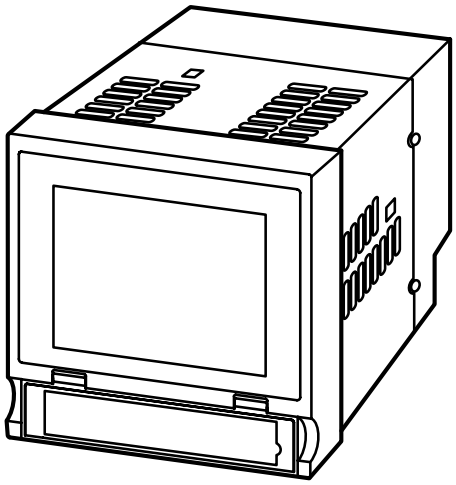
73VR2102 / 73VR2104 / 73VR2106 / 73VR2108 / 73VR2110 / 73VR2112

PAPERLESS RECORDER

STARTUP GUIDE

– Read Before Installation –



Contents

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1. POINTS OF CAUTION

Thank you for choosing us. Before use, please read this manual carefully. If you have any problems or questions with the product, please contact our sales office or representatives.

This product is for use in general industrial environments, therefore may not be suitable for applications which require higher level of safety (e.g. safety or accident prevention systems) or of reliability (e.g. vehicle control or combustion control systems).

For safety, installation and maintenance of this product must be conducted by qualified personnel.

■ CONFORMITY WITH EU DIRECTIVES

- This equipment is suitable for Pollution Degree 2 and Installation Category II (transient voltage 2500V). Reinforced insulation (signal input 1 or input 2 or input 3 or input 4 or input 5 or input 6 or input 7 or input 8 or input 9 or input 10 or input 11 or input 12 to power input to FG or Ethernet: 300V) is maintained*1. Prior to installation, check that the insulation class of this unit satisfies the system requirements.
- The equipment must be mounted on a panel surface. Once mounted on a panel, take appropriate precautions to prevent operators to be exposed to the terminal block*.
  In order to enable the operator to turn off the power input immediately, install a switch or a circuit breaker according to the relevant requirements in IEC 60947-2 and properly indicate it*1.
- Altitude up to 2000 meters*1.
- Insert noise filters for the ports explained below.

- For the power source, input, and LAN cable connected to the unit, NEC Tokin ESD-SR-250 or equivalent model is recommended.
- For the power source and input connected to the unit, COSEL NAC-06-472 or equivalent model is recommended.
- Be sure to connect the unit's FG terminal to the ground terminal of the filter, which is inserted in the power source, and connect the ground terminal of the filter to the most stable grounding point with shortest length.

- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures* to ensure the CE conformity.
  * For example, installation of noise filters and clamp filters for the power source, input and output connected to the unit, etc.

*1. Except desktop type.

■ POWER INPUT

- Power input rating & operational range: Check the power rating for the unit on the specifications.

  100 – 240 V AC rating: 85 – 264 V, 47 – 66 Hz,
  approx. 25 VA at 100 V, approx. 35 VA at 240 V

  24 V DC rating: 24 V ±10%, approx. 11 W
- Supplying any level of power other than specified above can damage the 73VR21x or the power source.
- The power cables and the signal I/O cables for the 73VR21x must be located separately.
- The main circuit cables (high voltage and high current), the signal I/O cables, and the power cables should not be bundled together or placed near each other.
- To increase noise resistance of the power input wires, twist the strands before connecting.

■ SAFETY PRECAUTION

- Before you remove the unit, turn off the power supply and input signal for safety.
- Do not use the 73VR21x in an environment where flammable gases are present. This may result in an explosion.
- Do not disassemble or modify the 73VR21x in any way. Doing so may result in a fire or an electrical shock.
- Do not strike the panel of the 73VR21x with a hard, heavy or pointed object, or press the panel with excessive force, it may result in panel damage or injury.
- Do not block the 73VR21x's ventilation openings or use it in areas where heat accumulates. Additionally, do not store or use it under high-temperature conditions.
- Do not store or use the 73VR21x in locations subject to direct sunlight, or where excessive dust or dirt is present.
- The 73VR21x is a precision instrument. Do not store or use it where large shocks or excessive vibration can occur.
- Do not store or use the 73VR21x in environments subject to chemical evaporation (such as that of organic solvents), or where there are chemicals and/or acids present in the air.
- Do not use paint thinner or organic solvents to clean the 73VR21x.
- Observe the environmental conditions when using the 73VR21x.
- Wait at least for 5 seconds before turning on the power supply after it has been turned off. The 73VR21x may not start up if the time interval is less than 5 seconds.

■ ENVIRONMENT

- Indoor use.
- The 73VR21x is designed to be mounted on a vertical panel. It is not suitable for a slanted or a horizontal panel surface.
- Environmental temperature must be within 0 to 50°C (32 to 122°F) with relative humidity within 30 to 85% RH in order to ensure adequate life span and operation.
- Desktop type cannot be mounted on a panel surface.
- The handle and rubber feet cannot be detached from desktop type unit.

■ GROUNDING

- Be sure to determine in advance the most stable grounding point in the environment and earth the 73VR21x's FG terminal and that of connected devices (PC) to it in order to protect the devices from dielectric breakdown.
- Grounding is also effective to eliminate noise that could cause errors in the 73VR21x's operation.

■ CF CARD

- Do not turn off the power supply to the 73VR21x or reset it during recording. The CF Card may be destroyed.
- Observe the described procedure when you need to replace the CF Card during recording.
- Confirm the sides and the connector position of the CF Card when inserting one to the card slot.

■ LCD PANEL

- The LCD panel's liquid contains an irritant. If the panel is damaged and the liquid contacts your skin, rinse immediately the contact area with running water for at least 15 minutes. If the liquid gets in your eyes, rinse immediately your eyes with running water for at least 15 minutes and consult a doctor.
- The following phenomena are LCD characteristics, and NOT a product defect:
  - LCD screen may show uneven brightness depending upon displayed images or contrast settings.
  - The LCD screen pixels may contain minute black-and-white-colored spots.
  - The color displayed on the LCD screen may appear different when seen from outside the specified viewing angle.
  - When the same image is displayed on the screen for a long time period, an afterimage may appear when the image is changed. If this happens, turn off the 73VR21xand wait 10 seconds before restarting it.
- To prevent an afterimage:
  - Set the screensaver when you plan to display the same image for a long time period.
  - Plan to change the screen image periodically so that the same image does not remain for the long time period.

■ BACKLIGHT

- Even when the backlight is failed, the screen display can be controlled by touching it.
- Backlight failure is confirmed by the following phenomena:
  - The screen gets dark even when no screensaver setting is enabled.
  - If the screensaver is activated, the screen display does not recover when the screen is touched.
- The backlight can be replaced in our factory. The LCD must be replaced at the same time. Please consult us.

