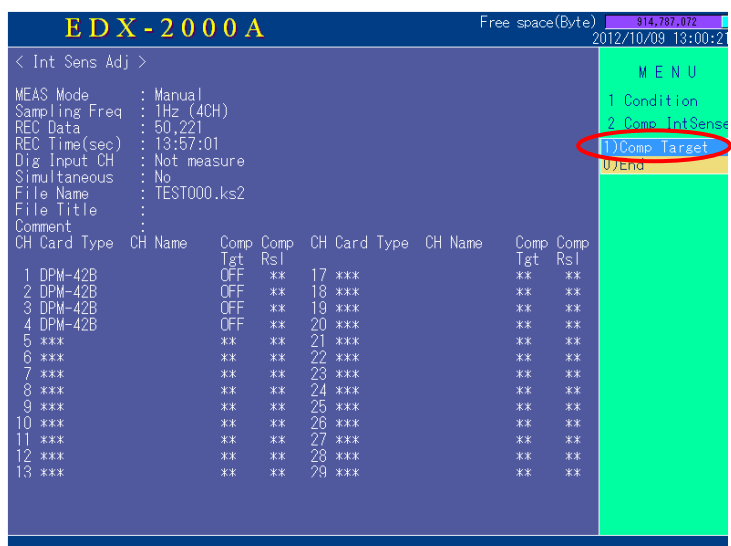
Put the cursor to menu item 6) <Comp IntSense> and press the **ENTER** key.



Comp IntSense

Select item 6) <Comp IntSense> of the Conditions Screen to display the right screen.

Put the cursor to menu item 1) <Comp Target> and press the **ENTER** key.



Comp Target

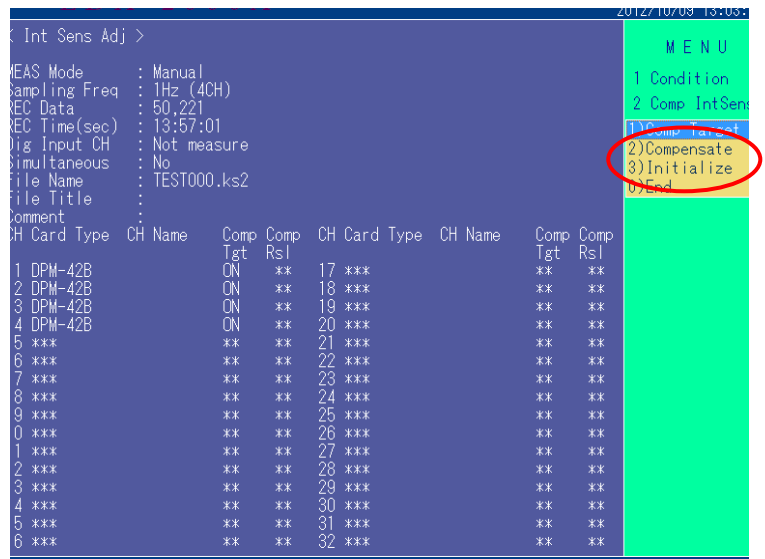
An "Comp Target" setting window appears as shown at the right.

Put the cursor to either "ON" or "OFF" and press the **ENTER** key. Only channels that are set to "ON" are allowed for compensating the internal sensitivity.



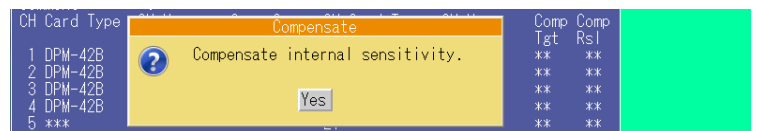
If there are channels that are set to "ON" for "Comp Target", menu items 2) <Compensate> and 3) <Initialize> are added to the menu.

Put the cursor to menu item 2) <Compensate> and press the **ENTER** key.



Compensate

An "Compensate" window appears as shown at the right.

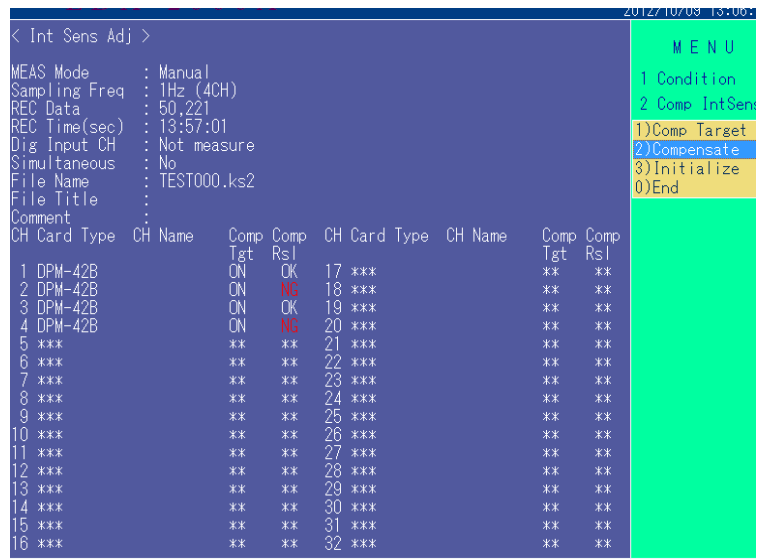


Execute the internal sensitivity compensation → **ENTER** key

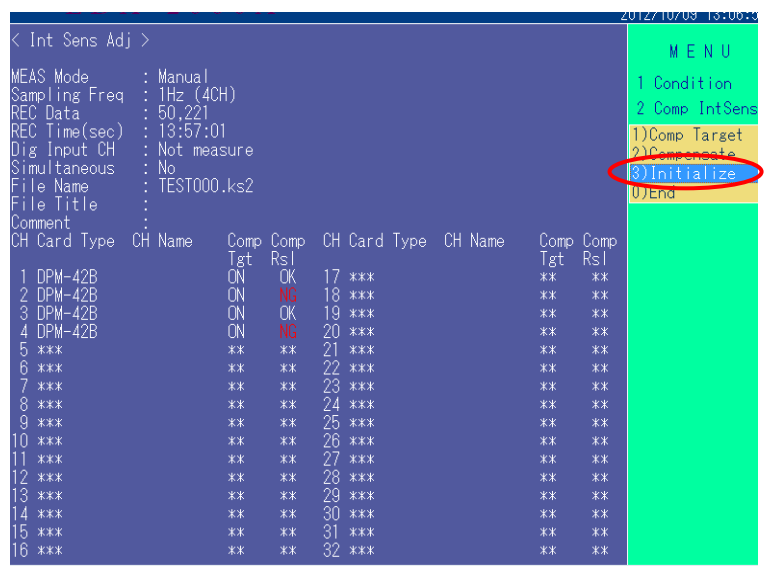
Stop the internal sensitivity compensation → **ESC** key

After a while, it automatically ends the internal sensitivity compensation and the compensated results are displayed on the screen. (See the right figure.) For channels indicated with "NG", re-check sensors and connection cable of the relevant channels, remove the cause and execute balance once again.

Confirm compensation results of all the channels are all "OK". On and after then, internal sensitivity compensation of the channels are active.



Sensitivity of channels, subjected to internal sensitivity compensation, are compensated. To initialize the internal sensitivity compensation, put the cursor to item 3) <Initialize> and press the **ENTER** key.

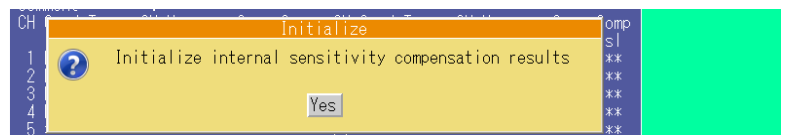


Initialize

An "Initialize" window appears as shown at the right.

Execute initialization → **ENTER** key

Stop initialization → **ESC** key



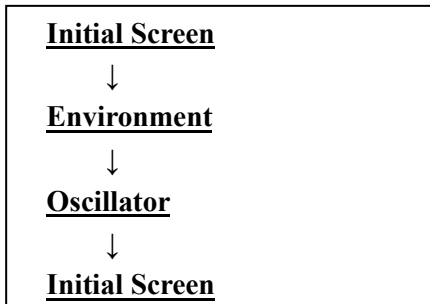
After a while, it automatically ends the initialization and the initialization results are displayed on the screen. On and after then, the sensitivity is returned to the initial state.

2-2 BY USING THE EDX-100A

With the EDX-100A, settings are executed by using the EDX-100A or Dynamic Data Acquisition Software DCS-100A.

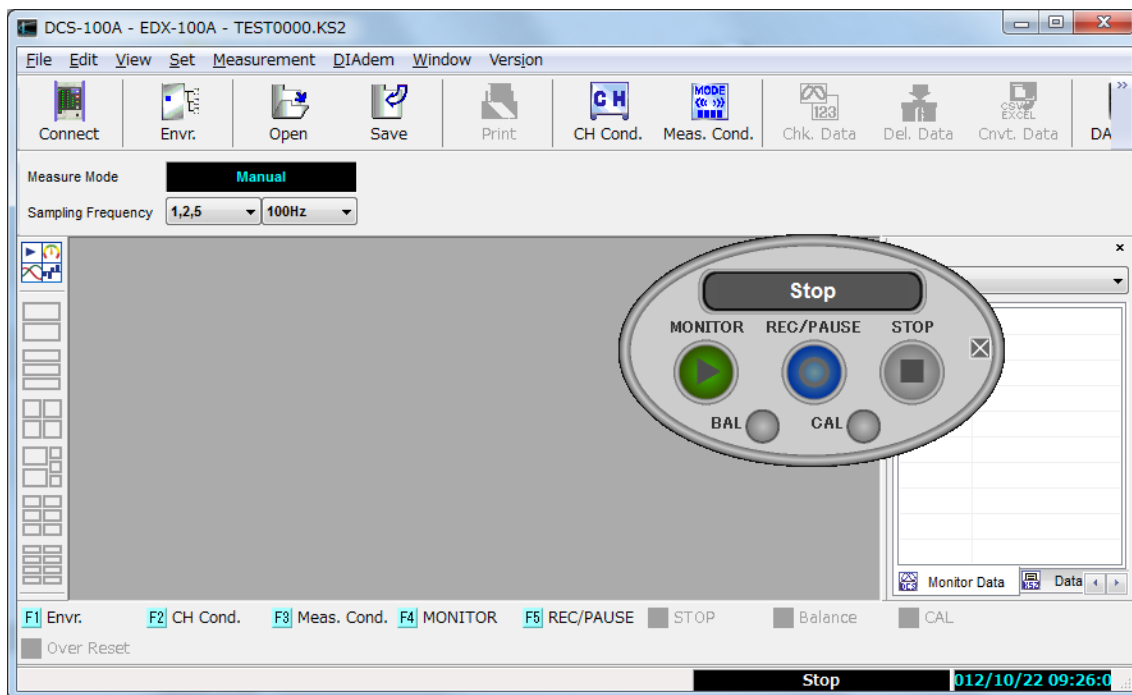
2-2-1 Environment

Set items in the following procedures.



<Settings>

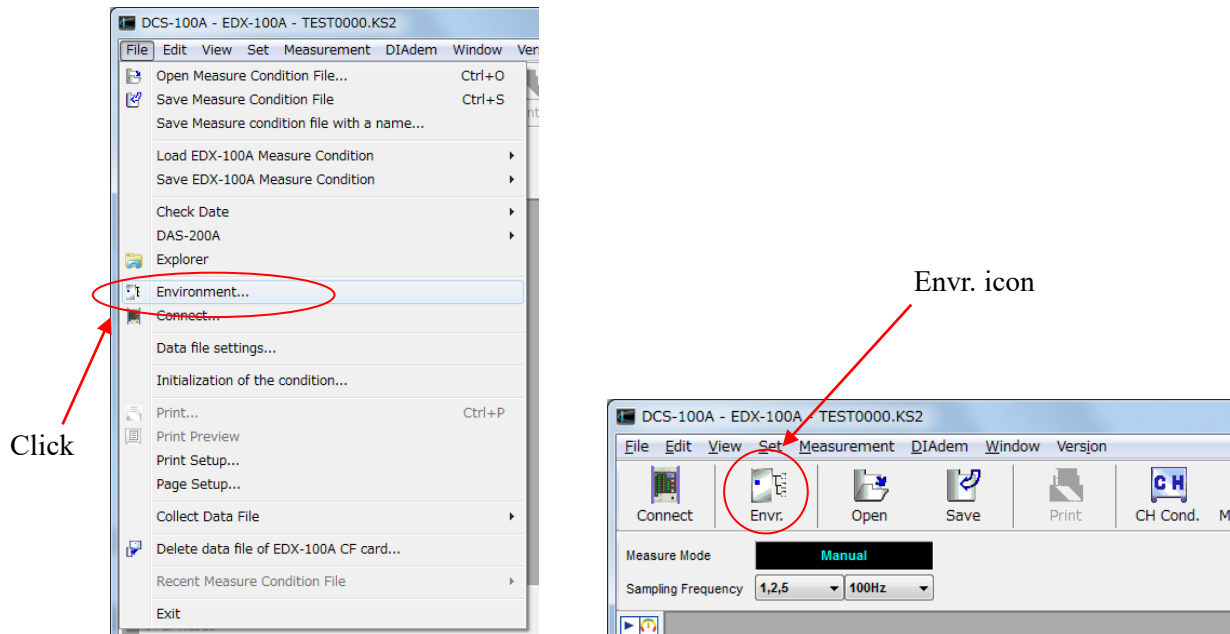
Initial Screen



Environment

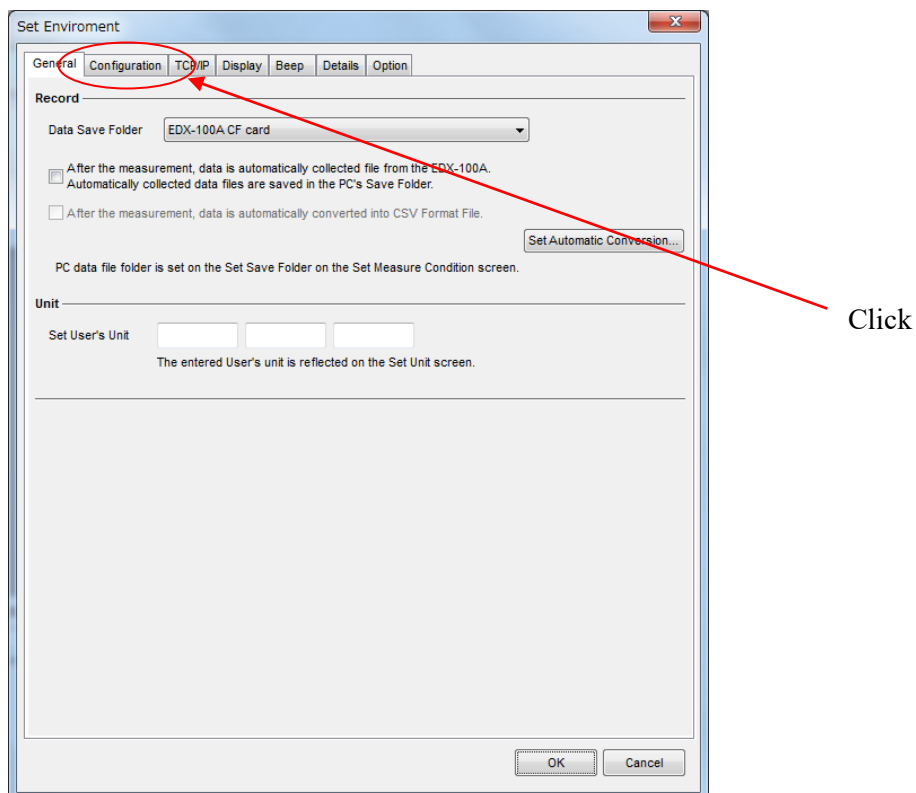
Open the Set Environment window as described below:

