



F/V CONVERTER CARD

CFV-40A

INSTRUCTION MANUAL

Thank you for purchasing KYOWA's product CFV-40A, F/V Converter card.
Read this manual carefully to ensure the long life and reliability of the product.
The product should not be used in any manners other than as described in this
Instruction Manual.

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This Instruction Manual is related to the use of CFV-40A/CFV-40A-1, F/V converter card (hereinafter referred to as the F/V card).

Although different input connectors are used for the CFV-40A and CFV-40A-1, specifications, etc. are used in common between the two.

- CFV-40A input connector PRC03-23A10-7F (TAJIMI ELECTRONICS made)
- CFV-40A-1 input connector EGG 1B. 307. CLL (LEMO made)

STANDARD ACCESSORIES

The following accessories are packed with the F/V card. When unpacking, check to be sure that all accessories are enclosed.

- CFV-40A
 - Product Warranty 1 each
 - Instruction Manual 1
 - Input Conversion Adaptor (FV-1A) 4
- CFV-40A-1
 - Product Warranty 1 each
 - Instruction Manual 1
 - Input Conversion Cable (U-103) 4

SAFETY PRECAUTIONS

Do not forget to read the “Safety Precautions” prior to use.

The F/V converter card is designed to be used according to “3. Specifications.” Do NOT use the F/V card in an environment exceeding the range of the above specifications of the EDX-100A, EDX-200A, EDX-2000A/B, EDX-3000A/B and EDX-5000A. Or, system failure may result in.

PRIOR TO USE

For safe use of the F/V card, be sure to read the following precautions.

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

SAFETY SYMBOLS

For safety operation of the F/V 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 severe injury or death of the operator.
 CAUTION	Improper operation of the system may result in injury to the operator and physical damage to the system.

 WARNING
• WARNING Take special notice of warning items described in the “EDX-100A Memory Recorder/Analyzer Instruction Manual for Hardware”, “EDX-200A Memory Recorder/Analyzer Instruction Manual for Hardware”, “EDX-2000A/B Memory Recorder/Analyzer Instruction Manual for Hardware”, “EDX-3000A/B Memory Recorder/Analyzer Instruction Manual for Hardware” and “EDX-5000A Memory Recorder/Analyzer Instruction Manual for Hardware.”

 CAUTION
• CAUTION Take special notice of caution items described in the “EDX-100A Memory Recorder/Analyzer Instruction Manual for Hardware”, “EDX-200A Memory Recorder/Analyzer Instruction Manual for Hardware”, “EDX-2000A/B Memory Recorder/Analyzer Instruction Manual for Hardware”, “EDX-3000A/B Memory Recorder/Analyzer Instruction Manual for Hardware” and “EDX-5000A Memory Recorder/Analyzer Instruction Manual for Hardware.” When installing or removing the F/V card in/from the EDX-100A, EDX-200A, EDX-2000A/B, EDX-3000A/B and EDX-5000A, do not touch any component parts of the F/V card. Or, system failure or damage may result in.

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 F/V card, and to information provided for reference purposes.

Examples of Notations

NOTE

Essential precautions required when handling the F/V card.

MEMO

Reference items required when handling the F/V card.

1. OUTLINE OF THE PRODUCT

1-1 OUTLINE

- The F/V card is a converter card designed to convert data of up to 20 kHz frequency into voltage.
- Capable of measuring 4 channel data with 1 card.
- The F/V card can supply power to sensors. (Approx. 12 VDC with Max. 50 mA)
- Monitor output of each channel is 5 V with range + full scale.
- The F/V card is insulated between input and output, between channels.

1-2 F/V CARD HANDLING PRECAUTIONS

- Set minimum pulse width of both H and L levels to 3 μ S or more.
Pulse width of less than the specified level 3 μ s may not be recognized.
- Although the F/V card is properly installed in the EDX-2000A, if “DISABLE” or “UNKNOWN” is displayed as the “Card Type” on the system menu screen, it is required to update the EDX-2000A hardware.
Contact our representative for updating the EDX-2000A hardware.
- After installing the F/V card in the EDX-100A, EDX-200A, EDX-2000A/B, EDX-3000A/B and EDX-5000A, it requires a certain time to become stable.
To conduct a stable measurement, preheat more than 30 minutes.
- Response time required to be displayed on the EDX-100A, EDX-200A, EDX-2000A/B, EDX-3000A/B and EDX-5000A screen is as follows.

Response time stated in “3.1 Hardware Specification” + Sampling Rate

- Since frequency is converted into analog voltage, monitor output is output approximately 50 μ S behind time after pulse input. (For continuous input pulse)

Time required for monitor output to starts responding from ‘0’ Hz (When input signal is shutoff) is obtained by the following expression.

Two cycles of input frequency before input signal is shutoff + Approx. 100 μ S.

Thus, monitor output shall be 0 V.

NOTE

Maximum input voltage of the F/V card is ± 50 V. If input voltage exceeds the said range, system failure may result in.

NOTE

Up to ‘2’ F/V cards can be installed in the EDX-100A, EDX-200A, EDX-2000A/B, EDX-3000A/B and EDX-5000A.

- EDX-2000A/B-64, EDX-3000A/B

When two F/V cards are installed: Up to 4 other cards

When one F/V card is installed: Up to 6 other cards

- EDX-100A-1, EDX-200A-1, EDX-200A-2H: One F/V card can be installed

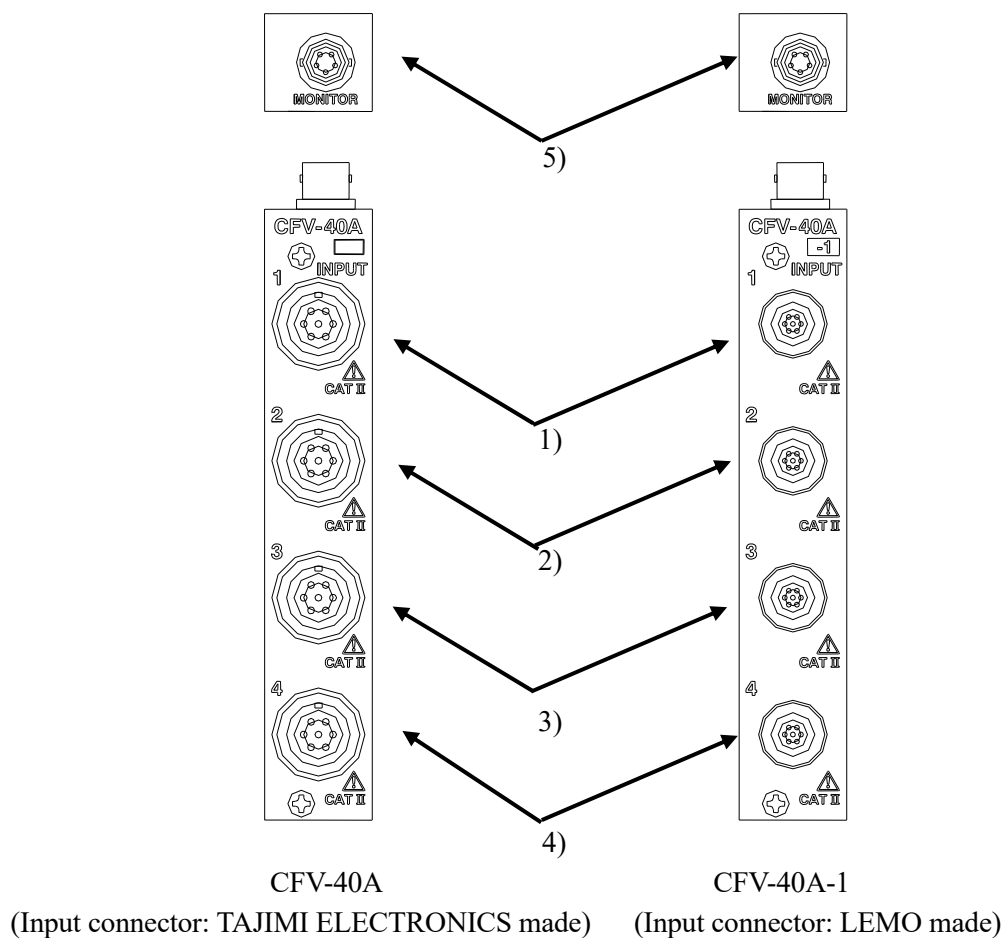
- EDX-100A-2: Two F/V cards can be installed

- EDX-100A-4, EDX-200A-4H: Two F/V cards can be installed

- EDX-5000A-64/80: Two F/V cards can be installed

Note that if the number of installed cards exceeds the said specified numbers, system failure may result in.