■ MINIMIZING NOISE INTERFERENCE TO ANALOG SIGNAL CABLES

- Noise entering through the analog signal cables may cause irregular measurement values, degradation of overall accuracy, and malfunction of the product.
- Despite the 73VR21x's excellent filtering capabilities against normal mode noise interference to analog signal cables, we recommend that you would conduct wiring to the product with the following points of caution, especially for low-level signals with thermocouple, mV and RTD measurements.
- The 73VR21x is capable of notch filtering the 50/60 Hz normal mode line noise. Select the operating mode setting switch at the rear side of the product.
- The A/D Conversion Mode is factory set to 'Medium' but is programmable to 'Slow'. In general, selecting the 'Slow' A/D conversion mode means the lower data conversion cycles, but the stronger noise filtering. Change this setting according to your needs.
- Do not install cables (power supply and input) close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

■ MINIMIZING CHANNEL-TO-CHANNEL COMMON MODE NOISE

- The CMNR ratio between channels are as described in the product's data sheet. Input types such as ±12V, ±6V, ±3V, ±1000mV are mostly safe from these interferences, however, the measuring accuracies for other input types may be compromised by large common mode noise.
- As described in the data sheet, the DC/AC voltage across the C terminals of the presently-scanned channel and the last scanned channel affects the measuring values.
- In order to obtain stable measuring results without noise interference, it is effective to minimize the against FG common mode noise between channels and between each channel to the ground terminal. We recommend that C terminals of each channel be cross-wired and then connected to the ground terminal FG to ensure the measurement of the highest accuracy.
- If such configuration is not possible, take special consideration to minimize the channel-to-channel common mode noise and the potential against the ground terminal.
  Employ a thermocouple/RTD sheath of high insulation to prevent a leak current. Do not weld a thermocouple directly to the surface of the measuring subject.
- Arranging channels so that a low-level signal channel is not located next to a high potential signal channel while multiplexing these signals is also effective.
- The potential of the open terminal C against the ground terminal FG equals to that of the last scanned channel.

■ STABILIZING COLD JUNCTION COMPENSATION

- Sudden ambient temperature change could increase the cold junction compensation error by the internal terminal temperature sensor. Please take the following precautions to prevent it.

- Be sure to close the terminal cover when operating the 73VR21x.
- Stabilize the temperature around the terminal block. DO NOT expose the terminal block in the direct line of air flow from air conditioners, cooling fans, or ventilation fans. Switching on and off the fans located close to the terminal block affects the ambient temperature.
- Resistor modules (model: REM3-250) can be connected to the 73VR21x to convert current inputs into voltage. However, it is not recommended when TC inputs are mixed because the heat developed on and around the REM3 affects the cold junction compensation performance. We recommend that REM3 be connected on a separate terminal board.
- Do not use wires of large diameter which has large heat dissipation. We recommend using the wires of 0.5 mm^2 (AWG 20) or thinner diameters not only for the thermocouple channels but for all other screw terminals.

■ CONNECTING OTHER DEVICES IN PARALLEL

- Turn off the burnout function for thermocouple inputs.
- No parallel connection is permitted for RTD.

■ DO NOT APPLY OVERRANGE NORMAL MODE VOLTAGE

- Do not apply voltages exceeding ±20V to terminals B – C for ±3V, ±6V or ±12V ranges to prevent damage.
- For other ranges, do not apply voltages exceeding ±12V to the same terminals to prevent damage.
  Applying voltages exceeding ±1.5V may affect the measuring accuracies of other channels.

■ INTERNAL CLOCK

- The internal clock data is stored in memory powered by a backup battery while the 73VR21x is without external power supply.
- The data will be reset to its default status when the battery is used up while the 73VR21x is left without power supply for a long time period. The clock adjustment will be necessary once the power is restored. Please refer to the 73VR21x Users Manual for the procedure.
- Once the power is restored, the 73VR21x starts recharging the battery. It will be full in approximately in 36 to 48 hours.

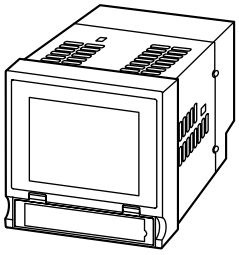
■ AND ....

- We recommend use of an UPS to supply power backups.
- The module is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

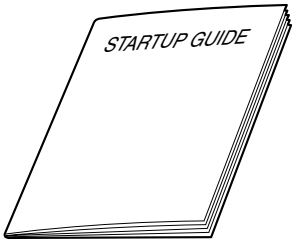
2. PACKAGE INCLUDES...

Please confirm that all items mentioned below are included in the package.

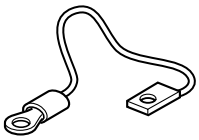
☐ Paperless Recorder



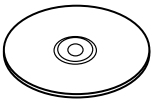
☐ Startup guide (this booklet)



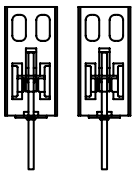
☐ Cold junction compensationn sensor (attached to the terminals)



☐ Software CD (73VRPAC2)



☐ Mounting bracket (two pieces)



Not included for desktop type.