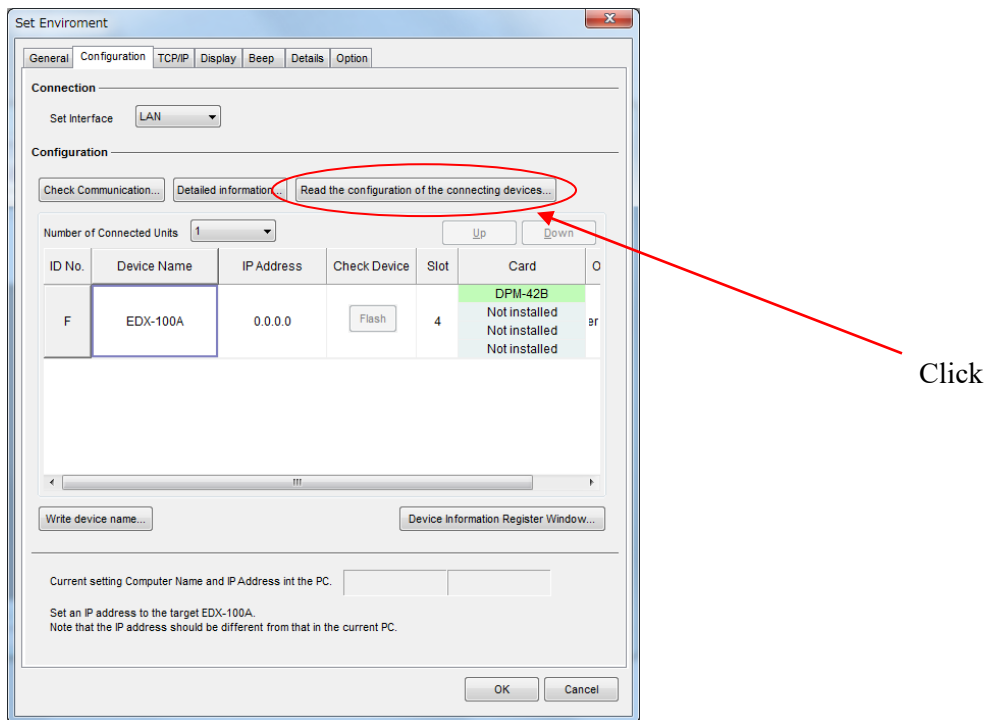
- Click the File - Environment.
- Click the Envr. icon from the toolbar.



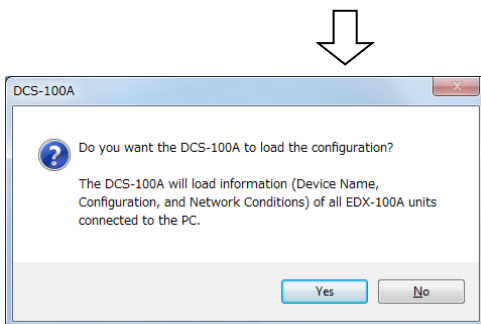
The following window appears.

Click the Configuration tab on the Set Environment window.

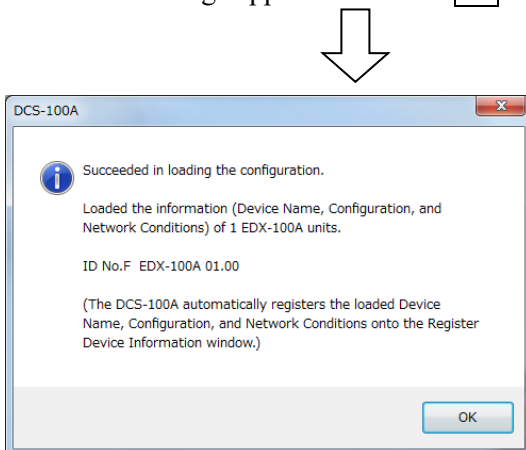




Click the **Read the configuration of the connecting devices...** button. The EDX-100A is searched online for loading the hardware configuration. Before pressing, make sure the control interface and ID No. of the EDX-100A are correct.



The above message appears. Click the **Yes** button.



Click the **OK** button. The new hardware configuration will appear on the Connection Configuration window.

NOTE

Although the **Read the configuration of the connecting devices...** button is pressed, if "DISABLE" or "UNKNOWN" is displayed as the "Card Type" on the system menu screen, it is required to update the EDX series hardware. Contact our representative for updating the EDX series hardware.

Oscillator

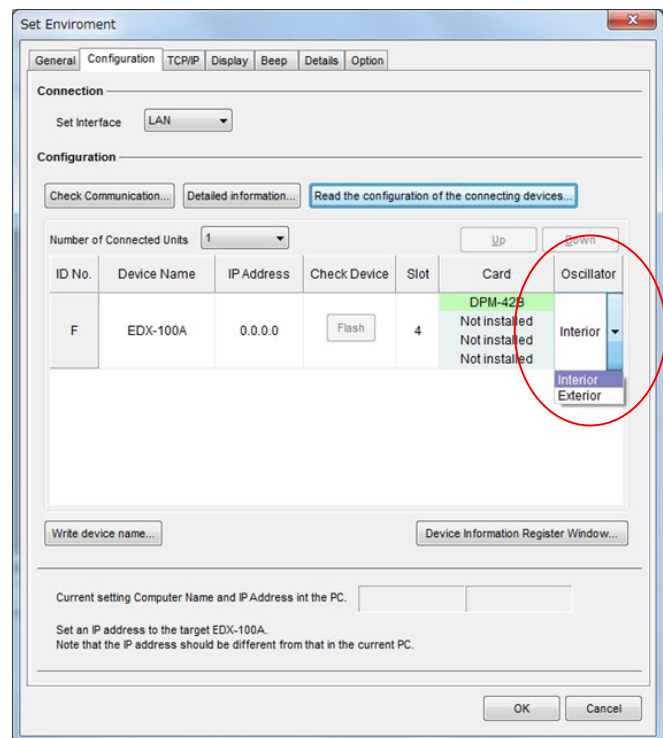
Set an oscillator for carrier wave that is used for the DPM card. The carrier wave frequency is approximately 12 kHz.

When the DPM card is installed, do not forget to confirm the setting of the oscillator. There are 2 types of oscillators, internal and external. Normally, when the EDX series is solely used in stand-alone form or when it is used as synchronous master, setting of the oscillator is internal side.

MEMO

When the external oscillator is used instead of EDX-100A internal oscillator, input the external oscillator from 4 pin (+ side) and 10 pin (- side) of CONT IN connector on the EDX-100A rear face. Set the external oscillator to have frequency 12 kHz and sinewave of amplitude 2 Vrms. When switching to the external oscillator, do not forget to execute internal sensitivity compensation. (For details, see 2-2-3 Setting Internal Sensitivity Compensation.)

Select the internal oscillator or external oscillator on the Connection Configuration window as shown at the right.



NOTE

- The DPM card would not operate unless the external oscillator has frequency of 12 kHz and sinewave of amplitude 2 Vrms.
- When the EDX series mainbody is set to a slave EDX, since it is automatically set to the external oscillator, always execute internal sensitivity compensation (for details, see 2-2-3 Setting Internal Sensitivity Compensation). Oscillator of the slave EDX is provided from the master EDX. For connecting multiple EDX series units, use synchronous cables [N-95] (optional accessory). For details, see the EDX-100A Instruction Manual.

2-2-2 Setting Channels

Set channels.

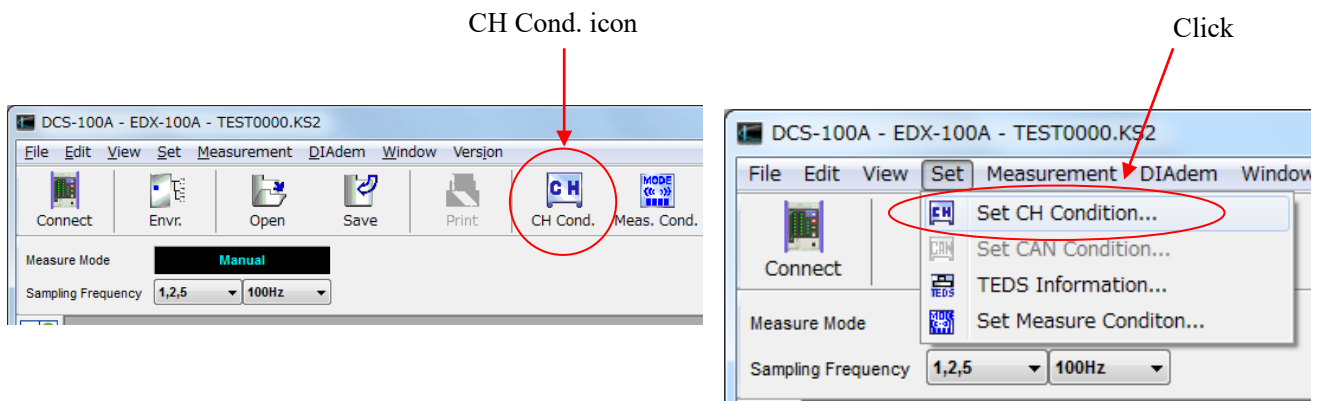
Set items in the following procedures.

<u>Initial Screen</u>							
↓							
<u>Channel condition</u>							
<u>Item</u>	① Measurement ON/OFF	② Mode	③ Range (note)	④ Low Pass Filter	⑤ Balance	⑥ Comp IntSense	⑦ CAL Range
<u>Selections</u>	Measure Not measure	BV (2.0V) BV (0.5V)	200 $\mu\text{m}/\text{m}$ 500 $\mu\text{m}/\text{m}$ 1k $\mu\text{m}/\text{m}$ 2k $\mu\text{m}/\text{m}$ 5k $\mu\text{m}/\text{m}$ 10k $\mu\text{m}/\text{m}$ 20k $\mu\text{m}/\text{m}$ 50k $\mu\text{m}/\text{m}$ OFF	FLAT 1k Hz 300 Hz 100 Hz 30 Hz 10 Hz AUTO*	ON OFF	ON OFF	100 % 50% SHUNT
↓							
<u>Initial Screen</u> *Displayed on the DPM-42B-F/42B-I-F. (Note) Selectable range varies with Mode.							
↓							
<u>Measurement</u>							
<Channel settings>							

Initial Screen

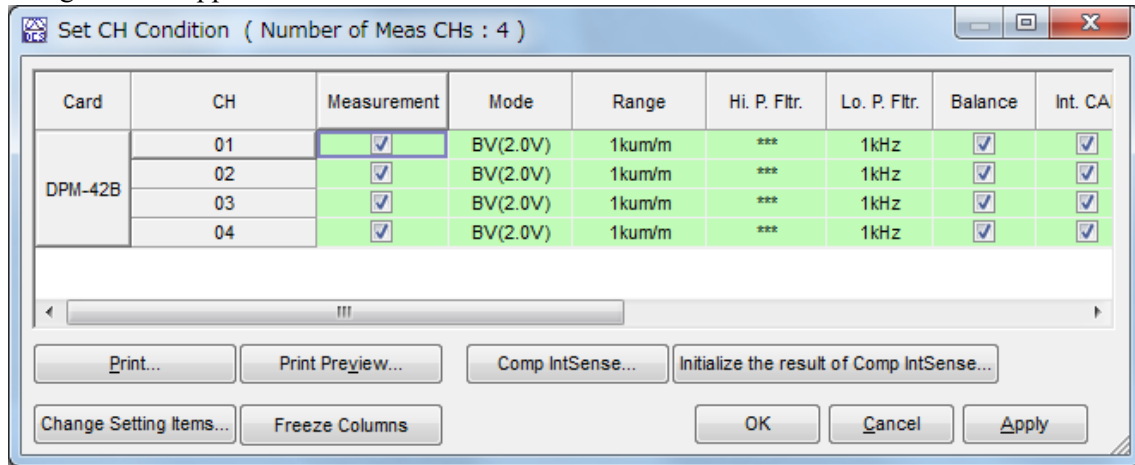
Open the Set CH Condition window as described below:

- Click the CH Cond. icon from the toolbar.
- Click the Set - Set CH Condition.



Set CH Condition window

The following window appears.



Measurement ON/OFF

Put a check mark to the check box next to the target channel.

Mode

Set the "Mode".

Select BV (2.0 V) or BV (0.5 V) from the list box.

Range

Set the "Range".

BV (2.0 V): 200 μ m/m, 500 μ m/m, 1k μ m/m, 2k μ m/m, 5k μ m/m, 10k μ m/m, 20k μ m/m, or OFF

BV (0.5 V): 1k μ m/m, 2k μ m/m, 5k μ m/m, 10k μ m/m, 20k μ m/m, 50k μ m/m, or OFF

It is required to select an appropriate "Range" according to the magnitude of the input signal. In addition, set the "Range" by considering the following.

- When the input signal is exceedingly smaller than the preset "Range", measuring accuracy may decrease.
- When the input signal is larger than the preset "Range", both recording data and monitor output become saturated.
- The smaller the "Range" is, the higher becomes the gain of the DPM card. Therefore, the noise tends to become larger.
- Set the "Range" to OFF. Then, the monitor output would not change and remain to be approximately 0 V.

Next, examples of setting "Range" when using a strain gage and a strain gage transducer are described in the following.

- Using a strain gage
 - ① Estimate the magnitude of the strain to be measured. Estimate the magnitude of the strain by considering the material or structure of the target to be measured.
 - ② Set the "Range" to a larger than and most approximate value to the magnitude of the estimated strain.