1-3 CONTROLS AND INDICATORS



- 1) Input connector 1 -----Input connector of the 1st channel.
- 2) Input connector 2 -----Input connector of the 2nd channel.
- 3) Input connector 3 -----Input connector of the 3rd channel.
- 4) Input connector 4 -----Input connector of the 4th channel.
- 5) Monitor connector-----Connector for connecting a monitor output cable. Monitor voltage is 5 V with +full scale of each range.

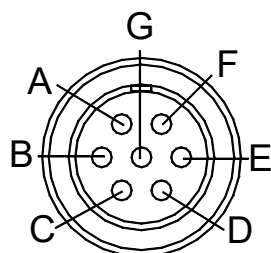
1-4 PIN ASSIGNMENT AND CONNECTION OF CONNECTORS

[pin assignment]

1) Input Connector

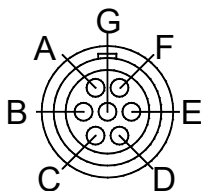
CFV-40A

(TAJIMI ELECTRONICS made)



CFV-40A-1

(LEMO made)



Pin assignment of input connectors

(Common to both connectors)

Pin	Signal Name
A	Sensor power supply (+12 V)
B	Input COM
C	Sensor power supply (Input COM)
D	+ Input
E	FG (GND)
F	ID signal+
G	Input COM

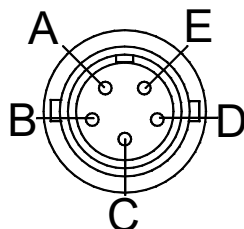
Channel No. of the input connector shall be as follows according to slot into which the F/V card is installed in the EDX-2000A.

Input Connector \ Slot	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-2000A power supply connector side.

* Slot No. 5 to 8: Specified only for EDX-2000A-64.

2) Monitor Output Connector



Pin assignment of monitor output connectors

Pin	Signal Name
A	Monitor output of the 1st CH
B	Monitor output of the 2nd CH
C	Monitor output of the 3rd CH
D	Monitor output of the 4th CH
E	Monitor output of COM

When the F/V card is installed in each slot, pin assignment of the monitor output connector shall be as described in the following table.

Pin \ Slot	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(U-64) connected to the monitor output connector is optional.

See "4. Optionals."

[Connection Method]

There are 6 types of cables for connecting to the F/V card. Choose an appropriate cable for connection.

Applicable conditioner card	Accessories/Optional	Model	Connector(card - input side)	Remarks
1)CFV-40A	Accessories	1)FV-1A	TAJIMI 7P(male) - BNC(female)	Sensor power supply ×
	Optionals	2)U-12	TAJIMI 7P(male) - crocodile clip	Sensor power supply ○
		3)U-13	TAJIMI 7P(male) - BNC(male)	Sensor power supply ×
2)CFV-40A-1	Accessories	1)U-103	LEMO(male) - BNC(female)	Sensor power supply ×
	Optionals	2)U-102	LEMO(male) - crocodile clip	Sensor power supply ○
3)CFV-40A/CFV-40A-1	Optionals	1)U-64	TAJIMI 7P(male) - BNC(male)	Monitor output

○: Can use sensor power supply.

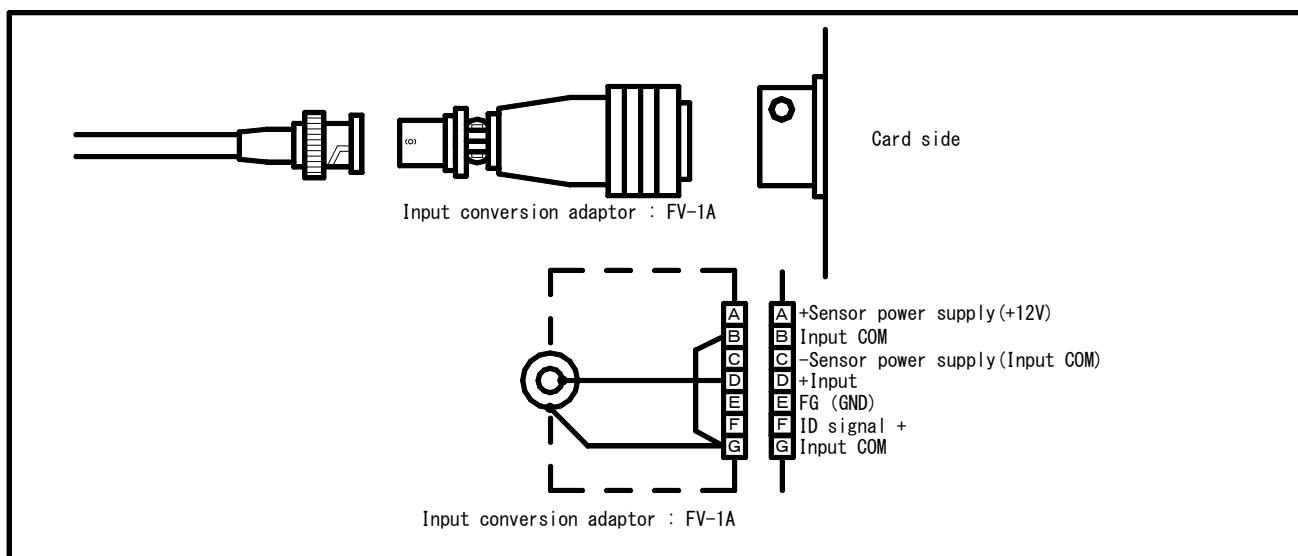
×: Cannot use sensor power supply.

1) Connecting CFV-40A

<Accessories for CFV-40A>

(1) When connecting only signal with a BNC cable, connect the accessory input conversion adaptor FV-1A.

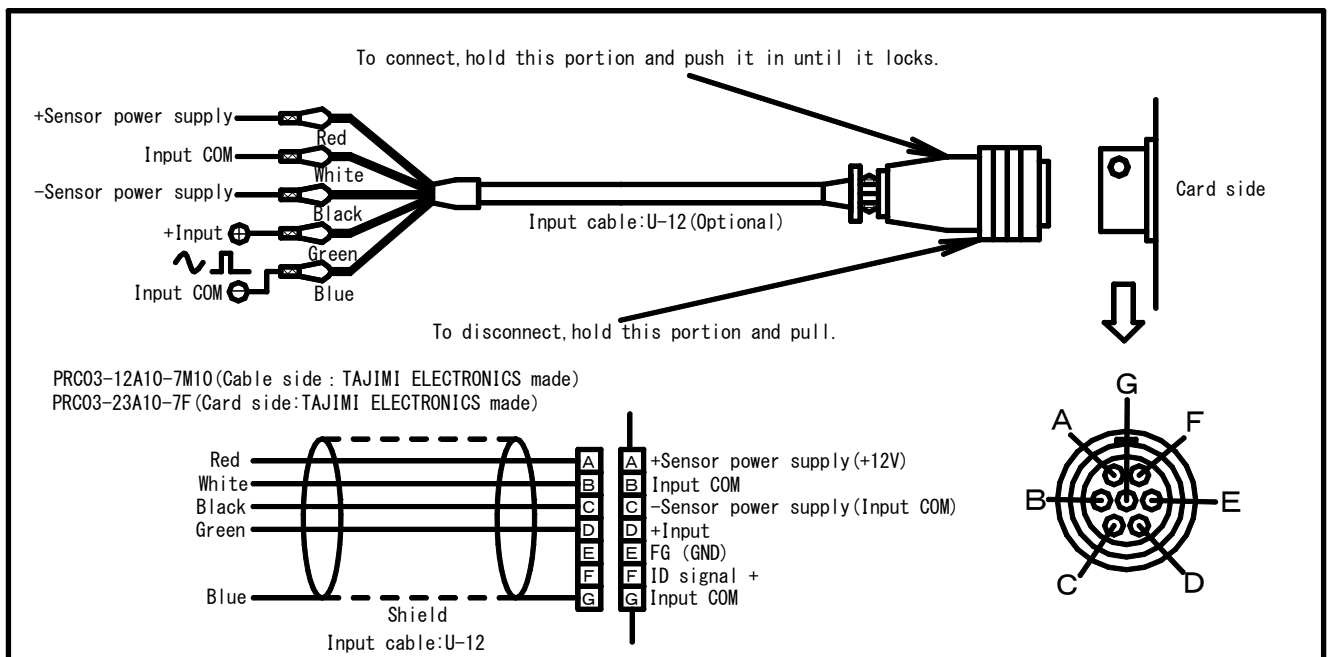
How to connect is described in the following figure.