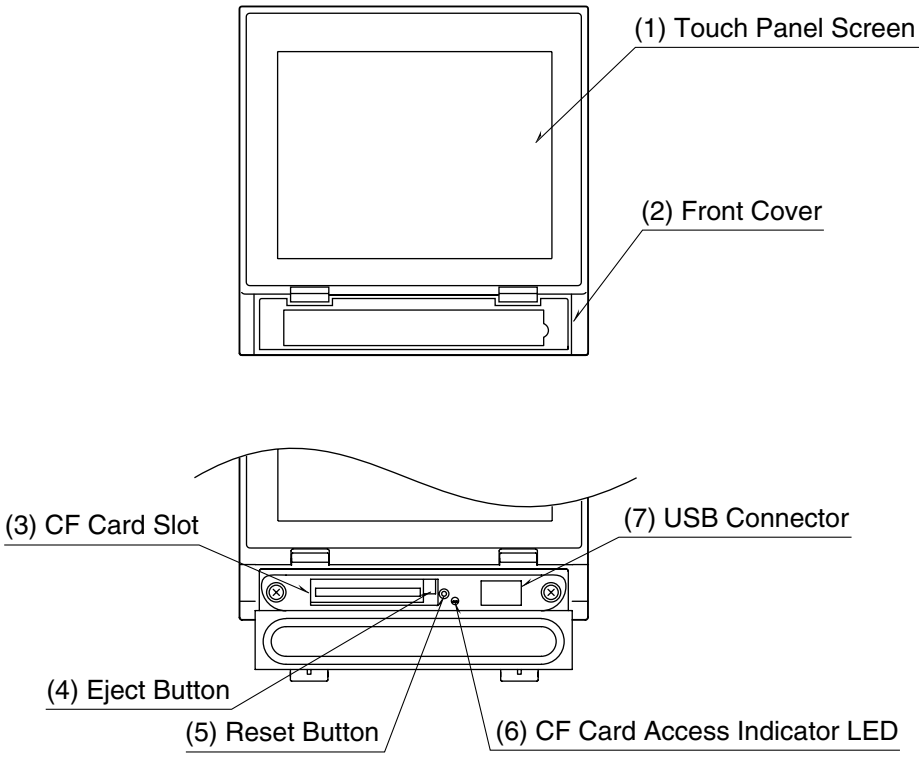
3. ITEMS TO PREPARE

- CF card
  Prepare one of the following model numbers:
  1. Manufacturer: Hagiwara Solutions
     Model No.: MCF10P-xxxxS
     Capacity: 128 MB through 1 GB
     (CFI-xxxxDG ... discontinued)
  2. Manufacturer: Apacer Technology
     Model name: CFC III
     Model No.: AP-CFxxxxRBNS-ETNDNRG Parts No.: 256 MB ... 81.28L10.UC08B
     512 MB ... 81.29L10.UC08B
     1 GB ... 81.2AL10.UC08B
     Capacity: 256 MB through 1 GB
     (AP-CFxxxxE3ER-ETNDNR, AP-CFxxxxE3ER-ETNDNRK,
     AP-CFxxxxE3NR-ETNDNRQ ... discontinued)
- CF card reader
  The CF card reader is required to read the card contents into a PC.

- Refer to Users Manuals stored in the 73VRPAC2 CD for detailed operations of the 73VR21x.
  Paperless Recorder (model: 73VR21x) Users Manual..... No. EM-7395-B

4. COMPONENT IDENTIFICATION

■ FRONT VIEW



(1) Touch Panel Screen
Trend chart and other data views and setup views are displayed.

(2) Front Cover
Access to the CF Card Slot.

(3) CF Card Slot
Insert a CF Card.

(4) Eject Button
Used to retrieve the CF Card.

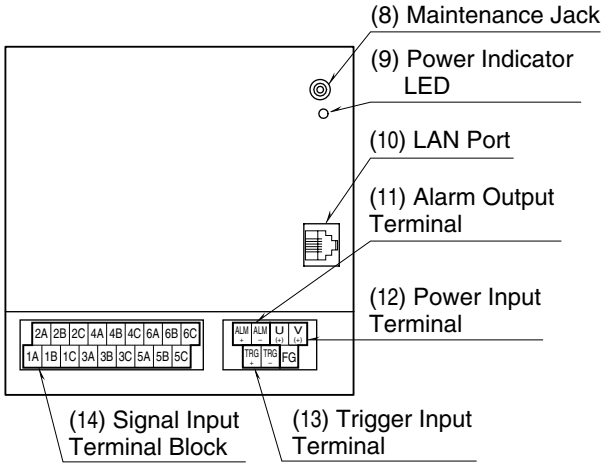
(5) Reset Button
Used to restart the 73VR21x.

(6) CF Card Access Indicator LED
Red LED turns on during the CF Card is accessed.

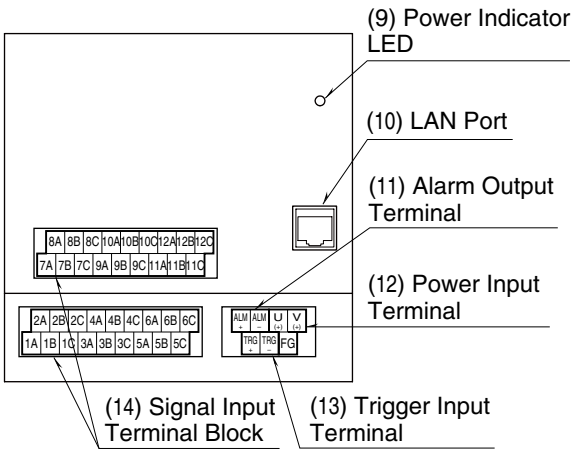
(7) USB Connector
Connect an USB flash-memory.

■ REAR VIEW

• 73VR2102, 2104, 2106

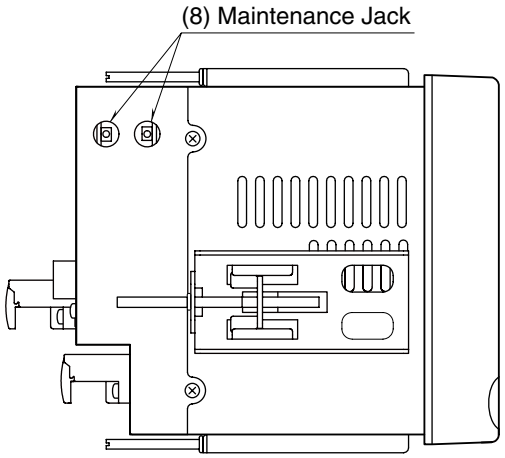


• 73VR2108, 2110, 2112



■ SIDE VIEW

• 73VR2108, 2110, 2112



(8) Maintenance jack connector
Unused.

(9) Power Indicator LED
LED turns on while the power is supplied.

(10) LAN Port
Connects the LAN cable.
(10BASE-T or 100BASE-TX)

(11) Alarm Output Terminal
Terminal to trigger an external alarm from the 73VR21x.

(12) Power Input Terminal
Terminal to connect power supply.

(13) Terminal for Trigger Input
Terminal to connect an external trigger input signal.