- Using a strain gage transducer

By referring to an equivalent strain output written on the Test Data Sheet of the strain gage transducer, estimate the magnitude of the strain obtained in the measurement and set the "Range" to a larger than and most approximate value to the magnitude of the estimated strain.

[Example]

By using data of the strain gage transducer in the following Test Data Sheet, when a strain output of approximately 30% of rated output is predicted, strain output is obtained by the following expression.

Equivalent strain output $\times 0.3 \approx 1200 \mu\text{m/m}$. Therefore, set the "Range" to 2000 $\mu\text{m/m}$ that is 2k $\mu\text{m/m}$.

Test Data Sheet					
Test Data Sheet					
Model name	LC-5TG	Data of Inspection	2005・9・ 7	Production number	・ ・ ・ ・ ・
Rated Capacity	50kN	Temperature	23℃	Humidity	50%
1. Rated output Rated output $\frac{2000.1}{4000.2} \mu\text{V/V} \times 10^{-6}$					
2 Nonlinearity 0.01 %RO					
Equivalent strain output					

MEMO

If the desired "Range" is not displayed on the "Range" setting window, check the "Mode."

Low Pass Filter

Set the "Low Pass Filter". Select the low pass filter from the list box.

DPM-42B/42B-I: FLAT, 1kHz, 300Hz, 100Hz, 30Hz, or 10Hz

DPM-42B-F/42B-I-F: FLAT, 1kHz, 300Hz, 100Hz, 30Hz, 10Hz, or AUTO

When AUTO is selected, the anti-aliasing filter becomes "ON" and cutoff frequency is set to 1/4 of the sampling frequency. (For details, see 1-5 PRECAUTIONS FOR USING DPM-42B-F/42B-I-F.)

The low pass filter removes high frequency component from the sensor output signal. The low pass filter is especially effective for output signal with exceeding noise. When the input signal sinusoidally (sin functionally) varies, set the low pass filter 2 to 5 times large the input signal frequency. If the input signal rapidly changes, set the low pass filter to approximately 10 times larger than the signal frequency.

NOTE

Compatible sampling frequency range of the anti-aliasing filter is 100 Hz or more.

Although the card is DPM-42B-F/42B-I-F, if "AUTO" is not displayed on the "Low Pass Filter" setting window, check whether or not the sampling frequency is set to less than 100 Hz.

If "Low Pass Filter" is set to "AUTO" with one channel, sampling frequency of less than 100 Hz would not appear on the "Sampling Frequency" setting window.

When setting the sampling frequency of less than 100 Hz, set the low pass filter to other than "AUTO."

On the contrary, if the sampling frequency is set to less than 100 Hz, "AUTO" would not appear on the "Low Pass Filter" setting window.

Balance ON/OFF

Put a check mark to the check box next to the target channel.

Only channels with a check mark are allowed for executing initial balance during measurements.

NOTE

During recording measured data, executing balance is not available.

To execute balance, click the **BAL** button on the Meas Operation Panel (see the left figure). After a while, it automatically ends balancing and the balanced results are displayed on the window. (See the following right figure.)

Channels indicated with "NG" mean that the bridge balance adjust results are exceeding the balance standard value.

Re-check sensors and connection cable of the relevant channels, remove the cause and execute balance once again.



BAL button

The image shows a software window titled "Balance result (OK : 4CH Total : 4CH)". It contains a table with three columns: "Card", "CH", and "Result". The table shows results for a "DPM-42B" card across four channels (01, 02, 03, 04), all of which are "OK". A "Close" button is at the bottom right.

Card	CH	Result
DPM-42B	01	OK
	02	OK
	03	OK
	04	OK

NOTE

When balance is executed to the DPM card, not only initial balance is adjusted when sensors are connected or changed but also offset value is calculated when standard equivalent strain (CAL) is entered. When the following conditions are changed, re-execute the balance once again.

- "Mode"
- "Range"
- "Anti-aliasing filter"

Always execute balance to all the channels that are used for the measurement.

Comp IntSense ON/OFF

Put a check mark to the check box next to the target channel.

Before executing the internal sensitivity compensation (see 2-2-3 Setting Internal Sensitivity Compensation), put a check mark,

CAL Range

Set the output value of the CAL.

Select "100%", "50%", or "SHUNT" from the list box.

- When 100% (50%) is selected

When +CAL is executed, +100% (+50%) of range value, and when -CAL is executed, -100% (-50%) of range value is added to the current output and displayed.

- When SHUNT is selected

Input fixed resistance between [+ Bridge excitation] and [- Input] of the strain gage bridge and add a certain value to the current output and display the obtained value. The output value is determined by the bridge resistance of the strain gage bridge irrespective of the CAL range.

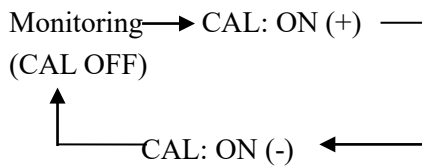
Output value for each bridge resistance is described in the following.

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

Calculation formula

$$\text{Output value} = \frac{\text{Bridge Resistance}}{1.36} \quad [\mu\text{m/m}]$$

To execute CAL, click the **CAL** button on the Meas Operation Panel (see the left figure). The following operations are repeated every time the **CAL** button is pressed.



CAL button

MEMO

- When "SHUNT" is selected, the same output with both +CAL and -CAL and accuracy is around $\pm 5\%$.
- Executing CAL, during recording measured data, is only available in manual measurement mode.

Measurement

After all the settings are complete, click the **OK** button on the Set CH Condition window to return to the initial screen.

To start the measurement, click the **MONITOR** button on the Meas Operation Panel.



MONITOR button

NOTE

For details, see Dynamic Data Acquisition Software DCS-100A Instruction Manual.

2-2-3 Setting Internal Sensitivity Compensation

Internal sensitivity compensation is a function used in the following case.

- When setting the oscillator to the "external oscillator."
- When compensating sensitivity
- When the input cable is long.
- When connecting a sensor for the first time.
- When changing the "Range".

When compensating the internal sensitivity, the sensitivity is finely adjusted by the internal CAL.

When an extension cable[N-81 to 85, 100](cable core cross-section area: 0.5mm²) is used, after compensating the internal sensitivity, multiply the recording data by the value in the following table. Error (sensitivity decrease) caused by the extension cable is compensated.

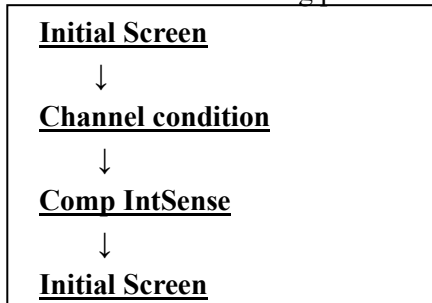
Extension cable Bridge resistance	5 m	25 m	50 m	75 m	100 m	200 m
120 ohm	1.0043	1.0182	1.0314	1.0517	1.0664	1.1057
350 ohm	1.0019	1.0085	1.0153	1.0244	1.0316	1.0497

NOTE

Prior to internal sensitivity compensation, do not forget to connect the actually using sensor. In addition, after compensating the internal sensitivity, when the sensor is replaced with a different one, since the results of the previous sensitivity compensation is effective, always initialize and reset the EDX series or execute the internal sensitivity compensation once again.

Take care that internal sensitivity compensation is executed in a state with no change in sensor input.

Set items in the following procedures.

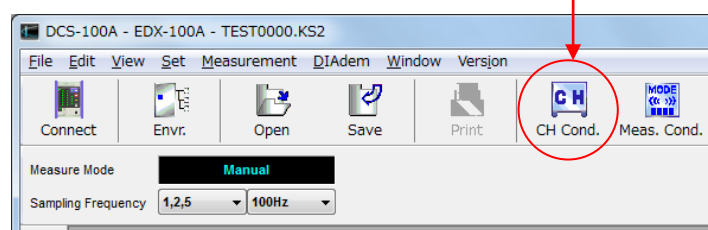


<Internal sensitivity compensation settings>

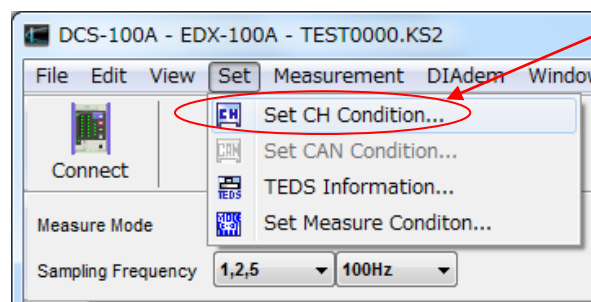
Initial Screen

- Click the CH Cond. icon from the toolbar.
- Click the Set - Set CH Condition.

CH Cond. icon



Click

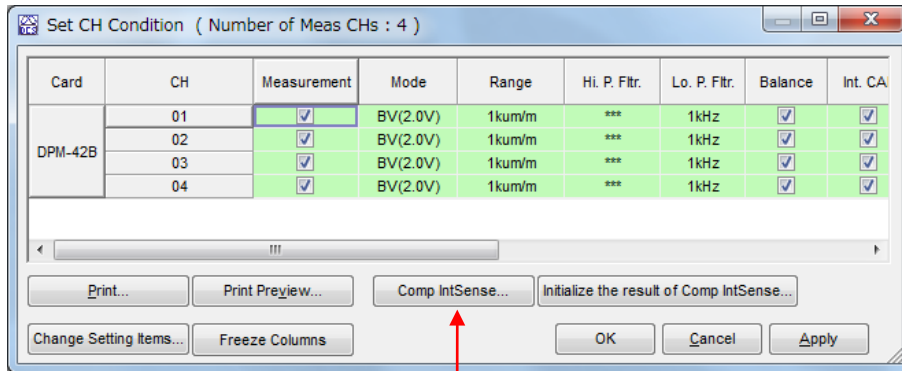


Set CH Condition window

The following window appears.

Only channels with a check mark on the Measurement ON/OFF column are allowed for executing internal sensitivity compensation.

Click the **Comp IntSense...** button.



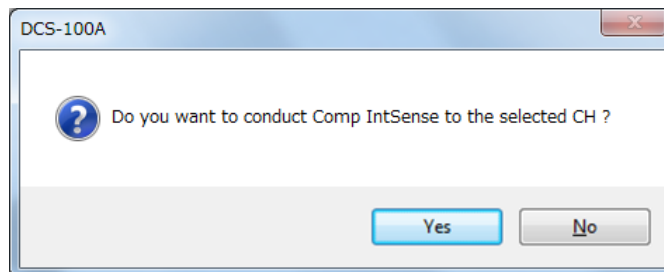
Click

Comp IntSense... button

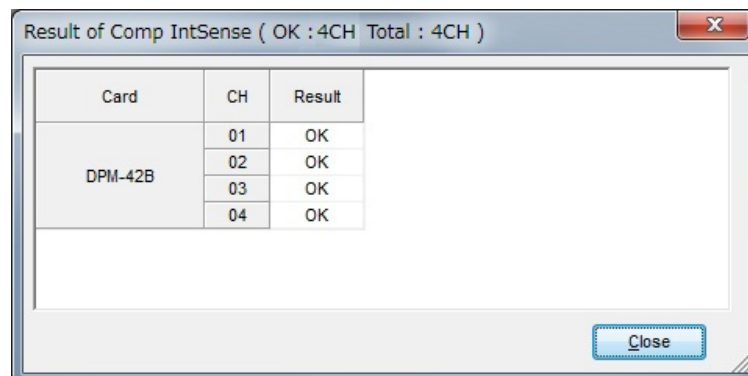
Click the **Comp IntSense...** button. The following window appears.

To execute the internal sensitivity compensation, click the **Yes** button.

To stop the internal sensitivity compensation, click the **No** button.



After a while, it automatically ends the internal sensitivity compensation and the compensated results are displayed on the window. (See the figure.)



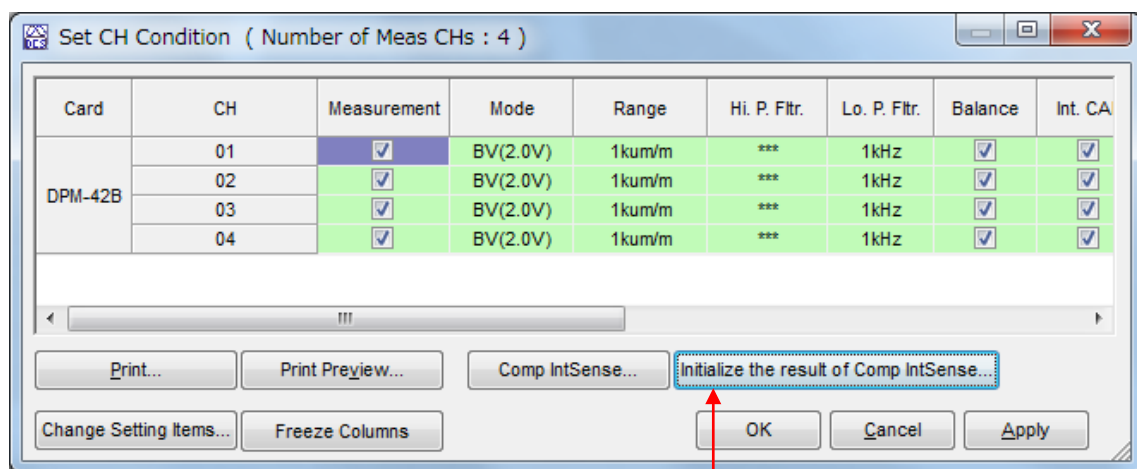
For channels indicated with "NG", re-check sensors and connection cable of the relevant channels, remove the cause and execute balance once again.

Confirm compensation results of all the channels are all "OK". Sensitivity of channels, subjected to internal sensitivity compensation, are compensated.

Initialize

Sensitivity of channels, subjected to internal sensitivity compensation, are compensated. To initialize the internal sensitivity compensation, click the Initialize the result of Comp IntSense... button on the Set CH Condition window.

On and after then, the sensitivity is returned to the initial state.



Click

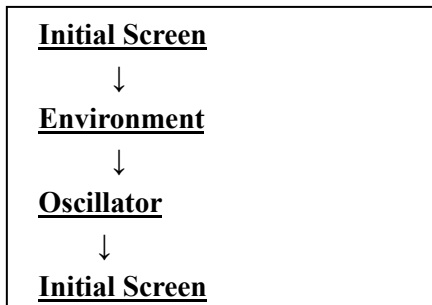
2-3 BY USING THE EDX-3000A

With the EDX-3000A, settings are executed by using the EDX-3000A or Dynamic Data Acquisition Software DCS-100A.