<Optionals for CFV-40A>

- (2) When connecting sensors that require power supply with a TAJIMI ELECTRONICS made connector, connect the optional input cable U-12.

How to connect is described in the following figure.



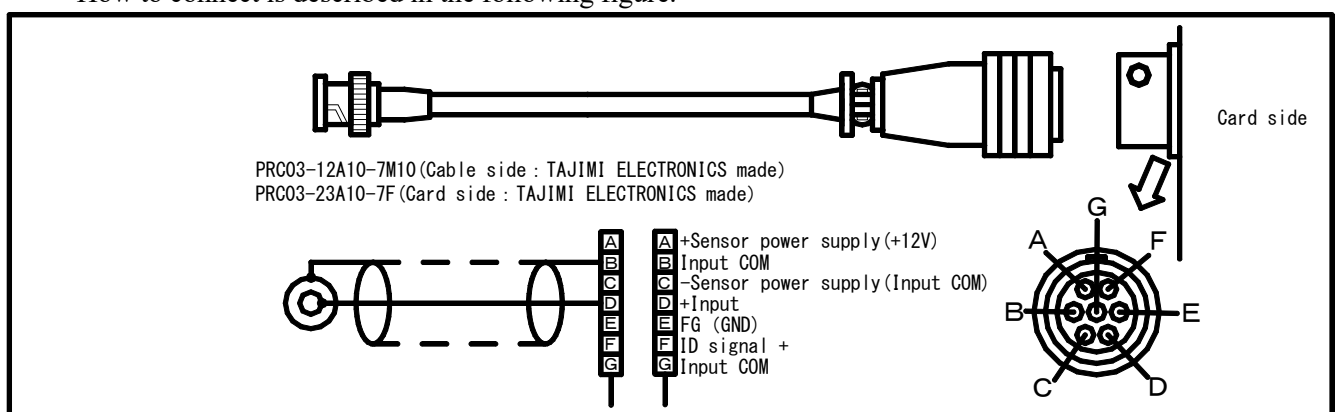
NOTE

Although sensor power supply is provided with overcurrent protection (Max. 50 mA), take special care not to damage sensors and properly connect the cable. In addition, since the input connector is used in common with strain sensors, do not to connect strain gages or strain gage type transducers. Or sensor may break down.

<Optionals for CFV-40A>

- (3) When connecting only signal with a BNC connector, connect the optional input cable U-13.

How to connect is described in the following figure.

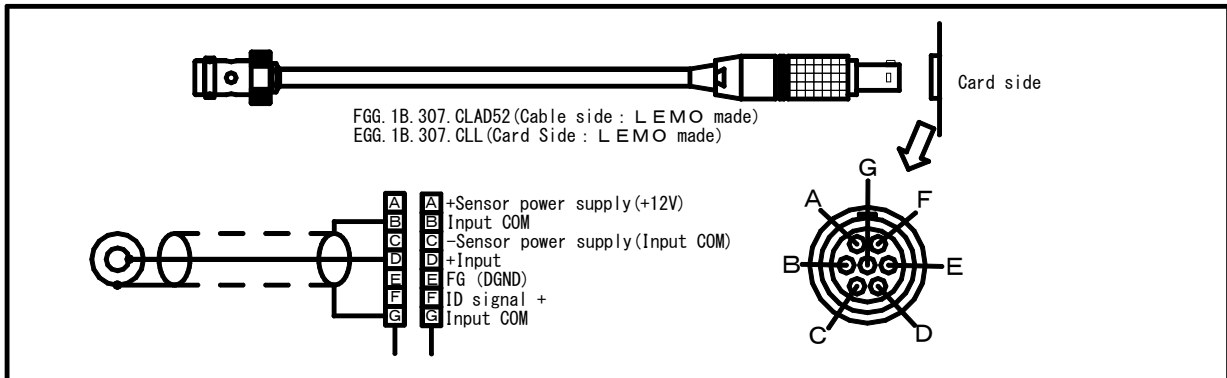


2) Connecting CFV-40A-1

<Accessories for CFV-40A-1>

(1) When connecting only signal with a BNC connector, connect the accessory input cable U-103.

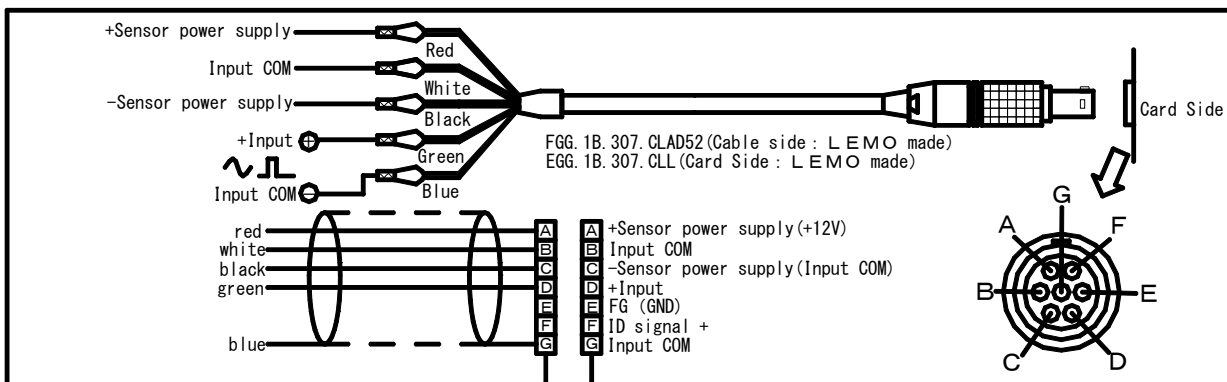
How to connect is described in the following figure.



<Optionals for CFV-40A-1>

(2) When connecting sensors that require power supply with a LEMO made connector, connect the optional input cable U-102.

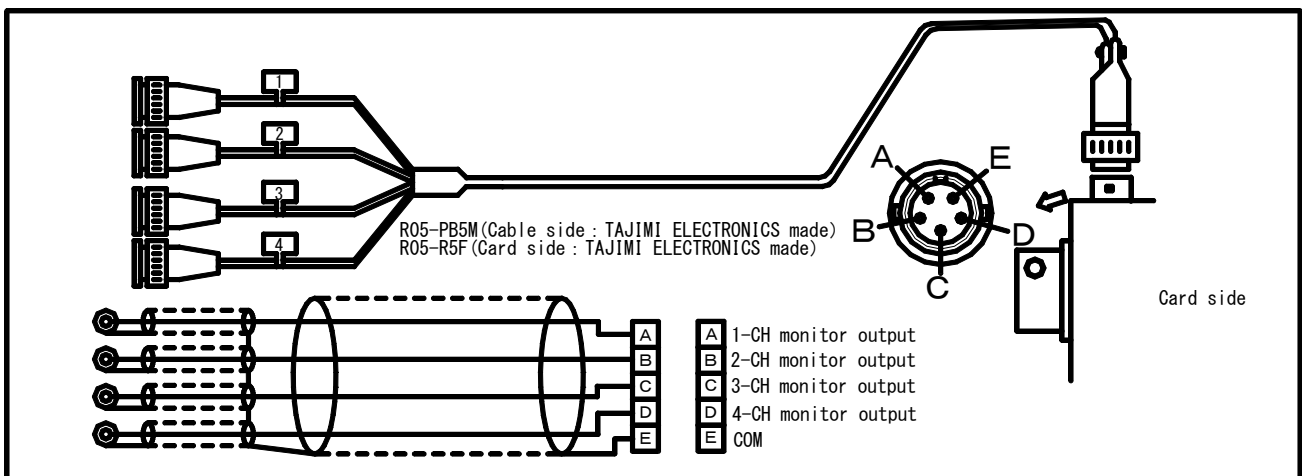
How to connect is described in the following figure.