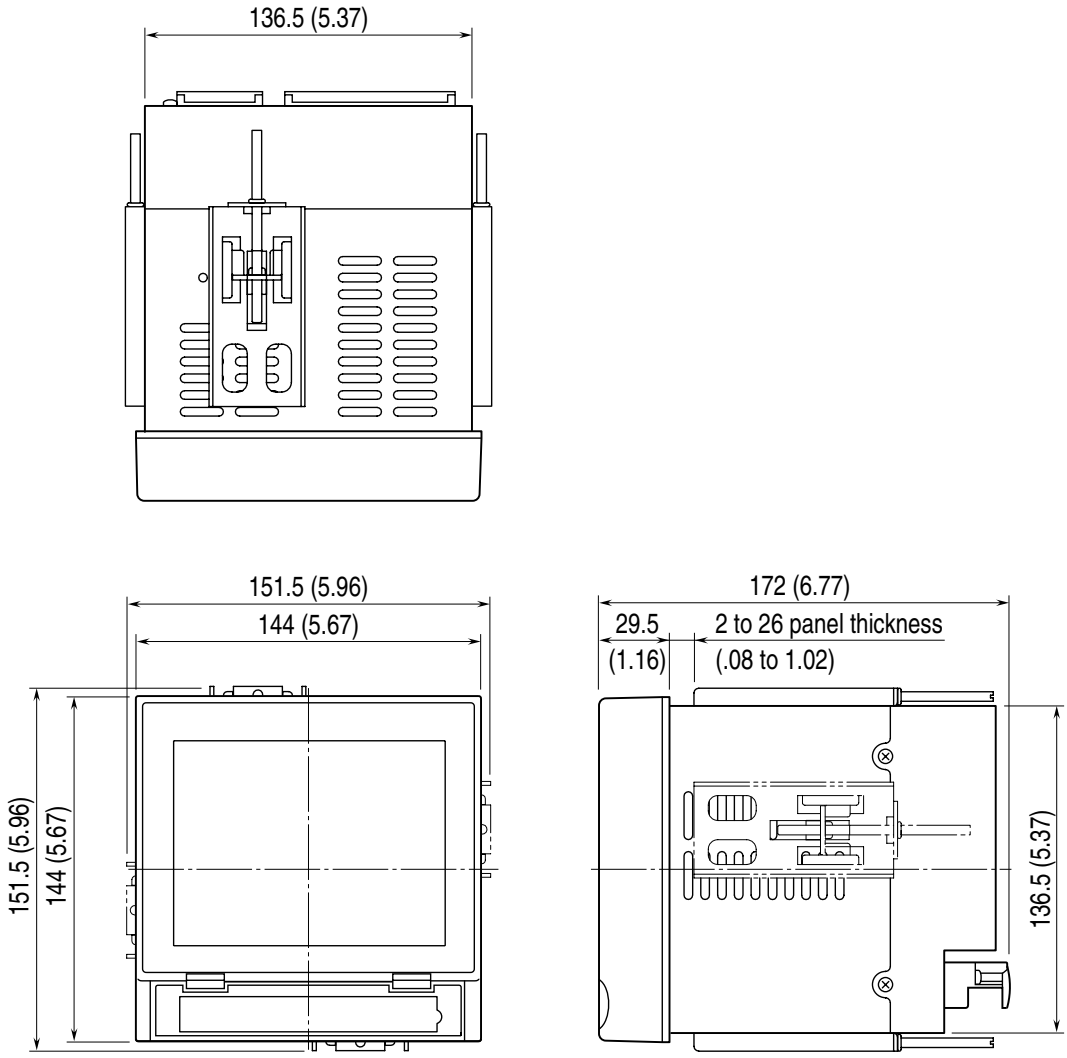
(14) Signal Input Terminal Block
Terminal to connect input signals.

5. EXTERNAL DIMENSIONS

Unit: mm (inch)

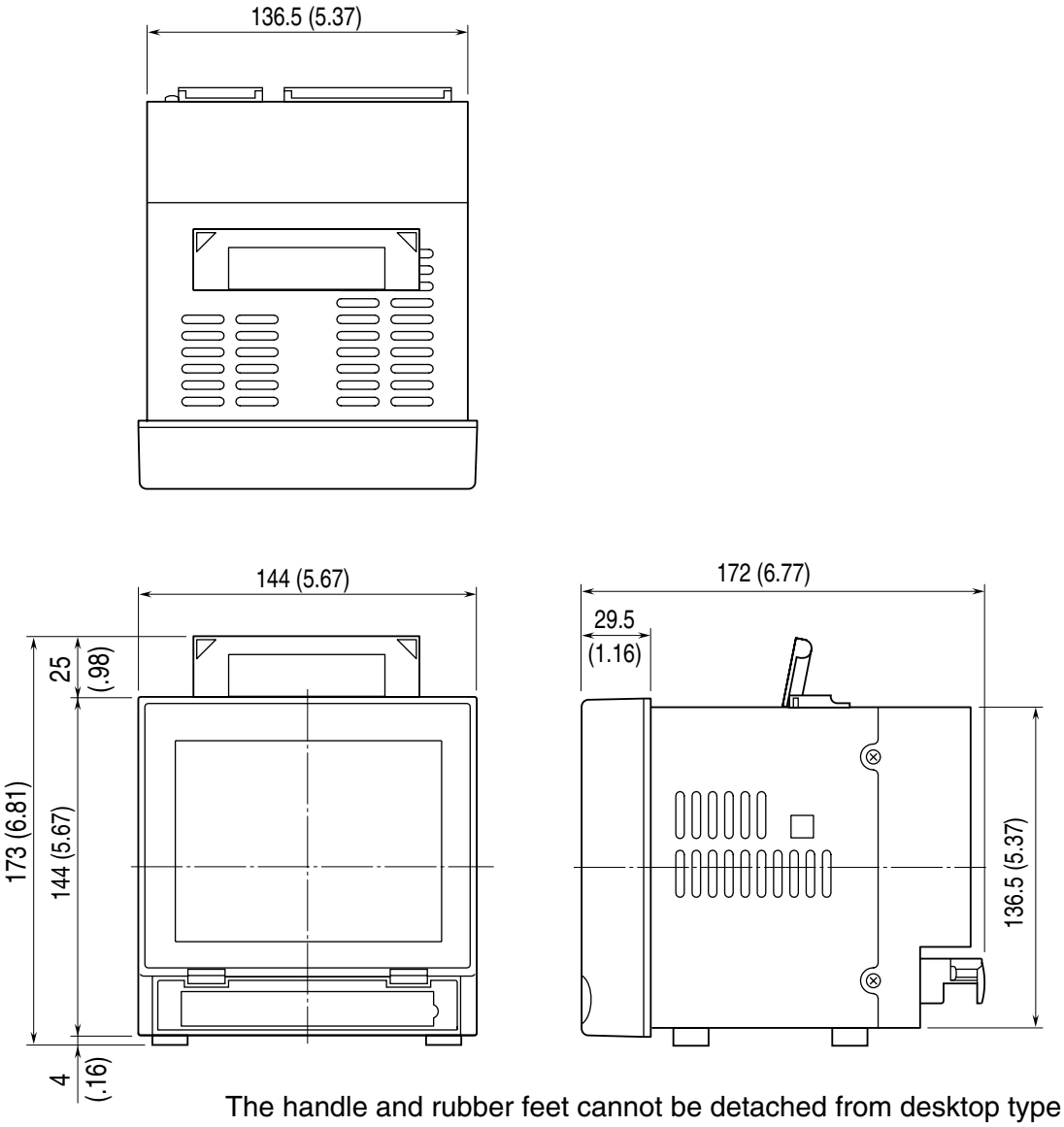
■ 73VR2102, 73VR2104, 73VR2106

· Panel mount type



Attach the mounting bracket either on the top/bottom or on the sides.