2-3-1 By Using the EDX-3000A

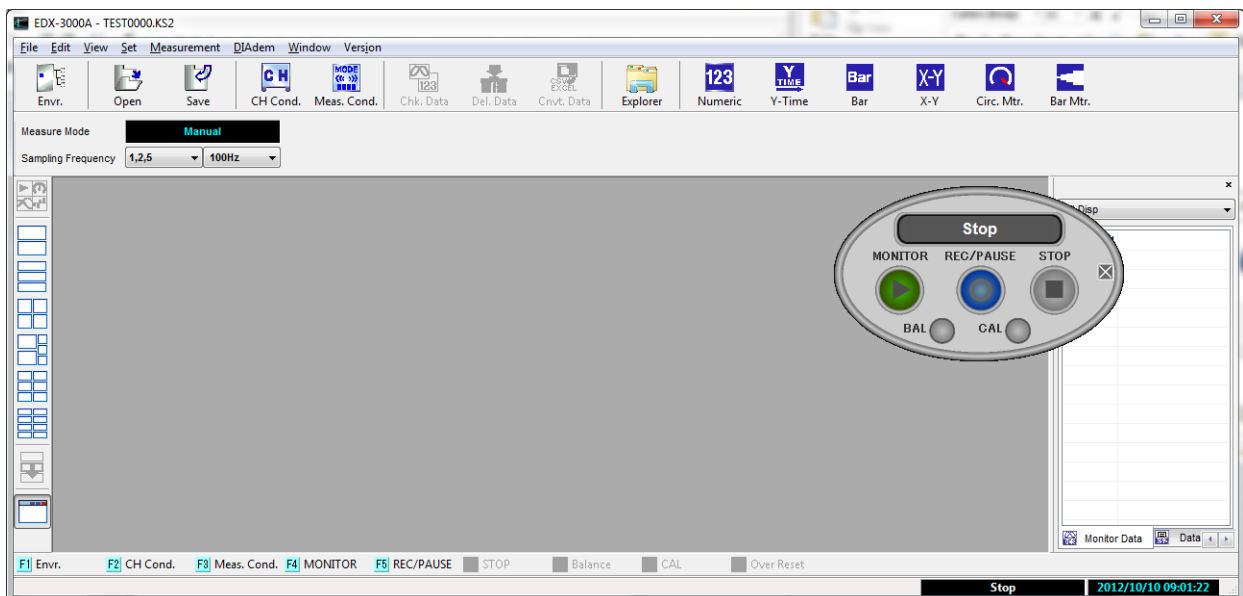
2-3-1-1 Environment

With the EDX-3000A, set items in the following procedures.



<Settings>

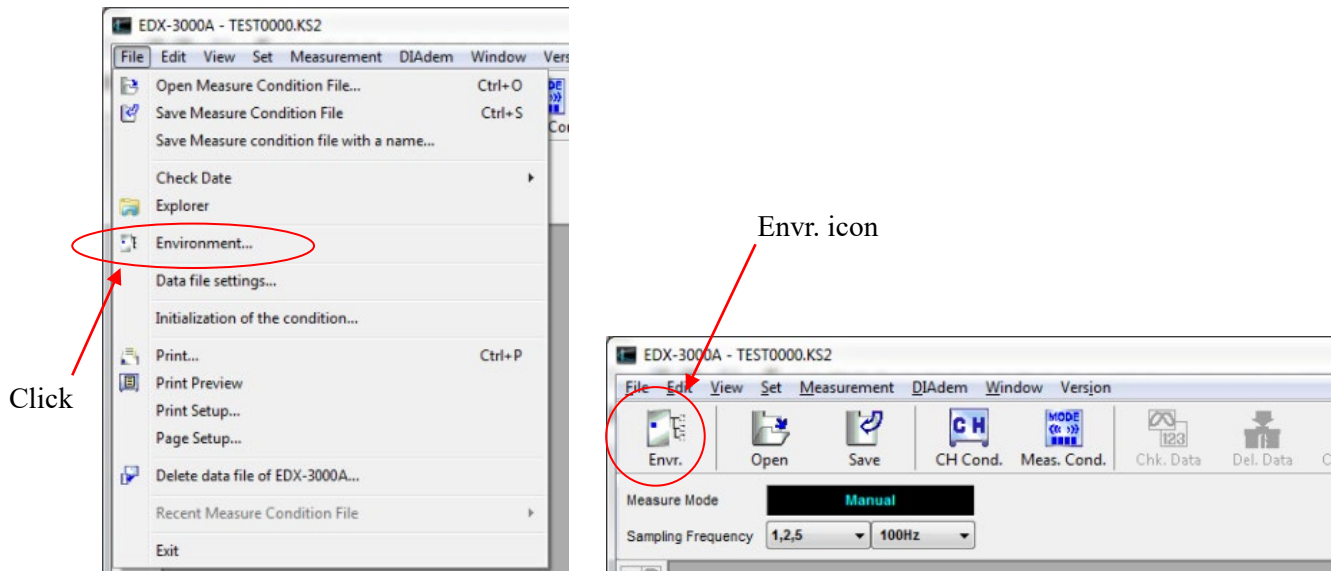
Initial Screen



Environment

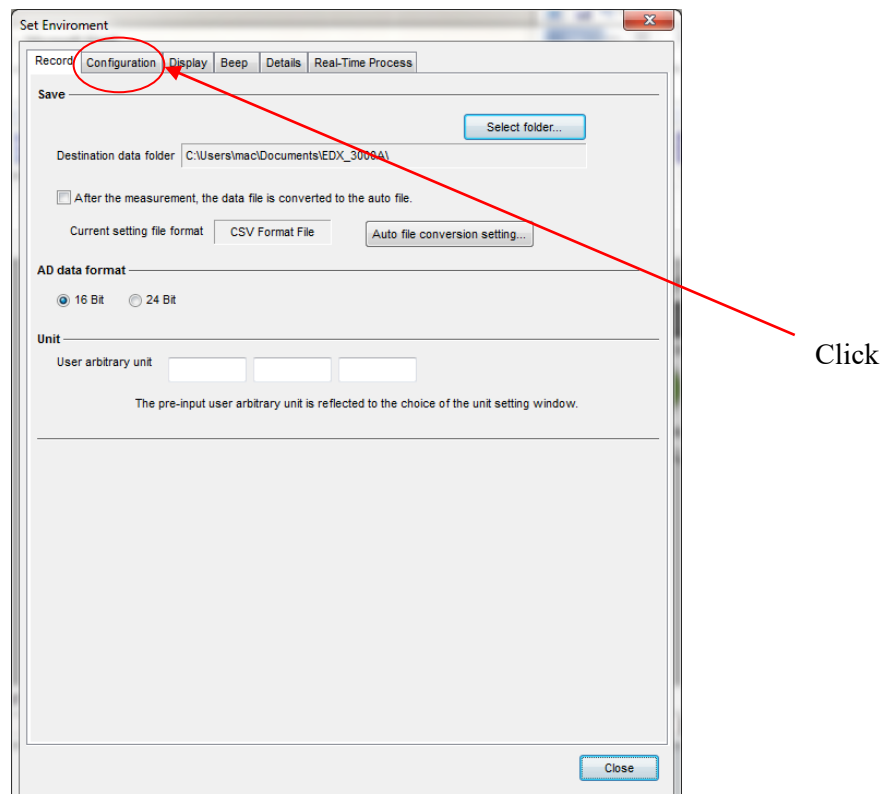
Open the Set Environment window as described below:

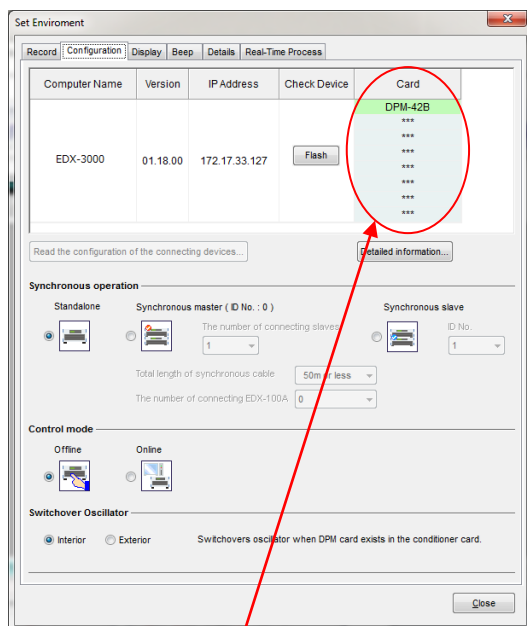
- Click the File - Environment.
- Click the Envr. icon from the toolbar.



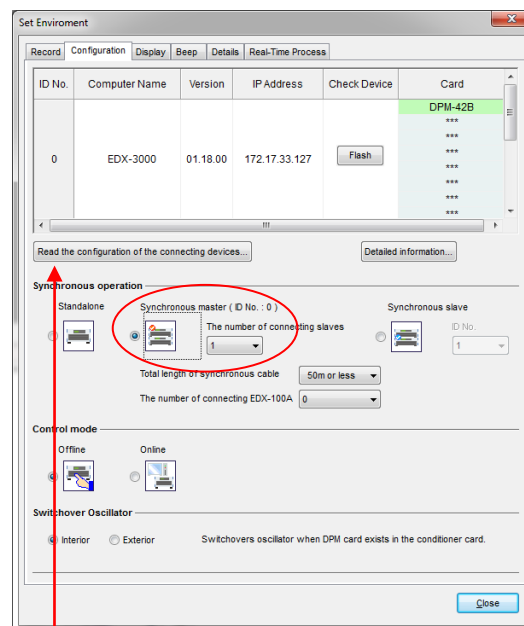
The following window appears.

Click the Configuration tab on the Set Environment window.



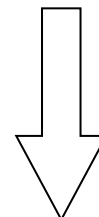


The model appears.

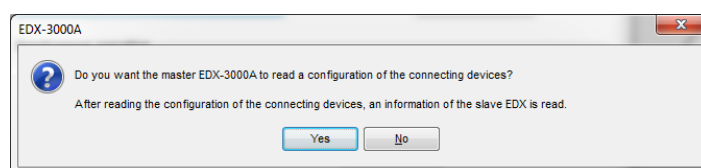


When the EDX series is used as the synchronous master, select the "Synchronous mater" and click the Read the configuration of the connecting devices... button.

The model appears on the Set Environment window. When the EDX series is used as the synchronous master, hardware configuration of slave units are also appear on the Set Environment window. To load the hardware configuration of slave units, click the Read the configuration of the connecting devices... button.



The right message appears. Click the Yes button. The new hardware configuration will appear on the Connection Configuration window.



NOTE

Although the Read the configuration of the connecting devices... button is pressed, if "DISABLE" or "UNKNOWN" is displayed as the "Card Type" on the system menu screen, it is required to update the EDX series hardware. Contact our representative for updating the EDX series hardware.

Oscillator

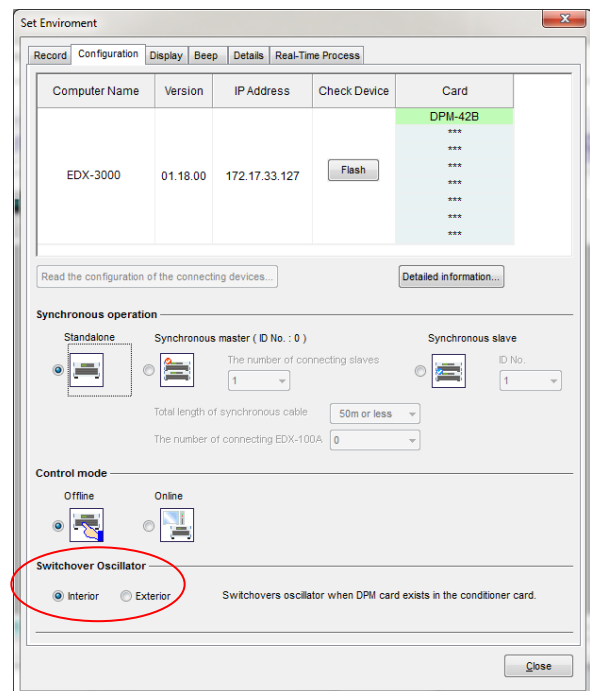
Set an oscillator for carrier wave that is used for the DPM card. The carrier wave frequency is approximately 12 kHz.

When the DPM card is installed, do not forget to confirm the setting of the oscillator. There are 2 types of oscillators, internal and external. Normally, when the EDX series is solely used in stand-alone form or when it is used as synchronous master, setting of the oscillator is internal side.

MEMO

When the external oscillator is used instead of EDX-3000A internal oscillator, input the external oscillator from 4 pin (+ side) and 10 pin (- side) of CONT IN connector on the EDX-3000A rear face. Set the external oscillator to have frequency 12 kHz and sinewave of amplitude 2 Vrms. When switching to the external oscillator, do not forget to execute internal sensitivity compensation. (For details, see 2-3-1-3 Setting Internal Sensitivity Compensation.)

Select the internal oscillator or external oscillator on the Connection Configuration window as shown at the right.



NOTE

- The DPM card would not operate unless the external oscillator has frequency of 12 kHz and sinewave of amplitude 2 Vrms.
- When the EDX series mainbody is set to a slave EDX, set it to the external oscillator, always execute internal sensitivity compensation (for details, see 2-3-1-3 Setting Internal Sensitivity Compensation). Oscillator of the slave EDX is provided from the master EDX. For connecting multiple EDX series units, use synchronous cables [N-95] (optional accessory). For details, see the EDX-3000A Instruction Manual.

2-3-1-2 Setting Channels

Set channels.

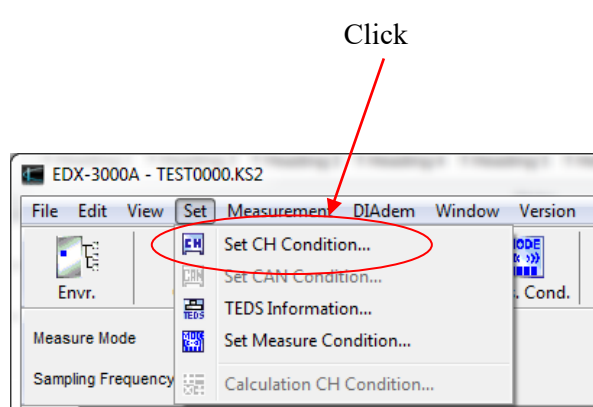
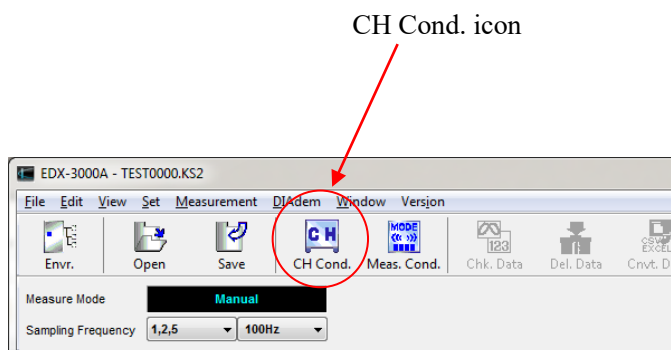
Set items in the following procedures.