3) Optionals in common to both CFV-40A and CFV-40A-1

(1) When connecting an output cable to a monitor connector, connect the optional output cable U-64.

How to connect is described in the following figure. A BNC connector is used for the output cable.

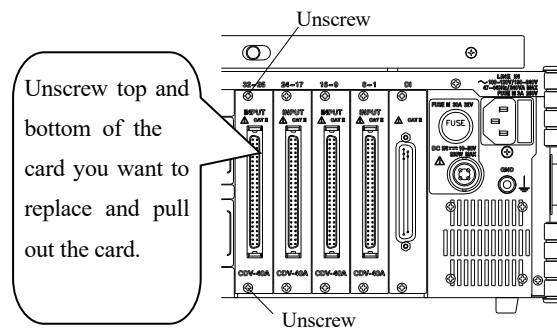


1-5 INSTALLATION OF F/V CARD BOARD

Note that power supply should be turned OFF before installing the F/V card board.

- 1) Unscrew the top and bottom of the already existing conditioner card or dummy panel.
- 2) Pull out the conditioner card or dummy panel already existing in the slot.
- 3) Slowly install the F/V card along the guide rail in the EDX-2000A/B and then, tighten the screws at the top and bottom of the conditioner card.
- 4) After replacing the conditioner card, power ON the EDX-2000A/B and check the system menu screen. If the “Card Type” CFV-40A is displayed on the “Slot No.” column, it means that the conditioner card is properly replaced.
If “DISABLE” or “UNKNOWN” is displayed as the “Card Type,” it is required to update the EDX-2000A/B hardware.

Contact our representative for updating the EDX-2000A/B hardware.



CFV-40As are installed in slot No. 1 and 2.

Slot No.	Card Type
1	CFV-40A
2	CFV-40A
3	* * *

NOTE

- When installing the F/V card in the EDX-2000A/B, do not touch any component parts of the F/V card. Or, performance failure or damage of the card may result in.
- When installing the CDV card into the EDX-100A, refer to the EDX-100A Instruction Manual.
- When installing the CDV card into the EDX-100A, refer to the EDX-200A Instruction Manual.
- When installing the CDV card into the EDX-100A, refer to the EDX-3000A/B Instruction Manual.
- When installing the CDV card into the EDX-100A, refer to the EDX-5000A Instruction Manual.

2. HOW TO SET CFV-40A/CFV-40A-1

How to set the F/V card is conducted entirely from the EDX-2000A/B screen.

Settings and measurement of the F/V card is conducted in due order as described in the following.

EDX-2000A/B System menu Screen						
↓						
2) Condition						
↓						
1) Channel Cond						
Item	(1) MEAS CH	(2) Mode	(3) Range	(4) Hi Pass	(5) CAL ON/OFF	(6) CAL Range
Selections	Measure Not measure	ZC/S ZC/N TTL	20 kHz 10 kHz 5 kHz 2 kHz 1 kHz 500Hz 100Hz 50Hz OFF	ON OFF	ON OFF	100% 50%
↓						
EDX-2000A/B System menu Screen						
↓						
1) Measurement						

<CFV-40A/CFV-40A-1 Setting Procedures>

EDX-2000A/B System menu Screen

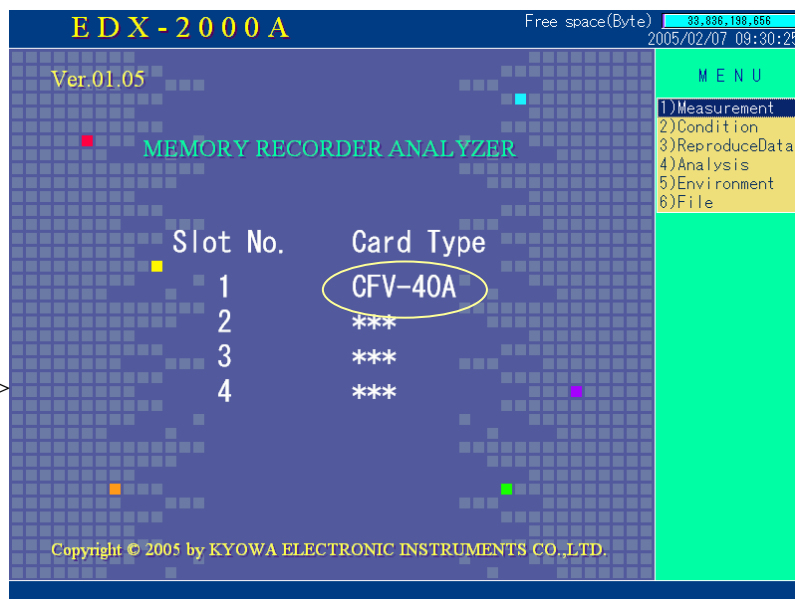
When the CFV-40A/CFV-40A-1 is properly installed in the EDX-2000A/B, CFV-40A or CFV-40A-1 is displayed on the “Card Type” column.

(The screen at the right shows that ‘1’ CFV-40A is installed in the slot No. 1.)

Here, select the cursor to item 2) <Condition> on the system menu screen and press the **ENTER** key.

MEMO

When no conditioner card is installed, ‘***’ is displayed as the “Card Type” in the “Slot” column.



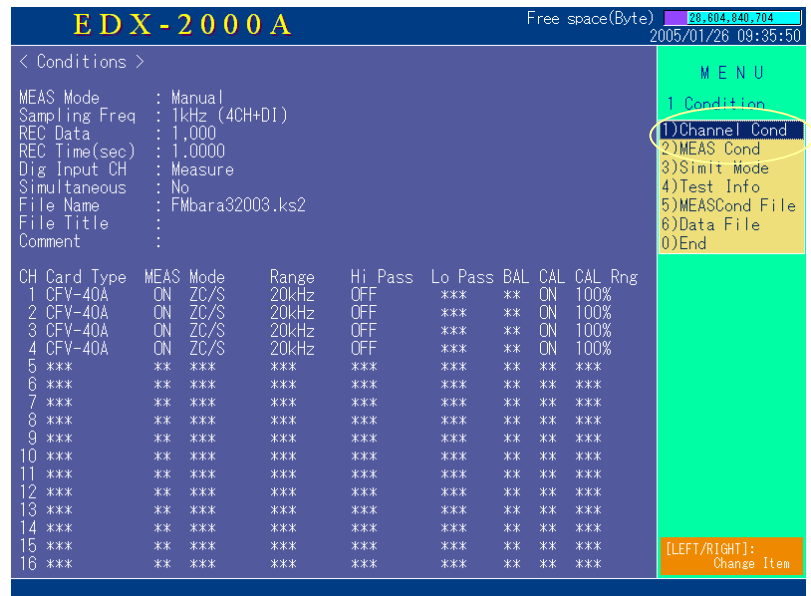
Condition Setting Screen

Select item 2) <Condition> from the system menu to display the screen at the right.

Here, select item 1) <Channel Cond> on the <Condition> main menu and press the **ENTER** key.

MEMO

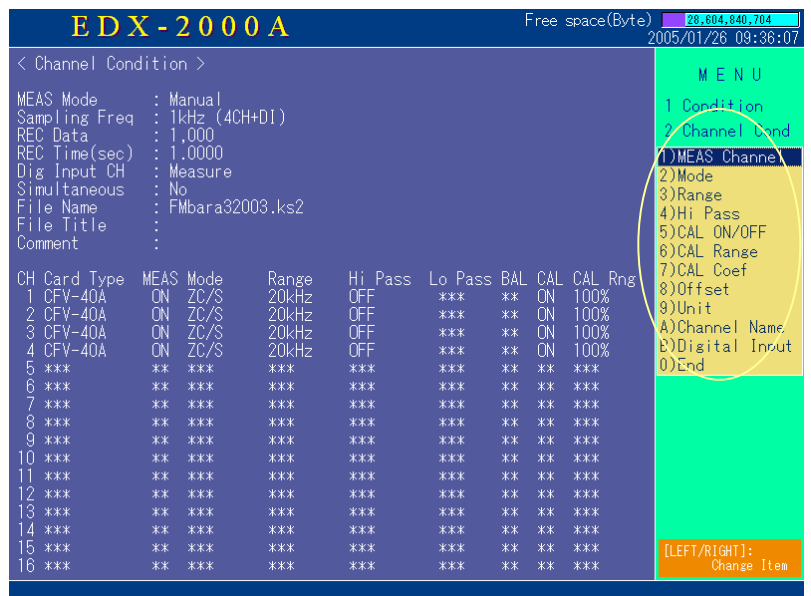
If no conditioner card is installed, CH column and items that are not available for setting conditions are indicated with “*.”