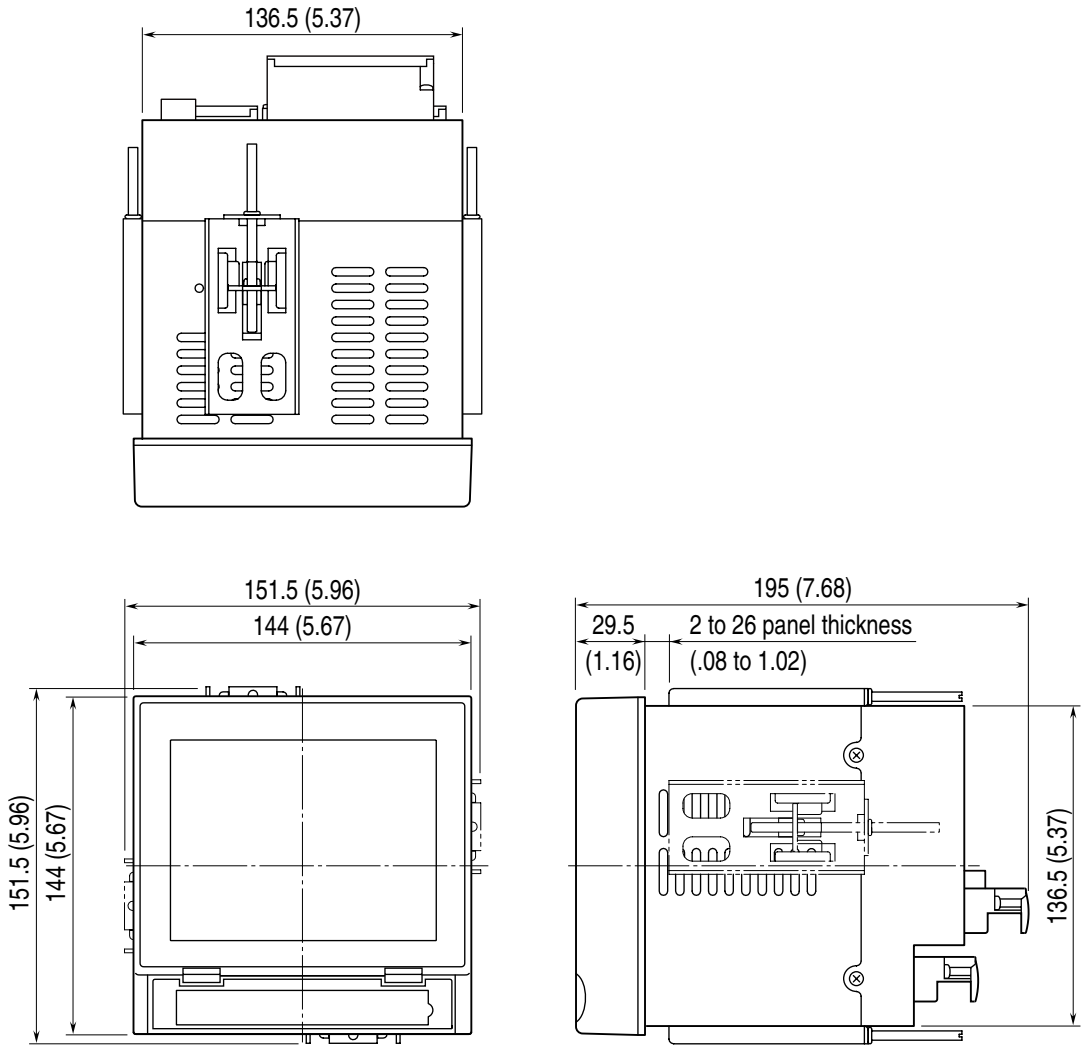
· **Desktop type**



The handle and rubber feet cannot be detached from desktop type unit.

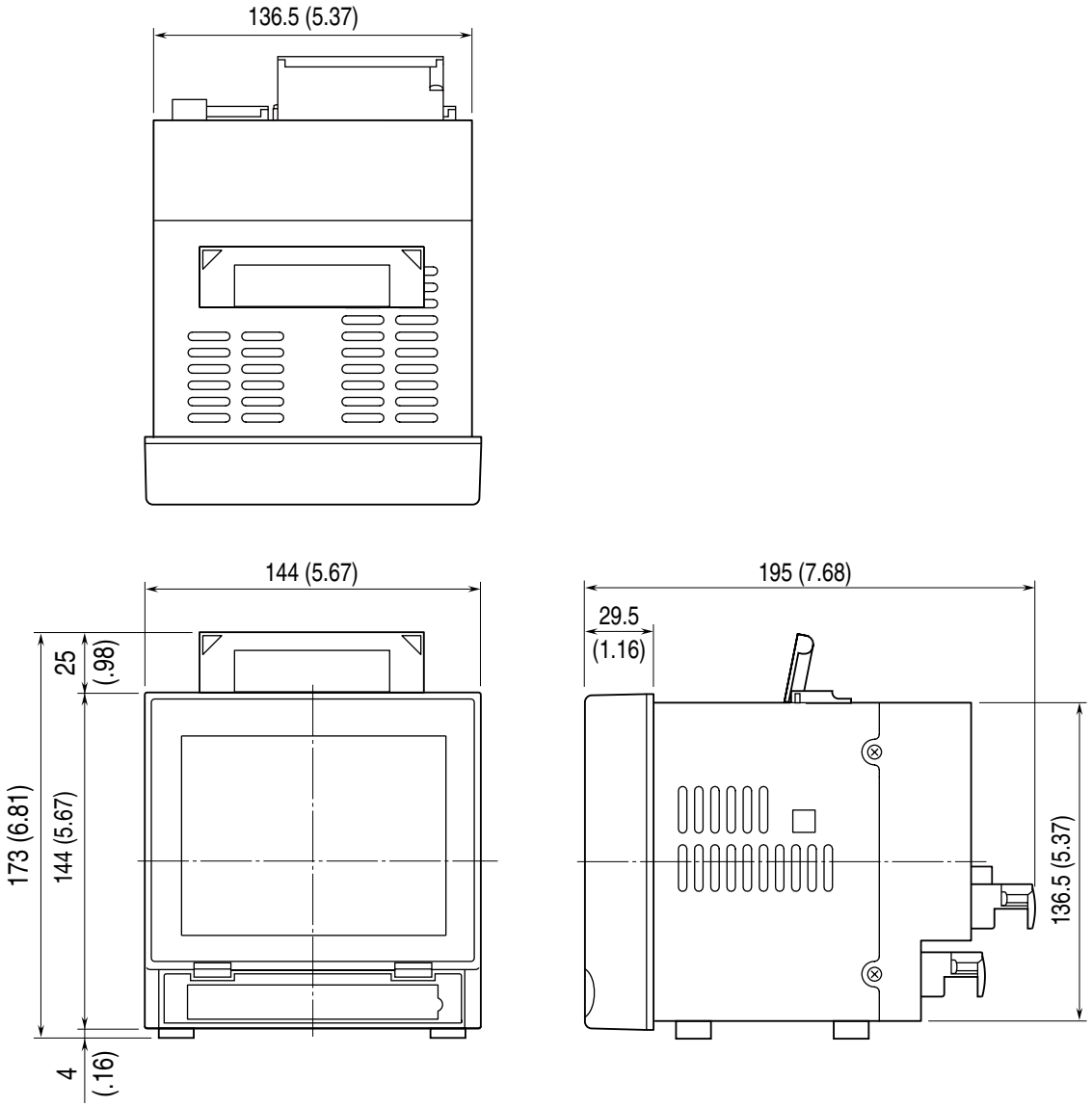
■ 73VR2108, 73VR2110, 73VR2112

· Panel mount type



Attach the mounting bracket either on the top/bottom or on the sides.