<u>Initial Screen</u>							
↓							
<u>Channel condition</u>							
<u>Item</u>	① Measurement ON/OFF	② Mode	③ Range (note)	④ Low Pass Filter	⑤ Balance	⑥ Comp IntSense	⑦ CAL Range
<u>Selections</u>	Measure Not measure	BV (2.0V) BV (0.5V)	200 $\mu\text{m/m}$ 500 $\mu\text{m/m}$ 1k $\mu\text{m/m}$ 2k $\mu\text{m/m}$ 5k $\mu\text{m/m}$ 10k $\mu\text{m/m}$ 20k $\mu\text{m/m}$ 50k $\mu\text{m/m}$ OFF	FLAT 1k Hz 300 Hz 100 Hz 30 Hz 10 Hz AUTO*	ON OFF	ON OFF	100 % 50% SHUNT
↓							
<u>Initial Screen</u> *Displayed on the DPM-42B-F/42B-I-F. (Note) Selectable range varies with Mode.							
↓							
<u>Measurement</u>							

<Channel settings>

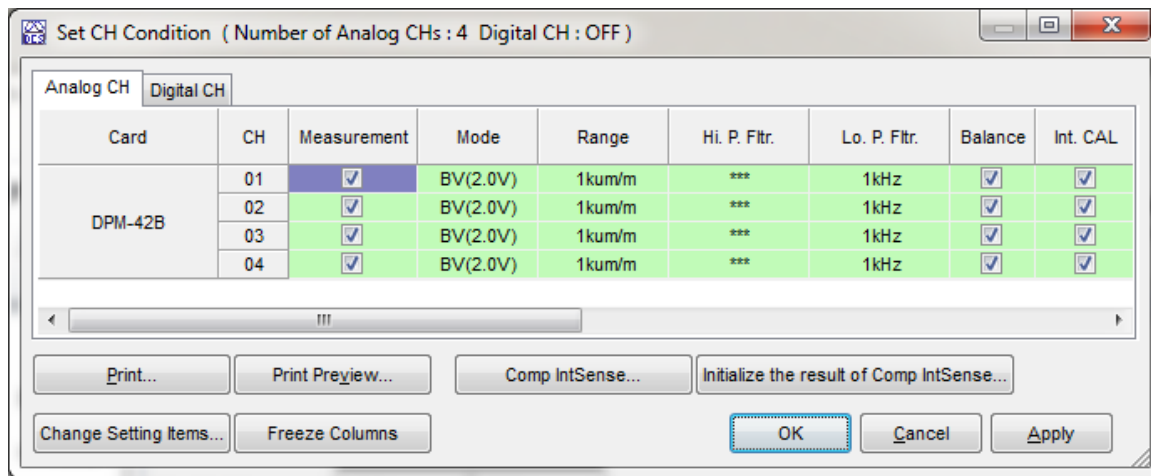
Initial Screen

- Click the CH Cond. icon from the toolbar.
- Click the Set - Set CH Condition.



Set CH Condition window

The following window appears.



Measurement ON/OFF

Put a check mark to the check box next to the target channel.

Mode

Set the "Mode" for each channel.

Select BV (2.0 V) or BV (0.5 V) from the list box.

Range

Set the "Range".

BV (2.0 V): 200 μ m/m, 500 μ m/m, 1k μ m/m, 2k μ m/m, 5k μ m/m, 10k μ m/m, 20k μ m/m, or OFF

BV (0.5 V): 1k μ m/m, 2k μ m/m, 5k μ m/m, 10k μ m/m, 20k μ m/m, 50k μ m/m, or OFF

It is required to select an appropriate "Range" according to the magnitude of the input signal. In addition, set the "Range" by considering the following.

- When the input signal is exceedingly smaller than the preset "Range", measuring accuracy may decrease.
- When the input signal is larger than the preset "Range", both recording data and monitor output become saturated.
- The smaller the "Range" is, the higher becomes the gain of the DPM card. Therefore, the noise tends to become larger.
- Set the "Range" to OFF. Then, the monitor output would not change and remain to be approximately 0 V.

Next, examples of setting "Range" when using a strain gage and a strain gage transducer are described in the following.

- Using a strain gage

- ① Estimate the magnitude of the strain to be measured. Estimate the magnitude of the strain by considering the material or structure of the target to be measured.
- ② Set the "Range" to a larger than and most approximate value to the magnitude of the estimated strain.

- Using a strain gage transducer

By referring to an equivalent strain output written on the Test Data Sheet of the strain gage transducer, estimate the magnitude of the strain obtained in the measurement and set the "Range" to a larger than and most approximate value to the magnitude of the estimated strain.

[Example]

By using data of the strain gage transducer in the following Test Data Sheet, when a strain output of approximately 30% of rated output is predicted, strain output is obtained by the following expression.
Equivalent strain output $\times 0.3 \approx 1200 \mu\text{m/m}$. Therefore, set the "Range" to 2000 $\mu\text{m/m}$ that is 2k $\mu\text{m/m}$.

Test Data Sheet					
Test Data Sheet					
Model name	LC-5TG	Data of Inspection	2005・9・ 7	Production number	・ ・ ・ ・ ・
Rated Capacity	50kN	Temperature	23℃	Humidity	50%
1. Rated output		2000.1 $\mu\text{V/V}$			
Rated output		4000.2 $\times 10^{-6}$			
2 Nonlinearity		0.01 %RO			

Equivalent strain output

MEMO

If the desired "Range" is not displayed on the "Range" setting window, check the "Mode."

Low Pass Filter

Set the "Low Pass Filter". Select the low pass filter from the list box.

DPM-42B/42B-I: FLAT, 1kHz, 300Hz, 100Hz, 30Hz, or 10Hz

DPM-42B-F/42B-I-F: FLAT, 1kHz, 300Hz, 100Hz, 30Hz, 10Hz, AUTO

When AUTO is selected, the anti-aliasing filter becomes "ON" and cutoff frequency is set to 1/4 of the sampling frequency. (For details, see 1-5 PRECAUTIONS FOR USING DPM-42B-F/42B-I-F.)

The low pass filter removes high frequency component from the sensor output signal. The low pass filter is especially effective for output signal with exceeding noise. When the input signal sinusoidally (sin functionally) varies, set the low pass filter 2 to 5 times large the input signal frequency. If the input signal rapidly changes, set the low pass filter to approximately 10 times larger than the signal frequency.

NOTE

Compatible sampling frequency range of the anti-aliasing filter is 100 Hz or more.

Although the card is DPM-42B-F/42B-I-F, if "AUTO" is not displayed on the "Low Pass Filter" setting window, check whether or not the sampling frequency is set to less than 100 Hz.

If "Low Pass Filter" is set to "AUTO" with one channel, sampling frequency of less than 100 Hz would not appear on the "Sampling Frequency" setting window.

When setting the sampling frequency of less than 100 Hz, set the low pass filter to other than "AUTO."

On the contrary, if the sampling frequency is set to less than 100 Hz, "AUTO" would not appear on the "Low Pass Filter" setting window.

Balance ON/OFF

Put a check mark to the check box next to the target channel.

Only channels with a check mark are allowed for executing initial balance during measurements.

NOTE

During recording measured data, executing balance is not available.

To execute balance, click the **BAL** button on the Meas Operation Panel (see the left figure). After a while, it automatically ends balancing and the balanced results are displayed on the window. (See the following right figure.)

Channels indicated with "NG" mean that the bridge balance adjust results are exceeding the balance standard value.

Re-check sensors and connection cable of the relevant channels, remove the cause and execute balance once again.



BAL button

The image shows a "Balance result" window with a title bar that says "Balance result (OK : 2CH NG : 2CH Other : 4CH Total : 8CH)". The window contains a table with three columns: Card, CH, and Result. The Card column shows "DPM-42B". The CH column lists channels 01 through 08. The Result column shows "OK" for channels 01, 03, and 05; "NG" for channels 02 and 04; and "***" for channels 06, 07, and 08. A "Close" button is at the bottom right.

Card	CH	Result
DPM-42B	01	OK
	02	NG
	03	OK
	04	NG
	05	***
	06	***
	07	***
	08	***

NOTE

When balance is executed to the DPM card, not only initial balance is adjusted when sensors are connected or changed but also offset value is calculated when standard equivalent strain (CAL) is entered. When the following conditions are changed, re-execute the balance once again.

- "Mode"
- "Range"
- "Anti-aliasing filter"

Always execute balance to all the channels that are used for the measurement.

Comp IntSense ON/OFF

Put a check mark to the check box next to the target channel.

Before executing the internal sensitivity compensation (see 2-3-1-3 Setting Internal Sensitivity Compensation), put a check mark.

CAL Range

Set the output value of the CAL.

Select "100%", "50%", or "SHUNT" from the list box.

- When 100% (50%) is selected

When +CAL is executed, +100% (+50%) of range value, and when -CAL is executed, -100% (-50%) of range value is added to the current output and displayed.

- When SHUNT is selected

Input fixed resistance between [+ Bridge excitation] and [- Input] of the strain gage bridge and add a certain value to the current output and display the obtained value. The output value is determined by the bridge resistance of the strain gage bridge irrespective of the CAL range.

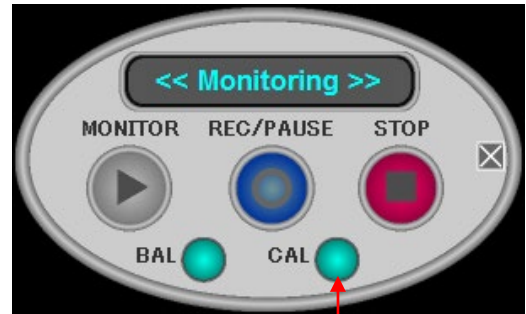
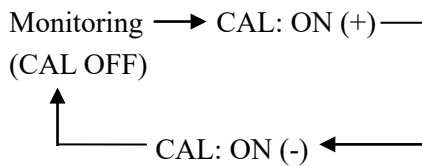
Output value for each bridge resistance is described in the following.

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

Calculation formula

$$\text{Output value} = \frac{\text{Bridge Resistance}}{1.36} \quad [\mu\text{m/m}]$$

To execute CAL, click the **CAL** button on the Meas Operation Panel (see the left figure). The following operations are repeated every time the **CAL** button is pressed.



CAL button

MEMO

- When "SHUNT" is selected, the same output with both +CAL and -CAL and accuracy is around $\pm 5\%$.
- Executing CAL, during recording measured data, is only available in manual measurement mode.

Measurement

After all the settings are complete, click the **OK** button on the Set CH Condition window to return to the initial screen.

To start the measurement, click the **MONITOR** button on the Meas Operation Panel.



MONITOR button

NOTE

For details, see EDX-3000A Instruction Manual.

2-3-1-3 Setting Internal Sensitivity Compensation

Internal sensitivity compensation is a function used in the following case.

- When setting the oscillator to the "external oscillator."
- When compensating sensitivity
- When the input cable is long.
- When connecting a sensor for the first time.
- When changing the "Range".

When compensating the internal sensitivity, the sensitivity is finely adjusted by the internal CAL.

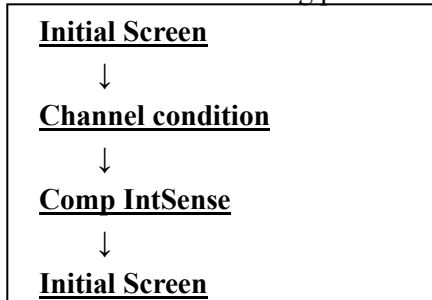
When an extension cable[N-81 to 85, 100](cable core cross-section area: 0.5mm²) is used, after compensating the internal sensitivity, multiply the recording data by the value in the following table. Error (sensitivity decrease) caused by the extension cable is compensated.

Extension cable Bridge resistance	5 m	25 m	50 m	75 m	100 m	200 m
120 ohm	1.0043	1.0182	1.0314	1.0517	1.0664	1.1057
350 ohm	1.0019	1.0085	1.0153	1.0244	1.0316	1.0497

NOTE

Prior to internal sensitivity compensation, do not forget to connect the actually using sensor. In addition, after compensating the internal sensitivity, when the sensor is replaced with a different one, since the results of the previous sensitivity compensation is effective, always initialize and reset the EDX series or execute the internal sensitivity compensation once again. Take care that internal sensitivity compensation is executed in a state with no change in sensor input.

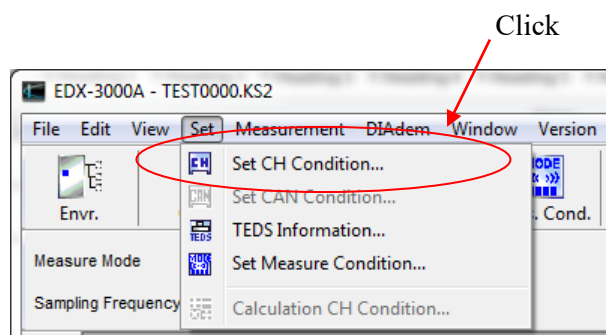
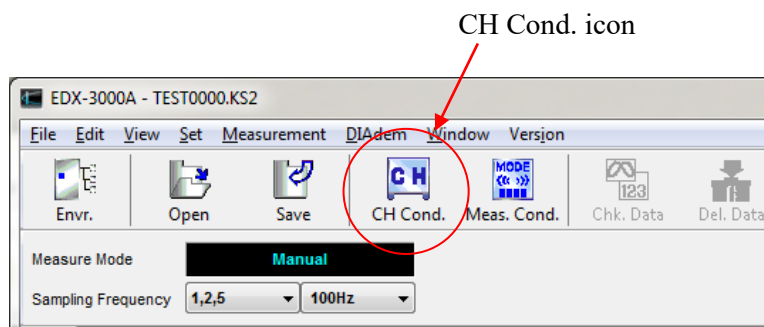
Set items in the following procedures.



<Internal sensitivity compensation settings>

Initial Screen

- Click the CH Cond. icon from the toolbar.
- Click the Set - Set CH Condition.