Channel Cond

Select item 1) <Channel Cond> from <Condition> main menu to display the screen at the right.

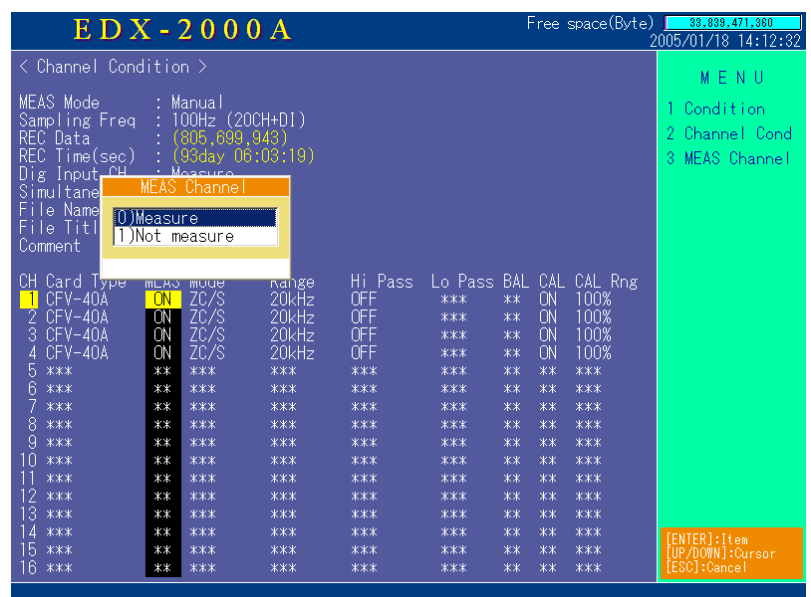
Here, select the cursor to the desired item and press the **ENTER** key.



MEAS Channel

Select item 1) <MEAS Channel> from the <Channel Cond> menu to display the screen at the right with “MEAS Channel” setting window.

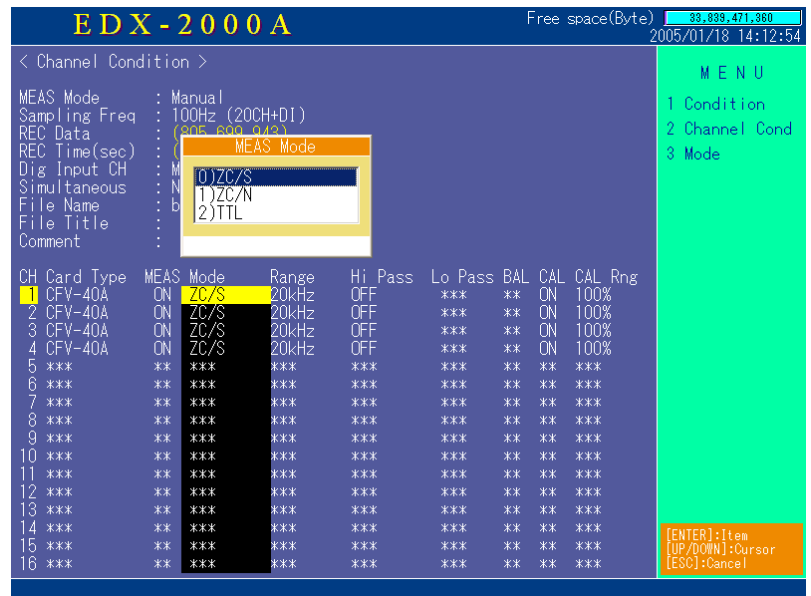
Select the cursor to either 0) Measure or 1) Not measure for each channel and press the **ENTER** key.



Mode

Select item 2) <Mode> from the <Channel Cond> menu to display the screen at the right with “MEAS Mode” setting window.

Here, select the cursor to ZC/S, ZC/N, or TTL according to amplitude or noise of the predicted input signal and then, press the **ENTER** key.

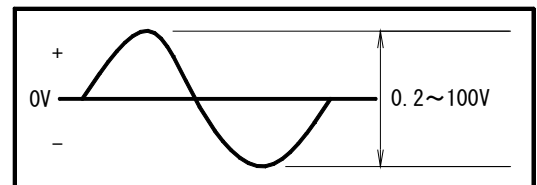


- **ZC/S (Zero Cross Special)**

Input the following waveform with 0 V in the center.

+ side: +0.1 to +50 V

- side: -0.1 to -50 V



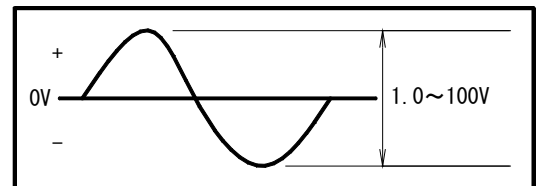
- **ZC/N (Zero Cross Normal)**

Input the following waveform with 0 V in the center.

+ side: +0.5 to +50 V

- side: -0.5 to -50 V

When noise is exceeding, sensitivity of the ZC/N mode is lower and thus, more effective against noise compared with the ZC/S mode.

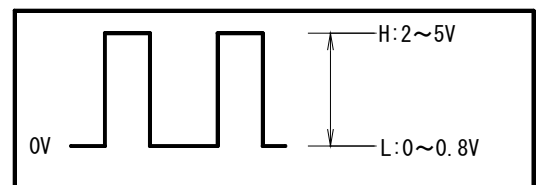


- **TTL**

This mode selects it to TTL and open collector input.

H level: 2.0 to 5 V

L level: 0 to 0.8 V

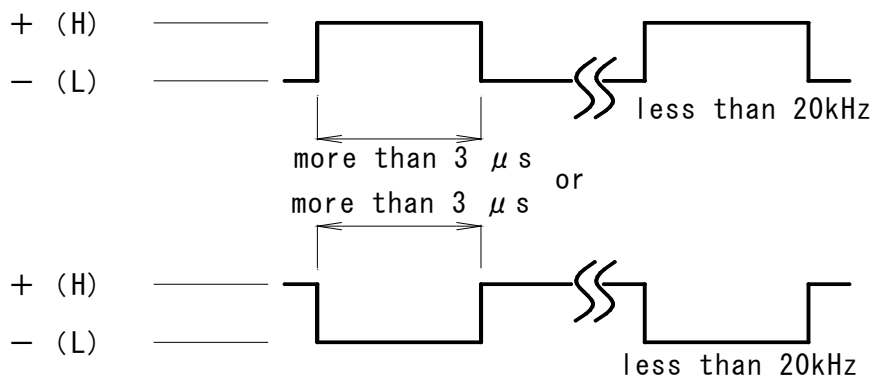


MEMO

When an input signal is in a rectangular waveform

Set pulse width of the input signal to more than 3 μ S.

Or, pulse width having less than 3 μ S may not be recognized.

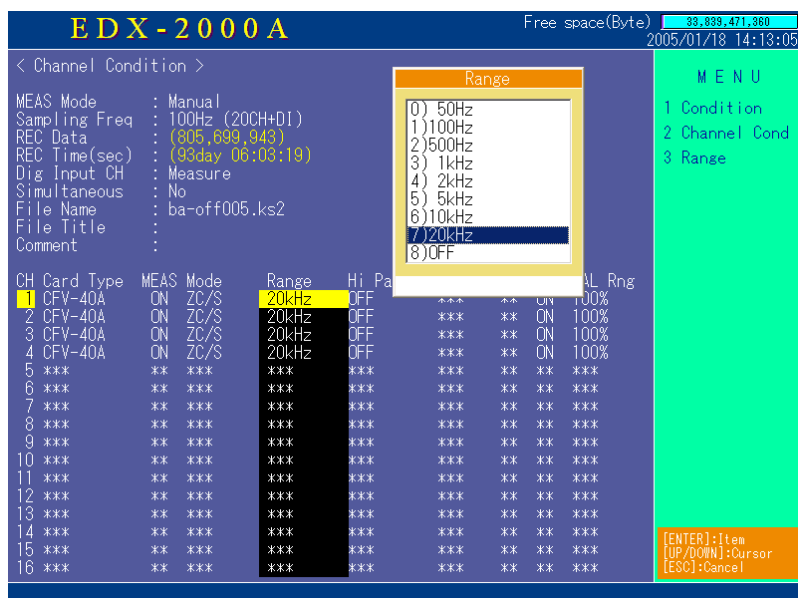


Range

Select item 3) <Range> from the <Channel Cond> menu to display the screen at the right with “Range” selecting window.