· **Desktop type**



The handle and rubber feet cannot be detached from desktop type unit.

6. INSTALLING THE UNIT

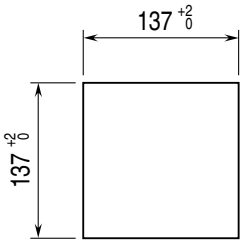
Mount the 73VR21x on the surface of a panel.

■ ADAPTABLE PANEL

Panel thickness: 2 to 26 mm
Material: Steel

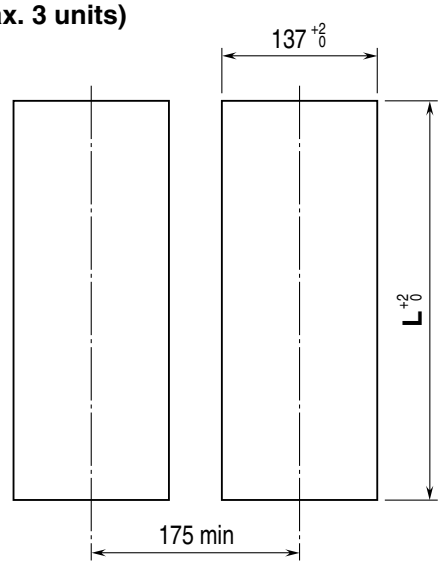
■ PANEL CUTOUT Unit: mm

■ SINGLE MOUNTING

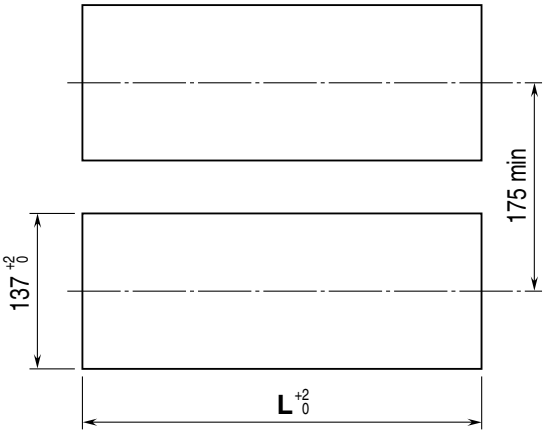


Number	L +2 0 (mm)
2	282
3	426
4	570
5	714
6	858
7	1002
8	1146
9	1290
10	1434
n	(114 × n) – 6

■ VERTICAL CLUSTERED MOUNTING (max. 3 units)



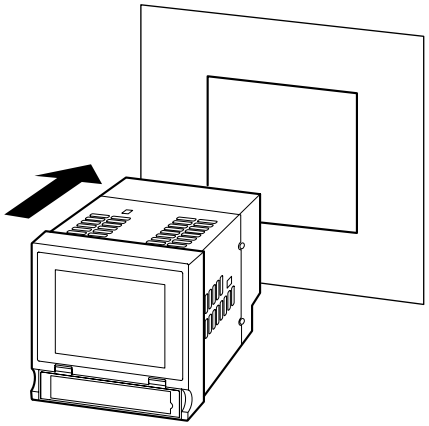
■ HORIZONTAL CLUSTERED MOUNTING



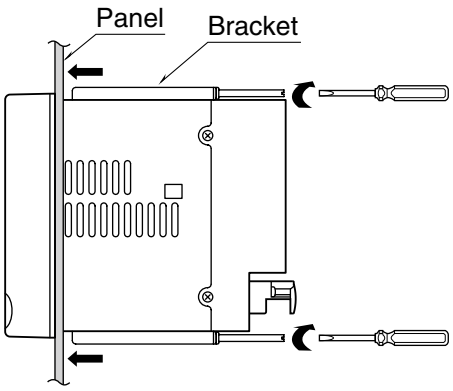
Notes
1. Dimensional tolerance ±3% unless otherwise specified.
   (±0.3 mm for <10 mm)
2. Desktop type cannot be mounted on a panel surface.

■ PANEL MOUNTING

(1) Insert the 73VR21x from the front side of the panel.



(2) Remote the sheets covering the mounting bracket holes. Fix two mounting brackets either on the sides or on the top and bottom of the unit. Tighten screws.



CAUTION !

Adequate tightening torque for the screws used to mount the unit onto the panel is between 0.8 and 1.2 N·m. If an excessive force is applied, the unit's enclosure may be destroyed, or the panel may be distorted, which would cause a compromise in the unit's protection against water or liquid ingress.

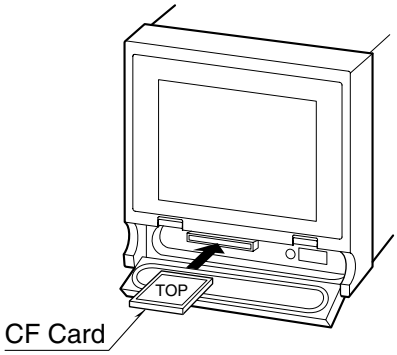
7. PREPARATION & WIRING TO THE UNIT

7.1 INSERTING CF CARD

Insert a CF card to store recorded data and setting of Paperless Recorder.

■ INSERTING THE CF CARD

(1) Turn off the power supply to the 73VR21x.
(2) Open the front cover.



(3) Insert the CF card so that its side without label is on the top.
(4) Push it in until EJECT button is popped up.
(5) Close the front cover.

NOTES – How to Take the CF Card Out –

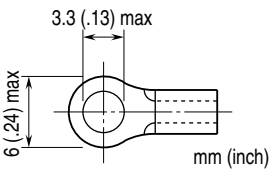
(1) When the 73VR21x is recording data, touch [MENU] key on the right bottom on the screen and touch [Stop] to stop the recording.
(2) Push EJECT button to the right side of the card slot and take the card out.

7.2 WIRING

■ TERMINAL

Please choose appropriate solderless terminals for the power and input terminals, referring to the figure to the right. Appropriate tightening torque is 0.5 N·m.