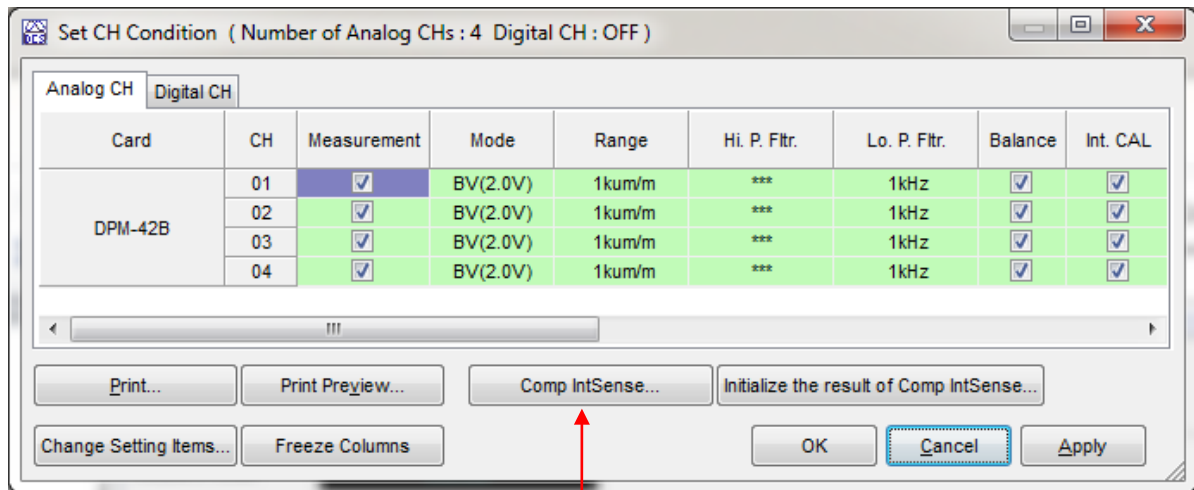


Set CH Condition window

The following window appears.

Only channels with a check mark on the Measurement ON/OFF column are allowed for executing internal sensitivity compensation.

Click the **Comp IntSense...** button.



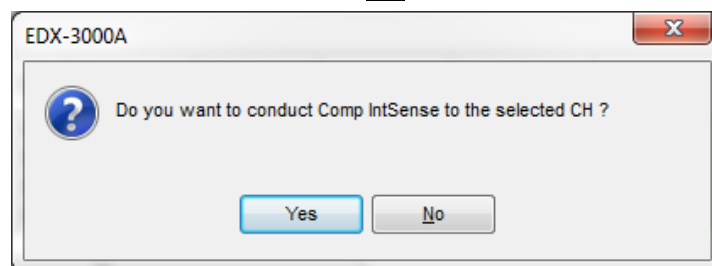
Click

Comp IntSense... button

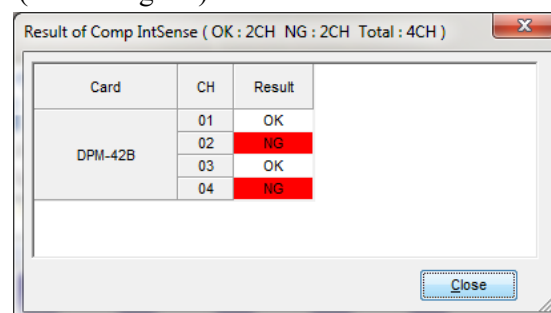
Click the **Comp IntSense...** button. The following window appears.

To execute the internal sensitivity compensation, click the **Yes** button.

To stop the internal sensitivity compensation, click the **No** button.



After a while, it automatically ends the internal sensitivity compensation and the compensated results are displayed on the window. (See the figure.)



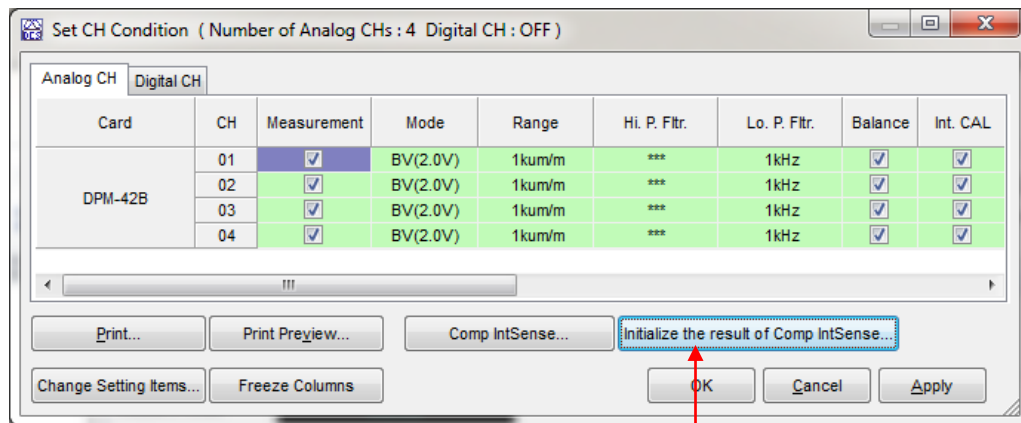
For channels indicated with "NG", re-check sensors and connection cable of the relevant channels, remove the cause and execute balance once again.

Confirm compensation results of all the channels are all "OK". On and after then, internal sensitivity compensation of the channels are active.

Initialize

Sensitivity of channels, subjected to internal sensitivity compensation, are compensated. To initialize the internal sensitivity compensation, click the Initialize the result of Comp IntSense... button on the Set CH Condition window.

On and after then, the sensitivity is returned to the initial state.



Click

2-3-2 By Using the DCS-100A

2-3-2-1 Environment

With the Dynamic Data Acquisition Software DCS-100A, set items in the following procedures.

Set Environment window of the EDX-3000A

↓
Initial Screen

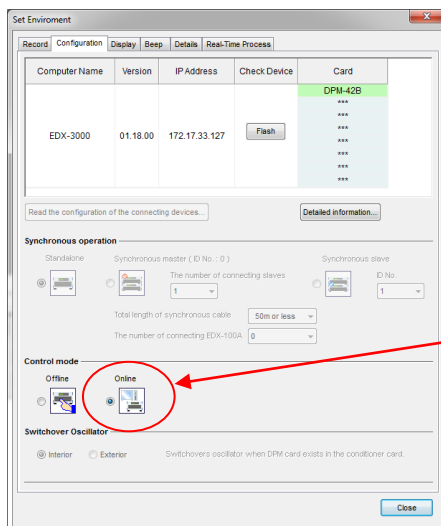
↓
Environment

↓
Oscillator

↓
Initial Screen

<Settings>

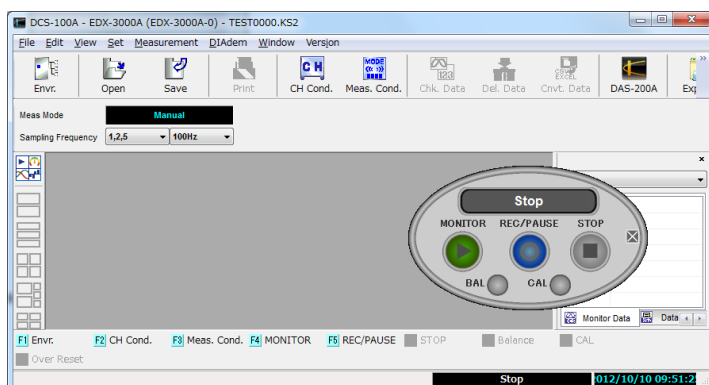
Set Environment window of the EDX-3000A



Click

To control the EDX-3000A by using the Dynamic Data Acquisition Software DCS-100A, set the control mode to "Online". You can set the control mode to "Online" on the Set Environment window.

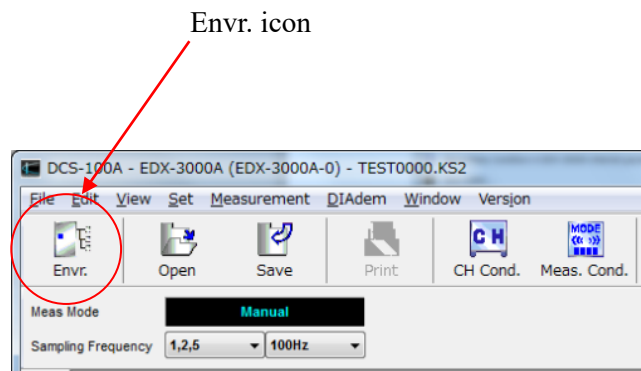
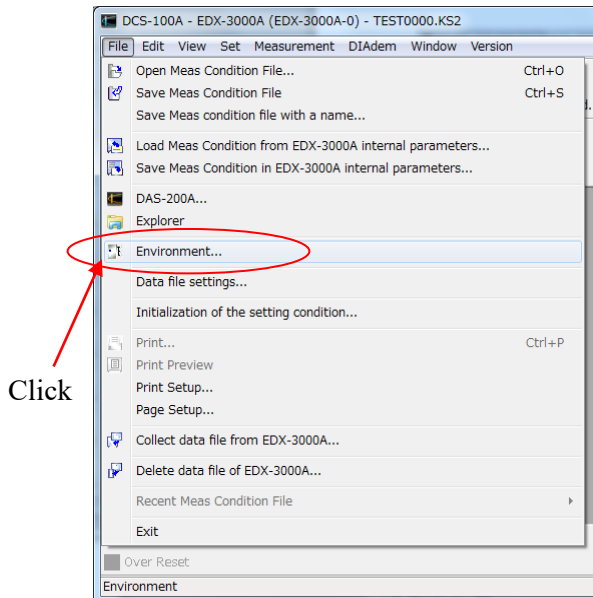
Initial Screen of the DCS-100A



Environment

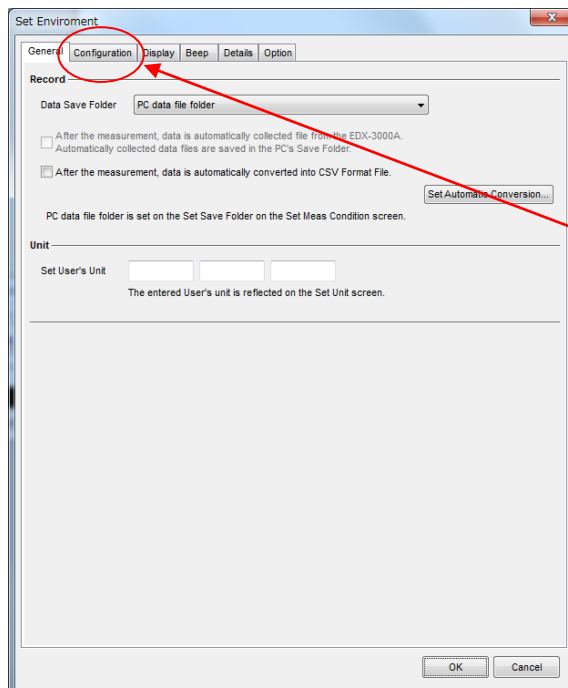
Open the Set Environment window of the DCS-100A as described below:

- Click the File - Environment.
- Click the Envr. icon from the toolbar.



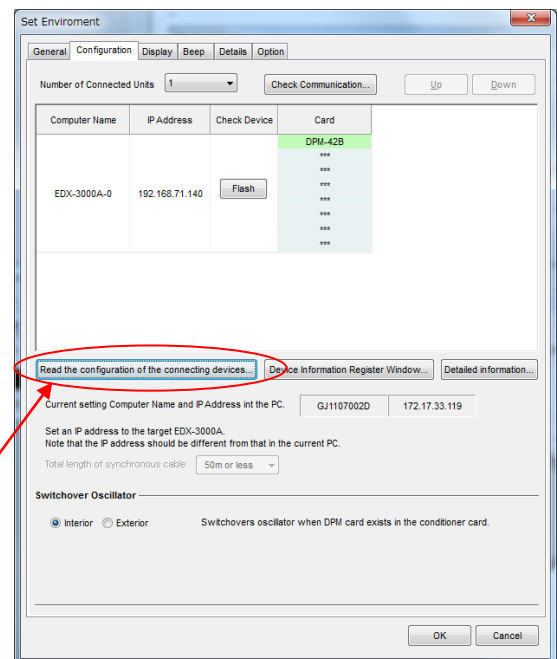
The following window appears.

Click the Configuration tab on the Set Environment window.

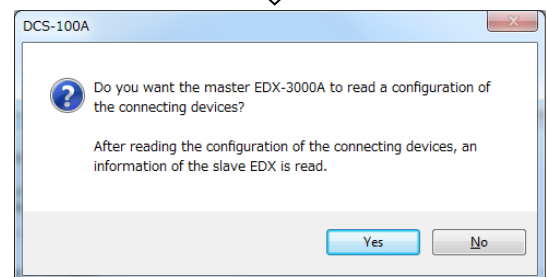


Click the **Read the configuration of the connecting devices...** button. The EDX-100A is searched online for loading the hardware configuration.

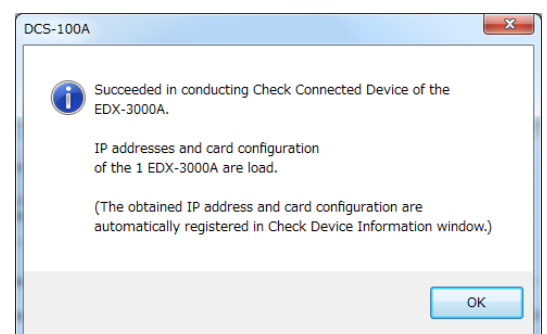
Click



The above message appears. Click the **Yes** button.



The right message appears. Click the **Yes** button. The new hardware configuration will appear on the Connection Configuration window.



NOTE

Although the **Read the configuration of the connecting devices...** button is pressed, if "DISABLE" or "UNKNOWN" is displayed as the "Card Type" on the system menu screen, it is required to update the EDX series hardware. Contact our representative for updating the EDX series hardware.

Oscillator

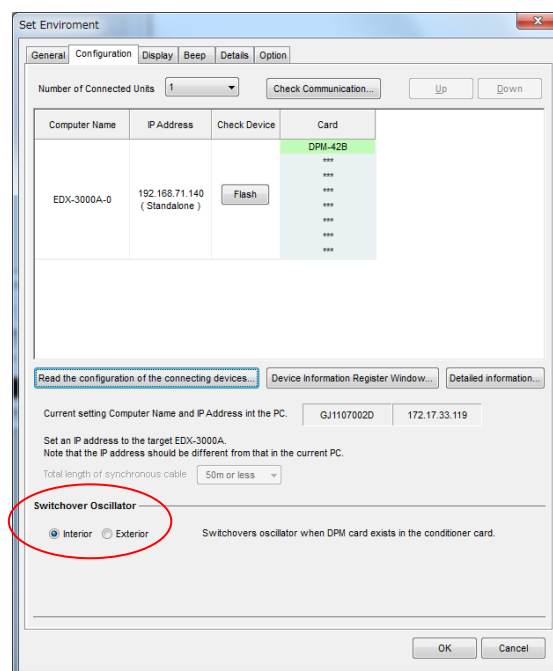
Set an oscillator for carrier wave that is used for the DPM card. The carrier wave frequency is approximately 12 kHz.