Here, select any one of the following frequencies according to the predicted input signal.

50 Hz, 100 Hz, 500 Hz, 1 kHz, 2 kHz,
5 kHz, 10 kHz, 20 kHz, and OFF

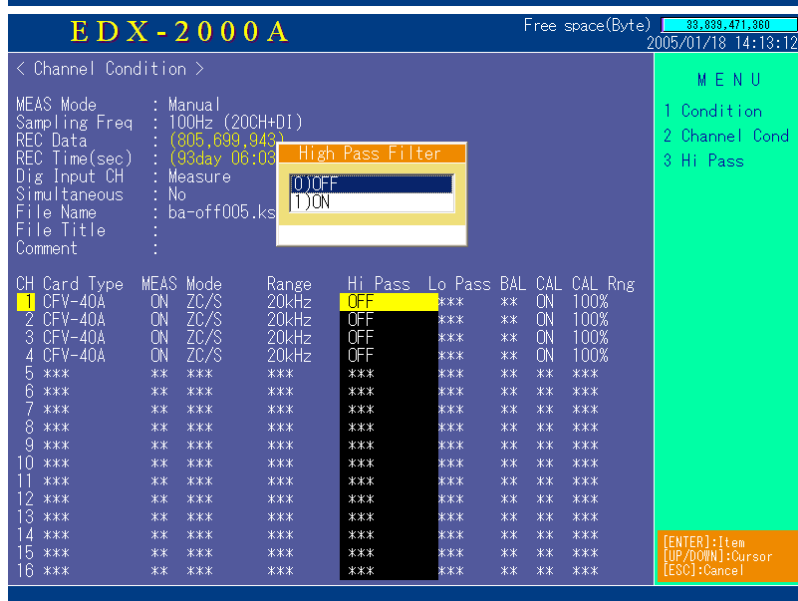


High Pass Filter

Select item 4) <Hi Pass> from the <Channel Cond> menu to display the screen at the right with “High Pass Filter” setting window.

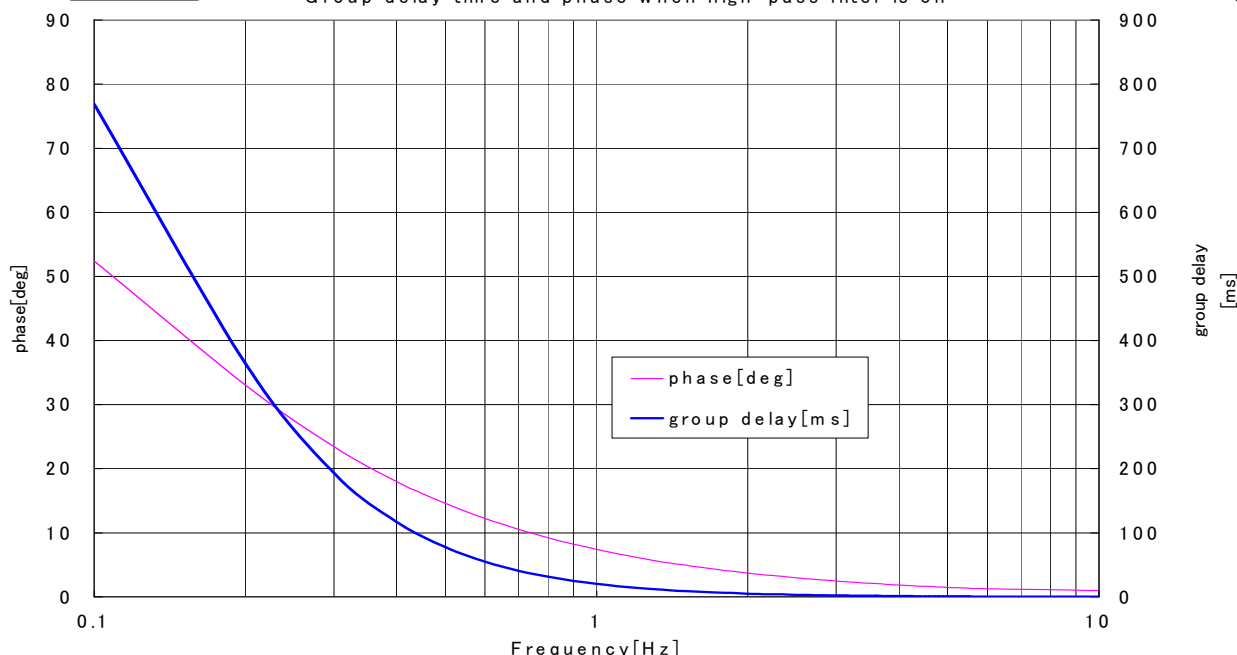
Here, if an offset value is set in the predicted input signal, select “ON” and if not, select “OFF.”

In addition, cutoff frequency of the high pass filter is set to approximately 0.13 Hz.



NOTE

Group delay time and phase when high-pass filter is on



In some cases, when high pass filter is set to “ON,” if the input frequency is low, group delay time and phase may be dislocated as shown in the above figure.

CAL ON/OFF

Select item 5) <CAL ON/OFF> from the <Channl Cond> menu to display the screen at the right with “CAL ON/OFF” setting window.

Here, to conduct CAL on the “Measurement” screen, select the cursor to “ON” and if not, to “OFF” and press the **ENTER** key.

CH	Card Type	MEAS Mode	Range	Hi Pass	Lo Pass	BAL	CAL	CAL Rng
1	CFV-40A	ON ZC/S	20kHz	OFF	***	**	ON	100%
2	CFV-40A	ON ZC/S	20kHz	OFF	***	**	ON	100%
3	CFV-40A	ON ZC/S	20kHz	OFF	***	**	ON	100%
4	CFV-40A	ON ZC/S	20kHz	OFF	***	**	ON	100%
5	***	** ***	***	***	***	**	**	***
6	***	** ***	***	***	***	**	**	***
7	***	** ***	***	***	***	**	**	***
8	***	** ***	***	***	***	**	**	***
9	***	** ***	***	***	***	**	**	***
10	***	** ***	***	***	***	**	**	***
11	***	** ***	***	***	***	**	**	***
12	***	** ***	***	***	***	**	**	***
13	***	** ***	***	***	***	**	**	***
14	***	** ***	***	***	***	**	**	***
15	***	** ***	***	***	***	**	**	***
16	***	** ***	***	***	***	**	**	***

CAL Range

Select item 6) <CAL Range> from the <Channel Cond> menu to display the screen at the right with “CAL Range” setting window.

Here, to conduct 100% CAL, select the cursor to “100%” and for 50% CAL, select to “50%.”

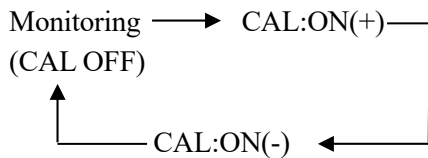
0% CAL can be conducted for either 100% or 50% CAL.

When 100% CAL is conducted, 100% of range value is added to the current output. In the same manner, for 50% CAL, 50% of range value is added to the current output.

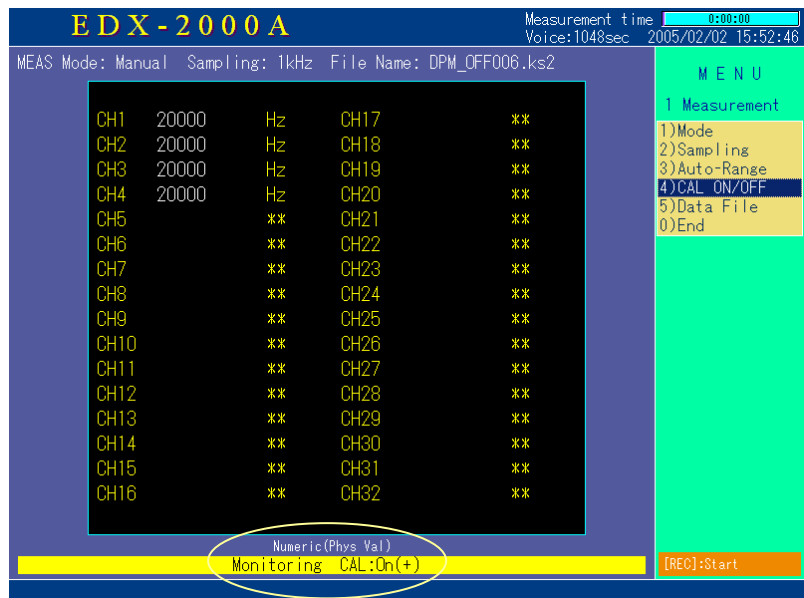
When 0% CAL is conducted, absolute value (0 Hz) is output.