Connection: M3 separable screw terminal
Screw terminal material: Nickel-plated steel (standard) or stainless steel
Applicable wire size: 0.25 to 1.65 mm^2 (AWG 22 to 16)
Recommended manufacturer: Japan Solderless Terminal
MFG.Co.Ltd, Nichifu Co.,ltd



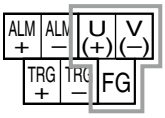
■ CONNECTING TO POWER SOURCE

• Confirm the power input rating on the specifications.

	Rated Voltage	Operational Voltage Range	Power Consumption
AC Power	100 – 240 V AC	85 – 264 V AC	Approx. 25 VA at 100 V Approx. 35 VA at 240 V
DC Power	24 V DC	24 V DC ±10%	Approx. 11 W

• How to connect

(1) Open the power terminal cover at the rear.
(2) Loosen the three screws of power terminal.



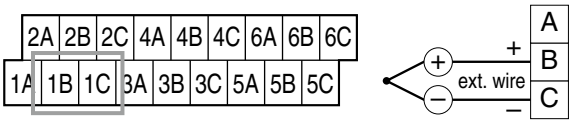
(3) Wire power cable and protective grounding cable to the power terminal.
(4) Close the terminal cover.

■ CONNECTING INPUT SIGNALS

The following explanation is an example with a thermocouple connected to Input 1, with the Burnout detection type: Upscale/None.

• How to connect

(1) Turn off the power supply to the 73VR21x and open the input terminal cover.
(2) Connect (+) side of the thermocouple to 1B and (–) side to 1C.



(3) Close the input terminal cover.

☛ When connecting other signal types, see the 73VR21x User's Manual Section 2.

8. SETTING UP THE RECORDER

Basic setup procedure is explained in this section, using an example of thermocouple input at Input 1 to store data in a CF card in 1 second storing interval.

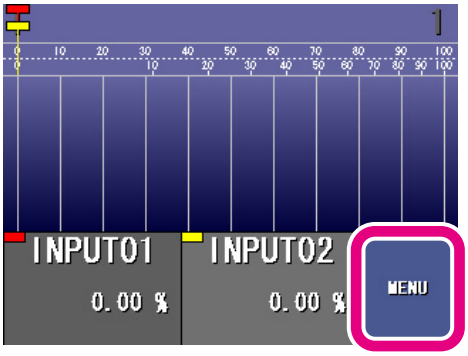
☛ See the 73VR21x User's Manual Section 5 for the setting details.

(1) Insert the CF card into the 73VR21x. Turn on the power supply to the 73VR21x.

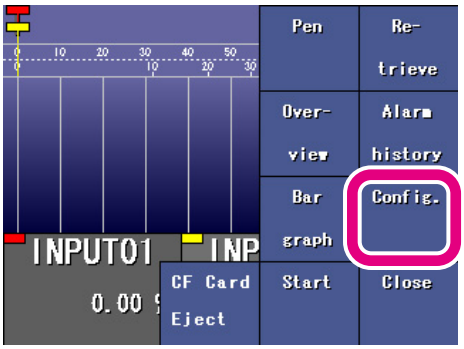
NOTES – Creating Files in the CF Card –
The 73VR21x creates files necessary to function once the power is turned on. This process takes some time. Please wait until the initial view appears on the screen.

☛ See the 73VR21x User's Manual Section 10 for the files in the CF card.

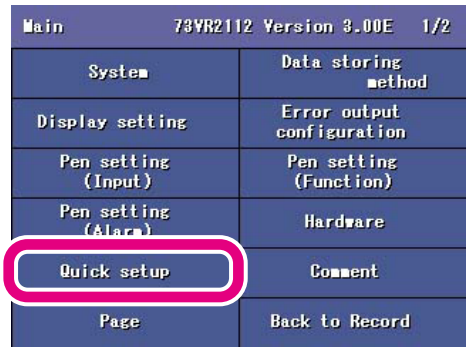
(2) Touch [MENU] key on the screen to call up control buttons.



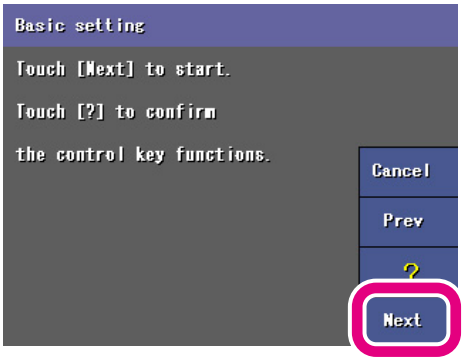
(3) Touch [Config.] key.



(4) Touch [Quick setup] in Main setup view.

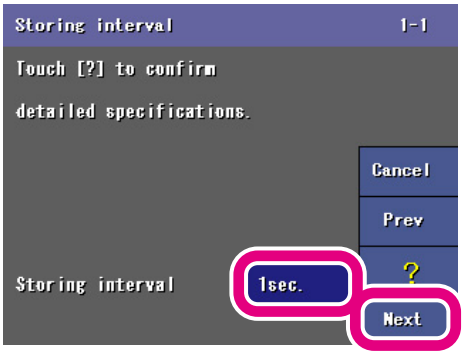


(5) 'Basic setting' view is on the screen.
Touch [Next].



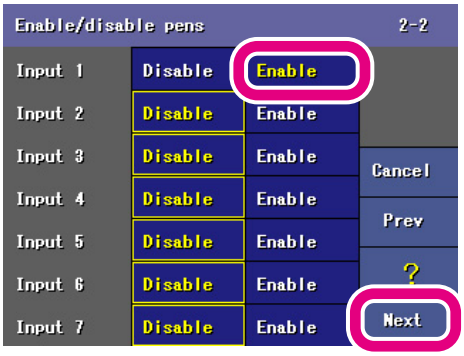
NOTES – Control Key Functions –
Cancel : Return to Main setup view without applying changes made in Quick setup.
Return : Go to the previous view (page).
? : Go to Help view.
Next : Go to the next view (page).

(6) 'Storing interval' view is on the screen.
Touch [Storing interval] key to show available options.
Choose '1 sec.' and touch [Next].



(7) 'Enable/disable pens' view is on the screen.
Touch [Next].

(8) Available selections for 'Enable/disable pens' are on the screen.
Choose 'Enable' for Input 1.
Choose 'Disable' for Input 2 through 7.
Touch [Next].

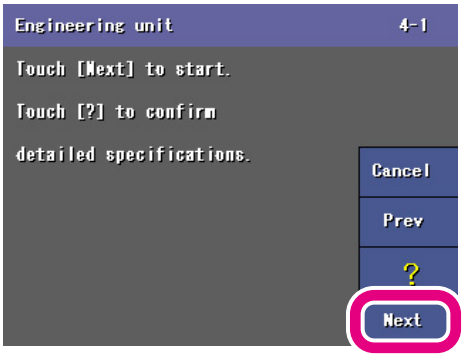


(9) ‘Tag’ view is on the screen.
Touch [Next].