When the DPM card is installed, do not forget to confirm the setting of the oscillator. There are 2 types of oscillators, internal and external. Normally, when the EDX series is solely used in stand-alone form or when it is used as synchronous master, setting of the oscillator is internal side.

MEMO

When the external oscillator is used instead of EDX-3000A internal oscillator, input the external oscillator from 4 pin (+ side) and 10 pin (- side) of CONT IN connector on the EDX-3000A rear face. Set the external oscillator to have frequency 12 kHz and sinewave of amplitude 2 Vrms. When switching to the external oscillator, do not forget to execute internal sensitivity compensation. (For details, see 2-3-2-3 Setting Internal Sensitivity Compensation.)

Select the internal oscillator or external oscillator on the Connection Configuration window as shown at the right.



NOTE

- The DPM card would not operate unless the external oscillator has frequency of 12 kHz and sinewave of amplitude 2 Vrms.
- When the EDX series mainbody is set to a slave EDX, set it to the external oscillator, always execute internal sensitivity compensation (for details, see 2-3-2-3 Setting Internal Sensitivity Compensation). Oscillator of the slave EDX is provided from the master EDX. For connecting multiple EDX series units, use synchronous cables [N-95] (optional accessory). For details, see the EDX-3000A Instruction Manual.

2-3-2-2 Setting Channels

For details, see 2-2-2 Setting Channels.

2-3-2-3 Setting Internal Sensitivity Compensation

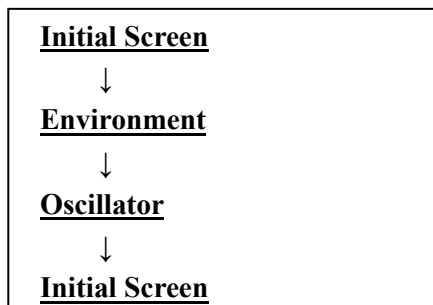
For details, see 2-2-3 Setting Internal Sensitivity Compensation.

2-4 BY USING THE EDX-200A

With the EDX-100A, settings are executed by using the Dynamic Data Acquisition Software DCS-100A.

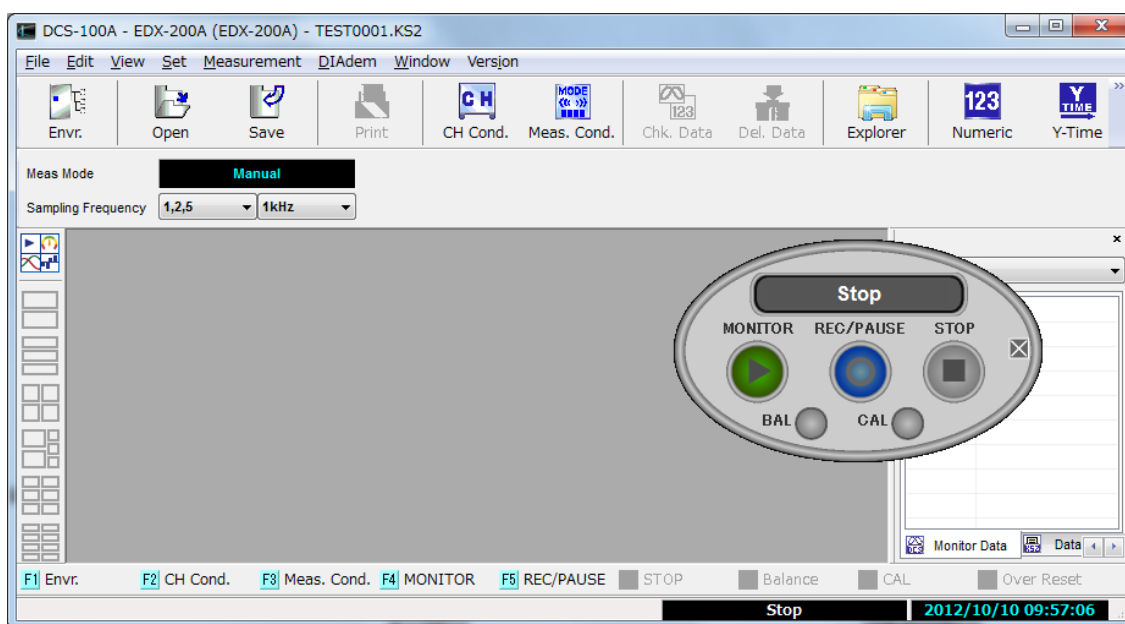
2-4-1 Environment

Set items in the following procedures.



<Settings>

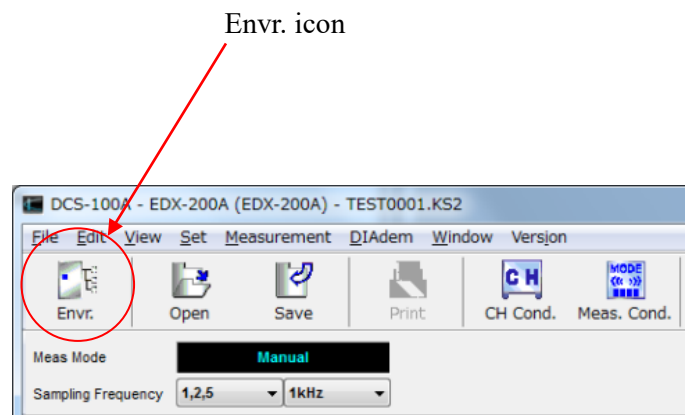
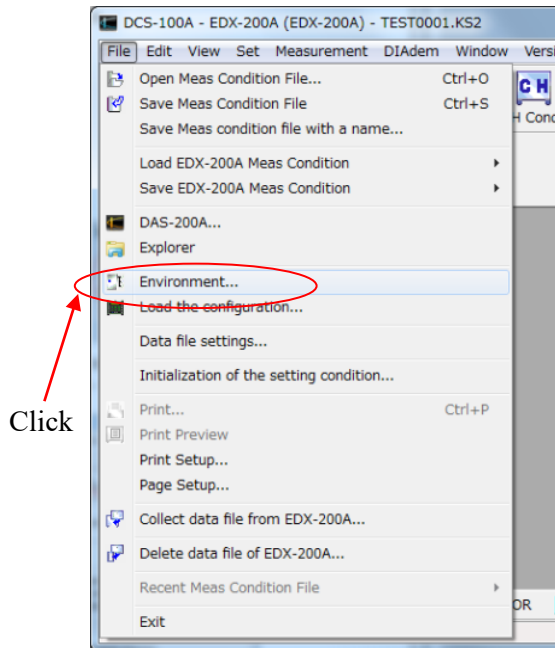
Initial Screen



Environment

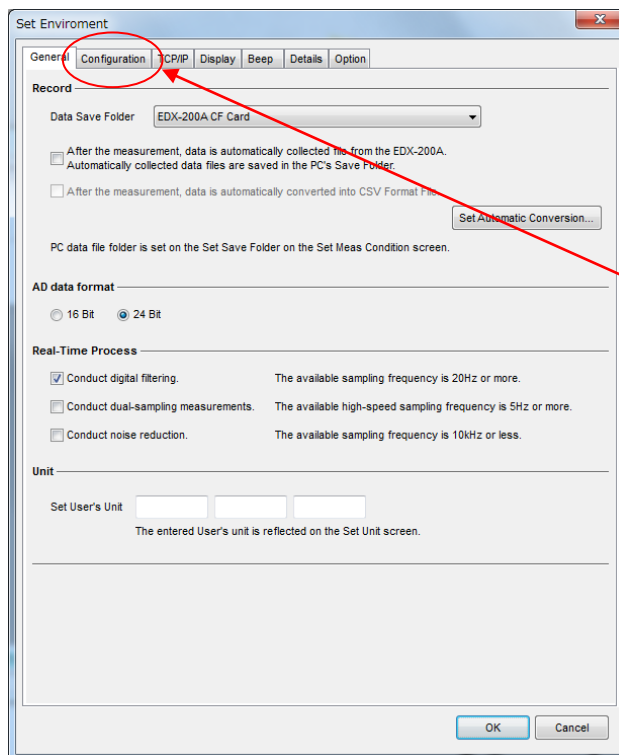
Open the Set Environment window as described below:

- Click the File - Environment.
- Click the Envr. icon from the toolbar.



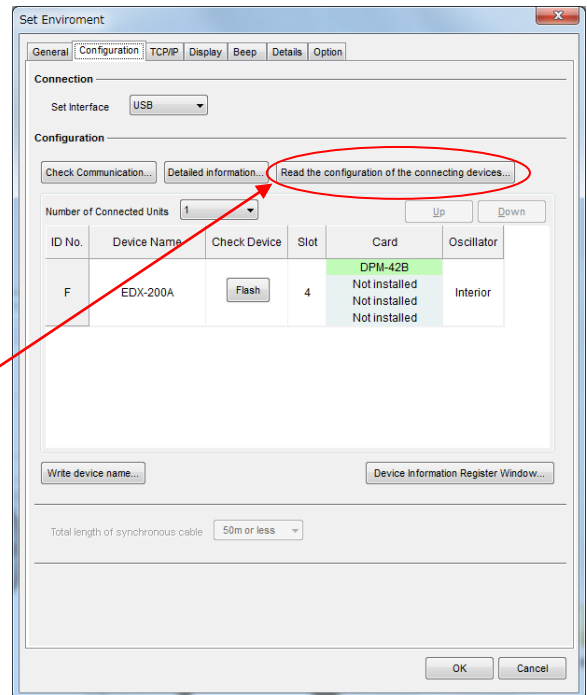
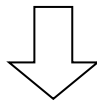
The following window appears.

Click the Configuration tab on the Set Environment window.

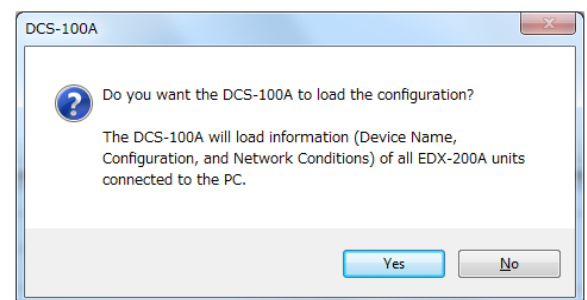
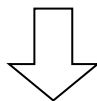


Click the **Check Connected Device...** button. The EDX-200A is searched online for loading the hardware configuration. Before pressing, make sure the control interface and ID No. of the EDX-200A are correct.

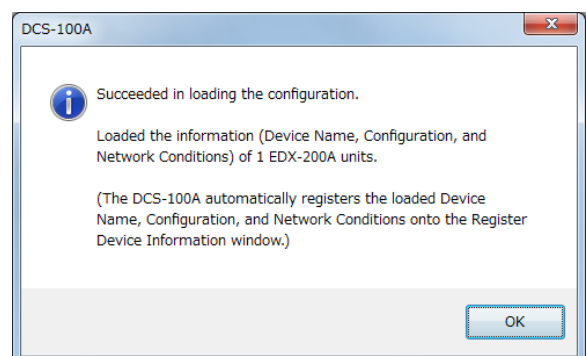
Click



The right message appears. Click the **Yes** button.



Click the **OK** button. The new hardware configuration will appear on the Connection Configuration window.



NOTE

Although the **Read the configuration of the connecting devices...** button is pressed, if "DISABLE" or "UNKNOWN" is displayed as the "Card Type" on the system menu screen, it is required to update the EDX series hardware. Contact our representative for updating the EDX series hardware.

Oscillator

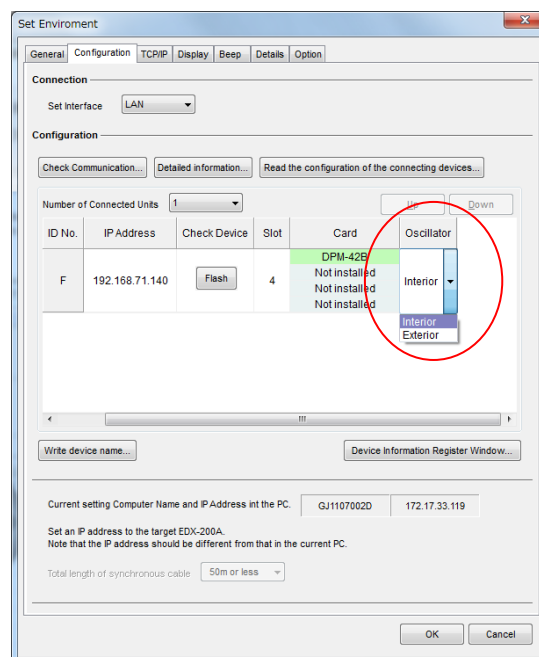
Set an oscillator for carrier wave that is used for the DPM card. The carrier wave frequency is approximately 12 kHz.

When the DPM card is installed, do not forget to confirm the setting of the oscillator. There are 2 types of oscillators, internal and external. Normally, when the EDX series is solely used in stand-alone form or when it is used as synchronous master, setting of the oscillator is internal side.

MEMO

When the external oscillator is used instead of EDX-200A internal oscillator, input the external oscillator from 4 pin (+side) and 10 pin (- side) of CONT IN connector on the EDX-200A rear face. Set the external oscillator to have frequency 12 kHz and sinewave of amplitude 2 Vrms. When switching to the external oscillator, do not forget to execute internal sensitivity compensation. (For details, see 2-4-3 Setting Internal Sensitivity Compensation.)

Select the internal oscillator or external oscillator on the Connection Configuration window as shown at the right.



NOTE

- The DPM card would not operate unless the external oscillator has frequency of 12 kHz and sinewave of amplitude 2 Vrms.
- When the EDX series mainbody is set to a slave EDX, since it is automatically set to the external oscillator, always execute internal sensitivity compensation (for details, see 2-4-3 Setting Internal Sensitivity Compensation). Oscillator of the slave EDX is provided from the master EDX. For connecting multiple EDX series units, use synchronous cables [N-95] (optional accessory). For details, see the EDX-200A Instruction Manual.

2-4-2 Setting Channels

For details, see 2-2-2 Setting Channels.