CH	Card Type	MEAS Mode	Range	Hi Pass	Lo Pass	BAL	CAL	CAL Rng
1	CFV-40A	ON ZC/S	20kHz	OFF	***	**	ON	100%
2	CFV-40A	ON ZC/S	20kHz	OFF	***	**	ON	100%
3	CFV-40A	ON ZC/S	20kHz	OFF	***	**	ON	100%
4	CFV-40A	ON ZC/S	20kHz	OFF	***	**	ON	100%
5	***	** ***	***	***	***	**	**	***
6	***	** ***	***	***	***	**	**	***
7	***	** ***	***	***	***	**	**	***
8	***	** ***	***	***	***	**	**	***
9	***	** ***	***	***	***	**	**	***
10	***	** ***	***	***	***	**	**	***
11	***	** ***	***	***	***	**	**	***
12	***	** ***	***	***	***	**	**	***
13	***	** ***	***	***	***	**	**	***
14	***	** ***	***	***	***	**	**	***
15	***	** ***	***	***	***	**	**	***
16	***	** ***	***	***	***	**	**	***

To conduct the CAL on the measurement screen (see the right figure), select the cursor to 4) CAL ON/OFF and press the **ENTER** key. The following operation is repeated every time the **ENTER** key is pressed.



CALrange	CAL:ON(+)	CAL:ON(-)
100%	100%	0%(0Hz)
50%	50%	0%(0Hz)

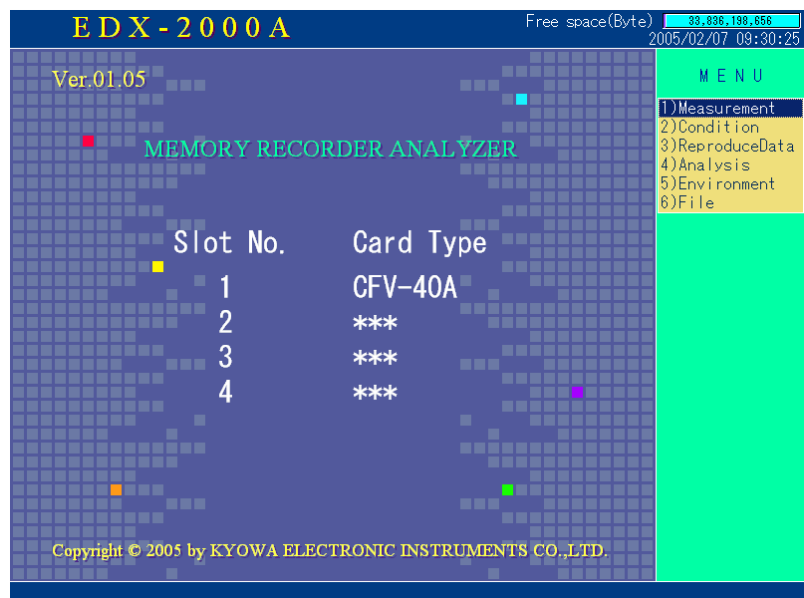


The above screen is an example when CAL:ON(+) is conducted with Range set to 20 kHz and CAL range set to 100% when 0 Hz is input or no signal is input.

Measurement

After the entire settings are complete, select item 0) <End> on the <Channel Cond> menu to return to the EDX-2000A/B system menu screen shown at the right.

Here, select item 1) <Measurement> to start the measurement with determined channel conditions.



NOTE

For detailed description of recording or reproduction of data, etc., see EDX-2000A/B Instruction Manual.

3. SPECIFICATIONS

3-1 HARDWARE SPECIFICATIONS

Name	CFV-40A / CFV-40A-1, F/V Converter Card			
Compatible Sensors	AC signal output sensor			
Number of Measuring Channels	4			
Input Signal.....	AC (Zero Cross), TTL level (including open-collector signal)			
Comparator Level	Switching Zero cross (0 V)/TTL level			
Input Voltage Range.....	• Zero cross ±(0.5 to 50 V): Hysteresis large (ZC/N mode) ±(0.1 to 50 V): Hysteresis small (ZC/S mode) • TTL level - H level: 2.0 to 5.0 V - L level: 0 to 0.8 V			
Input Impedance	Within 100 kΩ ±10%			
Non-linearity.....	Within ±0.1% FS (Including monitor output)			
Measuring Range.....	9 steps of 50, 100, 500, 1 k, 2 k, 5 k, 10 k, 20 kHz and OFF			
	Measuring range: 50 Hz (0.2 to 51 Hz)			
	100 Hz (0.2 to 102 Hz)			
	500 Hz (0.2 to 510 Hz)			
	1 kHz (0.5 to 1.02 kHz)			
	2 kHz (1.0 to 2.04 kHz)			
	5 kHz (2.5 to 5.1 kHz)			
	10 kHz (5.0 to 10.2 kHz)			
	20 kHz (10 to 20.4 kHz)			
	Accuracy:	Recorded data	Within ±0.1% FS	
		Monitor output	Within 5 V ±0.5%(When +FS)	
CAL Value (CAL).....	100% and 50% (Additional value)	} of each range are output.		
	0% (Absolute value)			
	Accuracy:	Within 0% FS (100% and 50%)		
		0 Hz (0%)		
Response Time.....	2 cycles of input frequency + 50 μS or less			
	(When input pulse is shutoff)			
	10 μS or less (For continuous input pulse)			
Sensor Power Supply.....	Within 12 VDC ±10% (50 mA or less for each channel)			
Resolution	16 bits			
Insulation Resistance	Between input and output, and between channels:			
	500 VDC, 50 MΩ or more			