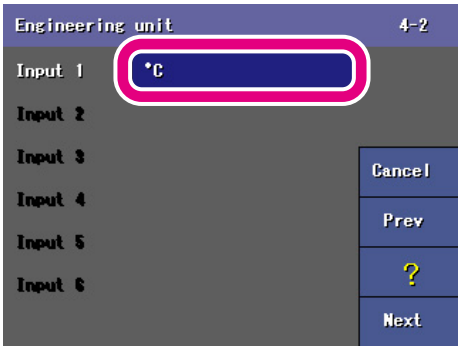
(10) Default tag names are on the screen.
Touch these names to change.
Leave the default ‘INPUT01’ as it is in this example.
Touch [Next].

NOTES
Pens you ‘disabled’ in the previous page do not show tag names.

(11) 'Engineering unit' view is on the screen.
Touch [Next].



(12) Default engineering units are on the screen.
Touch these units to change.
Touch the current unit selection for Input 1 and a keypanel appears on the screen.



The following is an example to set '°C' for Input 1.

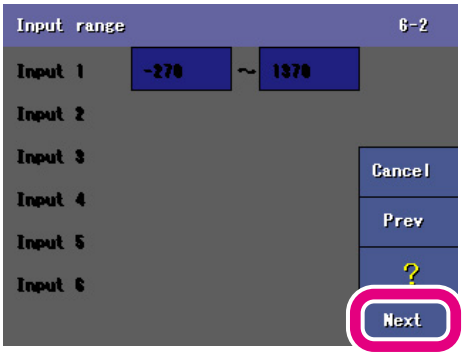
1. Touch [/%°] key for three (3) times to choose ' ° '.
2. Touch [A/a] key once to switch to the capital letter mode.
3. Touch arrow key to move to [ABC] key, and choose 'C' by touching the key for three (3) times.
4. Touch [OK].
5. The view returns to 'Engineering unit'.
6. Touch [Next].

(13) 'Analog type' view is on the screen.
Touch [Next].

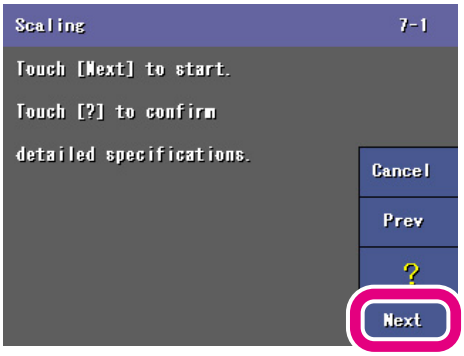
(14) Default analog types are on the screen.
Touch these type descriptions to change.
Touch the current type selection for Input 1 and a list of available options will appear.
Choose 'K (CA)' and the screen automatically returns to 'Analog type' view.
Touch [Next].

(15) 'Input range' view is on the screen.
Touch [Next].

(16) Default input ranges are on the screen.
Touch these type descriptions to change.
The input range is fixed for a temperature input.
Touch [Next].



(17) 'Scaling' view is on the screen.
Touch [Next].



(18) Default scaling ranges are on the screen.
Touch these values to change.
The scaling range is fixed for a temperature input.
Touch [Next].

(19) Now the basic setting is complete.
Touch [Record].

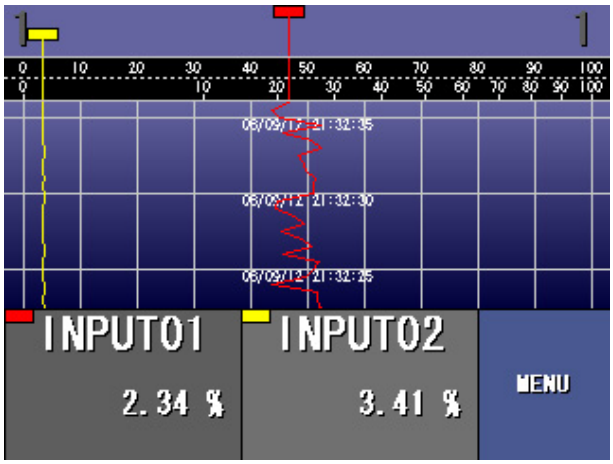
NOTES

Scaling range is automatically set as the plot position for the pen when you use Quick setup.

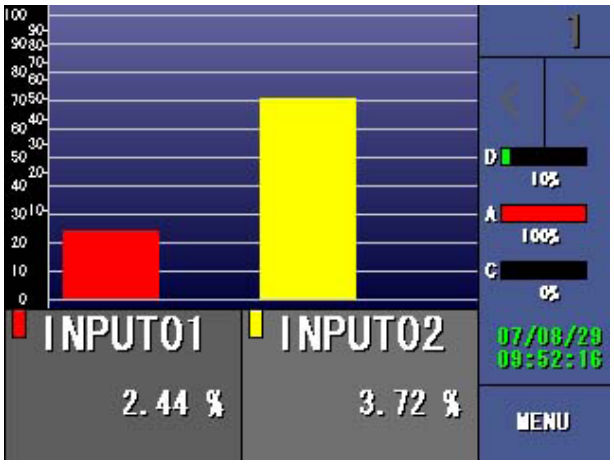
9. LET'S START RECORDING

Touch [MENU] on the recording view to call up a list of functions.
Touch [Start] to start recording.

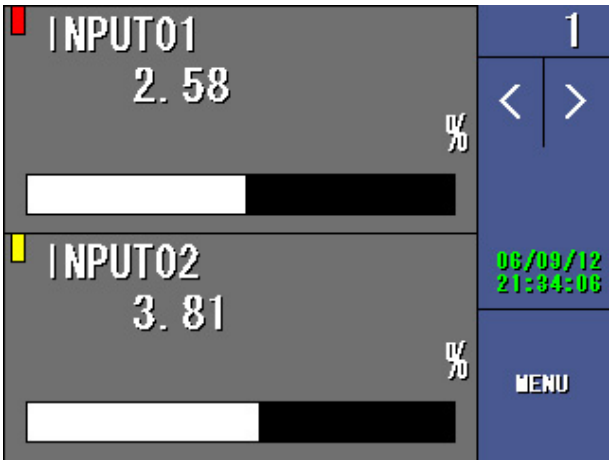
In order to show real time data on the screen, 'Trend view', 'Bargraph view' and 'Overview' are available.



Trend View



Bargraph View



Overiew

In order to show past data stored in the CF card, 'Retrieve view' and 'Alarm history' are available.

For more detail, refer to the 73VR21x User's Manuals.