2-4-3 Setting Internal Sensitivity Compensation

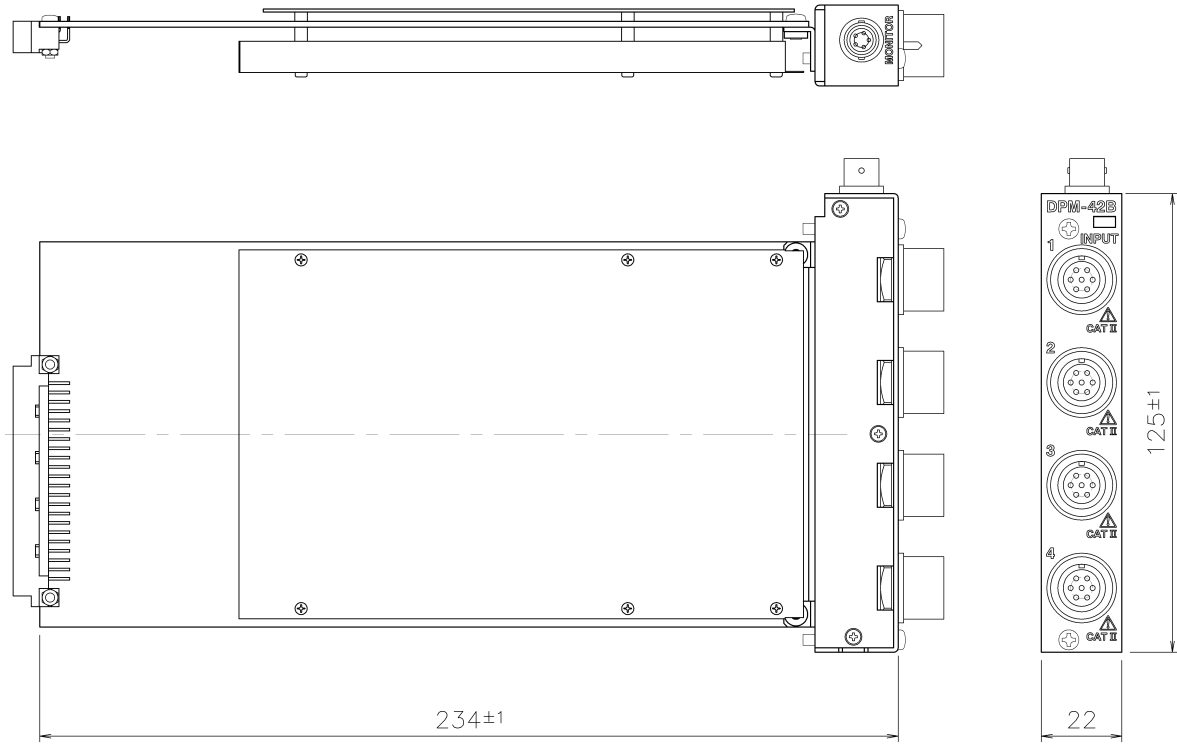
For details, see 2-2-3 Setting Internal Sensitivity Compensation.

3. SPECIFICATIONS

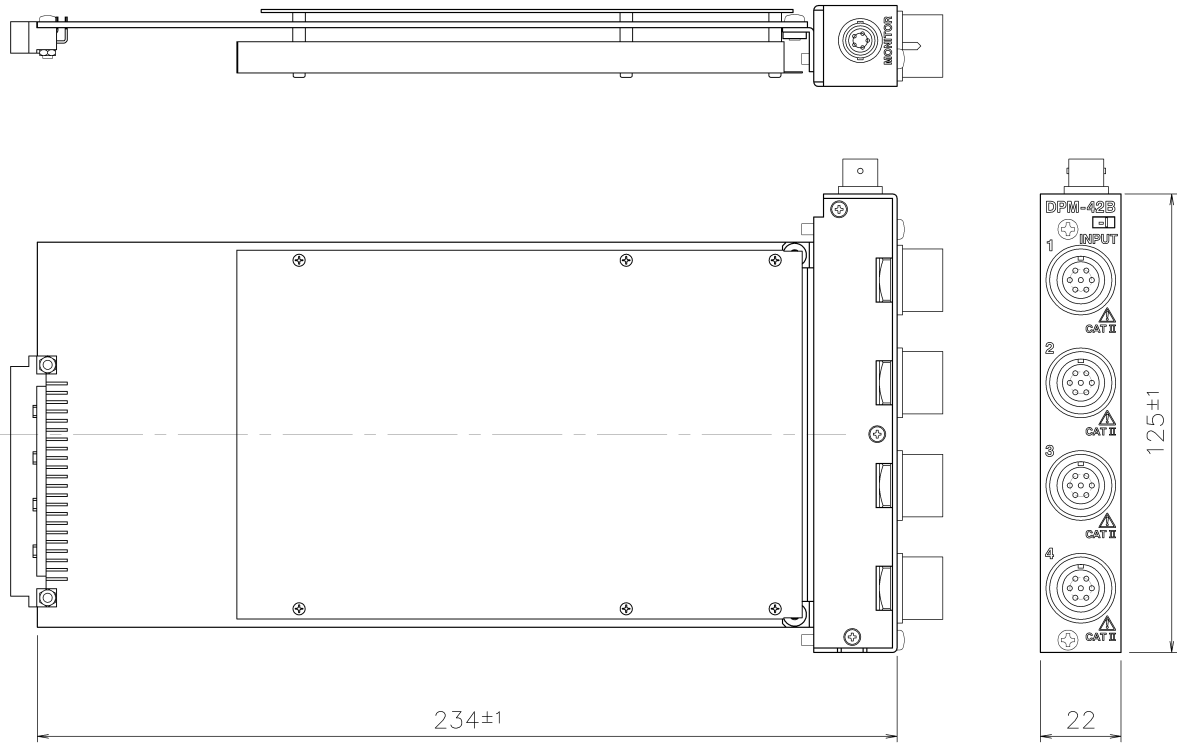
3.1 HARDWARE SPECIFICATIONS

Name	Dynamic strain amplifier card
Compatible sensors	Strain Gages, Strain Gage Transducers
Number of measuring channels	4
Frequency response range	DC to 5k Hz (Deviation: Within $\pm 10\%$)
Compatible bridge resistance	120 to 1000 ohm
Gage factor	2.00 fixed
Bridge excitation	2 Vrms and 0.5 Vrms selectable, 12k Hz sine wave
Balancing range	Resistance: Within $\pm 2.4\%$ ($\pm 12000 \mu\text{m/m}$) Capacitance: Within 2000pF
Balancing Method	Resistance: Auto balance (Saved in nonvolatile memory) Capacitance: CST method (Auto-tracking)
Range	【Bridge excitation: When 2 Vrms】 8 steps of 200, 500, 1000, 2000, 5000, 10000, 20000 $\mu\text{m/m}$ and OFF 【Bridge excitation: When 0.5 Vrms】 7 steps of 1000, 2000, 5000, 10000, 20000, 50000 $\mu\text{m/m}$ and OFF Accuracy: Within $\pm 0.5\%$ FS $\pm 100\%$ and $\pm 50\%$ of each range Accuracy: Within $\pm (0.5\% + 0.5 \mu\text{m/m})$
Calibration	Within $\pm 0.2\%$ FS
Nonlinearity	Second order butterworth Cutoff frequency: 6 steps of 10, 30, 100, 300, 300, 1kHz and FLAT Cutoff accuracy: $-3 \pm 1\text{dB}$ Attenuation: $-12 \pm 1\text{dB/oct.}$
Low pass filter	
Signal-noise ratio	【DPM-42B/DPM-42B-F】 50dB _{p-p} or more (Range: 500 $\mu\text{m/m}$, Low pass filter: FLAT) 【DPM-42B-I/DPM-42B-I-F】 44dB _{p-p} or more (Range: 500 $\mu\text{m/m}$, Low pass filter: FLAT)
Resolution	16 bits
Monitor output	Accuracy: $\pm 5 \text{ V} \pm 0.5\%$ (full scale in plus and minus directions) Nonlinearity: Within $\pm 0.5\%$ FS
Withstand voltage	250 VAC for 1 minute between input and output
Additional functions	Input check function: Checking input by inserting a resistor to a side of the bridge. Reading information of TEDS-installed sensor
Anti-aliasing filter	Eighth order butterworth
(DPM-42B-F, DPM-42B-I-F)	Cutoff frequency: Automatically set at sampling frequency $\times 0.25$. Cutoff characteristics: $-48 \pm 5 \text{ dB}$ (with sampling frequency $\times 0.5$) (Note) Provided that low pass filter is set to [AUTO].
Noise immunity	Reducing inverter noise
(DPM-42B-I, DPM-42B-I-F)	
Compliance	Directive 2014/30/EU (EMC) Directive 2011/65/EU, (EU)2015/863(10 restricted substances) (RoHS)

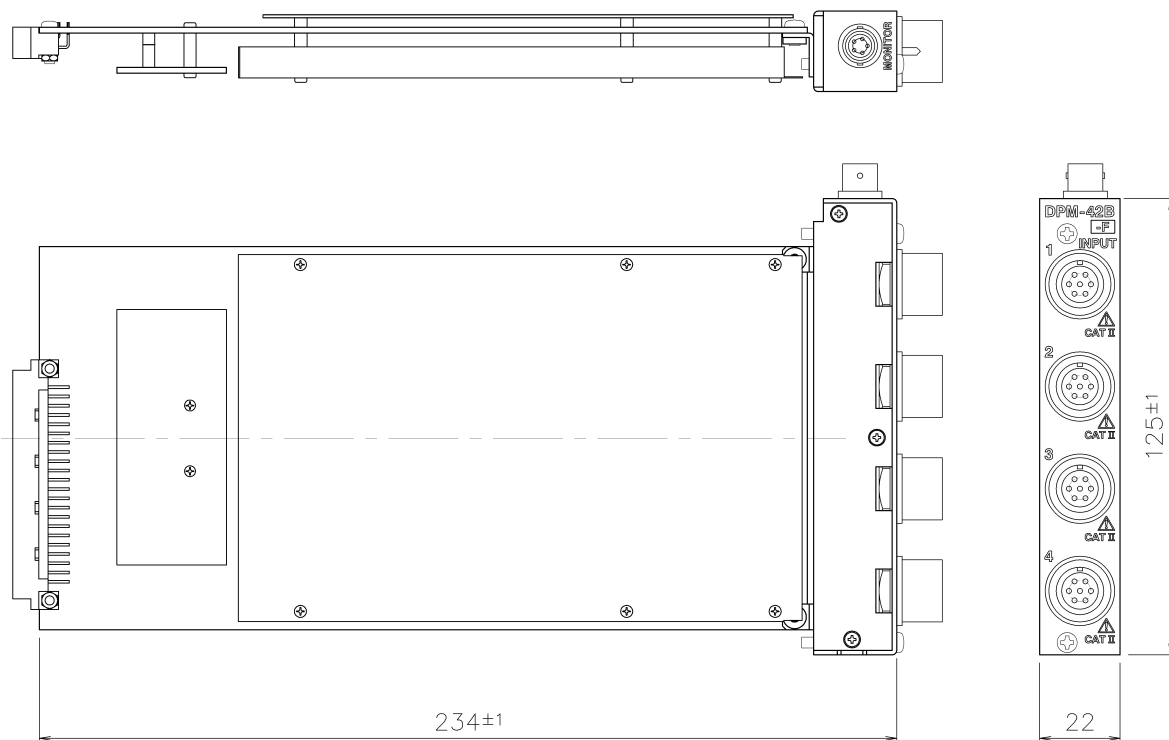
3.2 OUTSIDE DRAWING



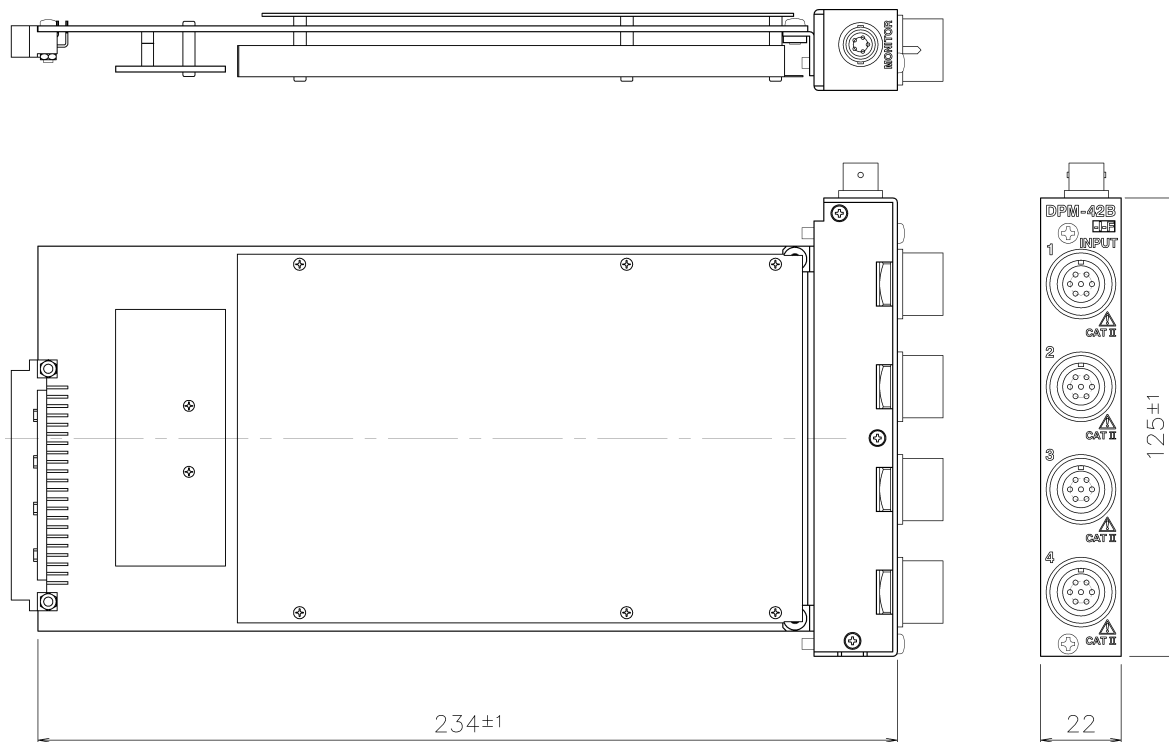
< DPM-42B >



< DPM-42B-I >



< DPM-42B-F >



< DPM-42B-I-F >

4. OPTIONAL ACCESSORIES

Monitor Output Cable <H-10296>

By connecting to a monitor BNC connector, this monitor output cable is capable of monitoring data for every CH. (Length: Approx. 2 m)

For details, see "1-7 PIN ASSIGNMENT AND CONNECTION OF INPUT CONNECTOR."