Number of cards installed.....Up to 2 cards

- EDX-2000A/B-64, EDX-3000A/B

When two F/V cards are installed: Up to 4 other cards

When one F/V card is installed: Up to 6 other cards

- EDX-100A-1, EDX-200A-1, EDX-200A-2H

One F/V card can be installed

- EDX-100A-2

Two F/V cards can be installed

- EDX-100A-4, EDX-200A-4H

Two F/V cards can be installed

- EDX-5000A-64/80

Two F/V cards can be installed

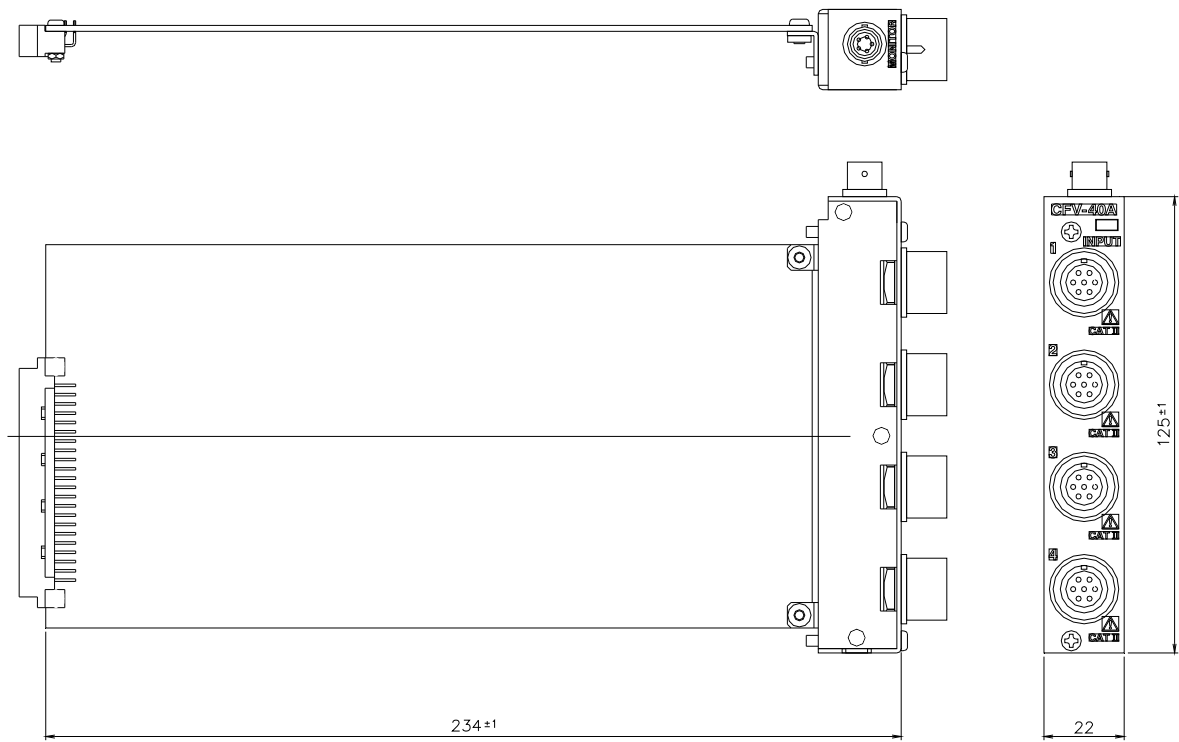
Input connector CFV-40A

TAJIMI ELECTRONICS made connector type

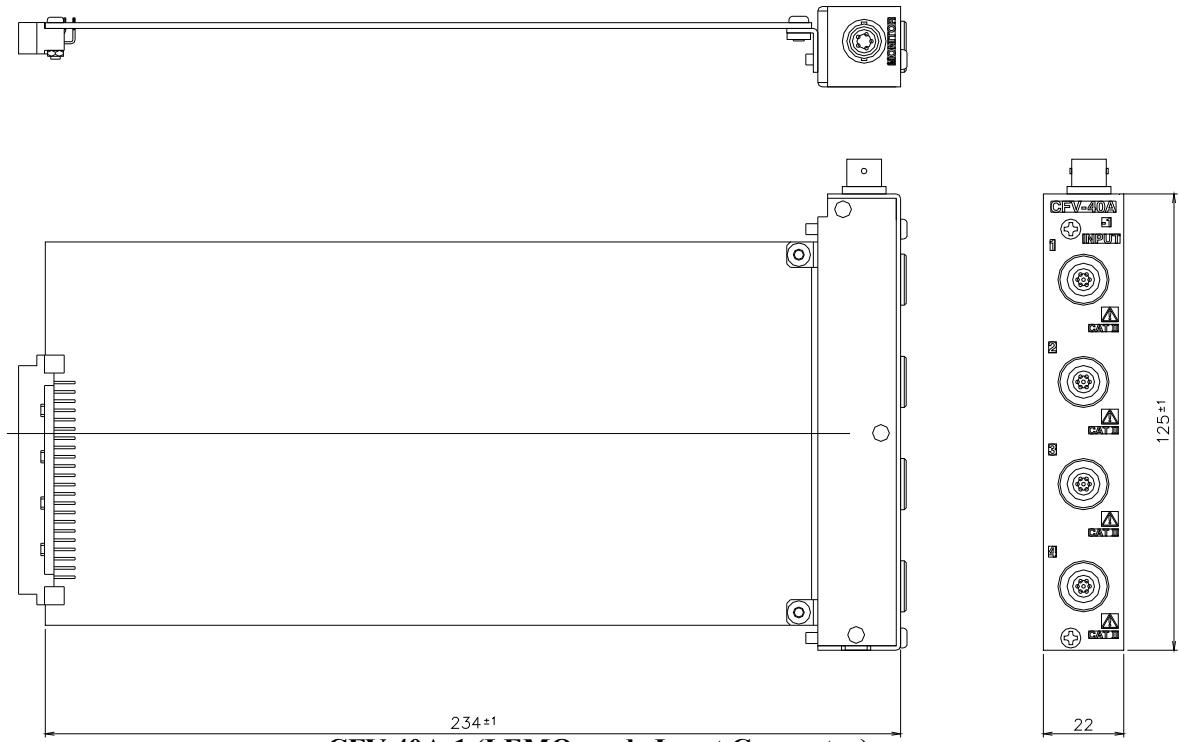
CFV-40A-1

LEMO made connector type

3-2 OUTSIDE DRAWING



<CFV-40A (TAJIMI ELECTRONICS made Input Connector)>



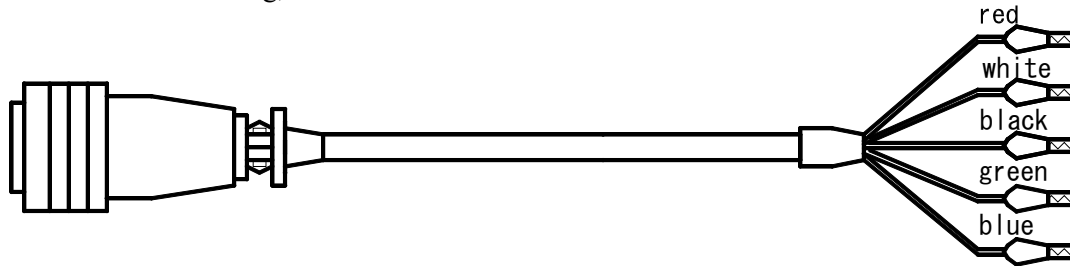
<CFV-40A-1 (LEMO made Input Connector)>

4. OPTIONALS

Input Cable (U-12) <Dedicated for CFV-40A>

TAJIMI ELECTRONICS made input connector is necessary for connecting sensors that require power supply. (Length: Approx. 1.5 m)

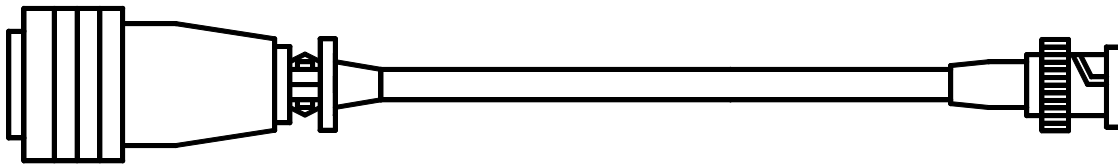
For connection and wiring, see “1-4 PIN ASSIGNMENT AND CONNECTION OF CONNECTORS.”



Input Cable (U-13) <Dedicated for CFV-40A>

A cable composed of an integrated combination of TAJIMI ELECTRONICS made connector and BNC connector. (Length: Approx. 1.5 m)

For connection and wiring, see “1-4 PIN ASSIGNMENT AND CONNECTION OF CONNECTORS.”

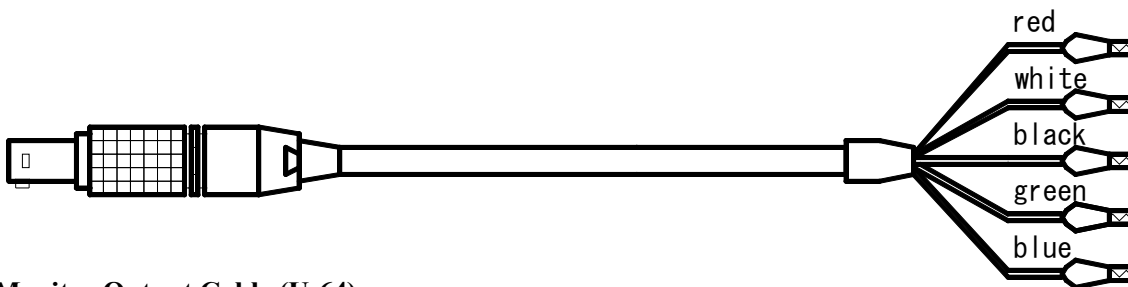


Input Cable (U-102) <Dedicated for CFV-40A-1>

LEMO made input connector is necessary for connecting sensors that require power supply.

(Length: Approx. 1.5 m)

For connection and wiring, see “1-4 PIN ASSIGNMENT AND CONNECTION OF CONNECTORS.”



Monitor Output Cable (U-64)

A monitor output cable enables monitoring of data for each channel by connecting to the monitor connector.

(Length: Approx. 2 m)

For connection and wiring, see “1-4 PIN ASSIGNMENT AND CONNECTION OF CONNECTORS.”

