INSTRUCTION MANUAL

PAPERLESS RECORDER (color LCD display)

MODEL

71VR1

BEFORE USE

Thank you for choosing us. Before use, please check contents of the package you received as outlined below. 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.

■ PACKAGE INCLUDES:

Paperless recorder (body + watertight packing)	(1)
Mounting bracket	(2)
CJC sensor (for 71VR1- E501-x)	(3)
Plug conversion adapter	(1)

MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures. For more details, refer to the operating manual (EM-7403-B) downloadable at our web site.

MEMORY CARD

Prepare the following model numbers: Available for purchase from us. Consult us.

- Manufacturer: Hagiwara Solutions Model: NSD6-002GT (discontinued) Capacity: 2 GB
- Manufacturer: Hagiwara Solutions Model: NSD6-004GH(A00SDI (discontinued), NSDA-004GT (discontinued), NSDA-004GL (discontinued), NSD6-004GH(B21SEI Capacity: 4 GB
- Manufacturer: Apacer Technology Model: AP-ISD04GIS4B-T (discontinued), AP-ISD04GIS4B-3T Capacity: 4 GB

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

- This equipment is suitable for Pollution Degree 2, Installation Category II (transient voltage 2500V) and Measurement Category II (contact output, transient voltage 2500V). Reinforced insulation (analog input or contact input or contact output or network interface to power to FE: 300V) and basic insulation (analog input each other or contact input or network interface to contact output each other: 300V) are maintained. Prior to installation, check that the insulation class of this unit satisfies the system requirements.
- Altitude up to 2000 meters.
- Do not share the grounding point of PE (Protective Earth) of other devices with FE (Functional Earth). Handle as signal ground.
- The equipment must be installed such that appropriate clearance and creepage distances are maintained to conform to CE requirements. Failure to observe these requirements may invalidate the CE conformance.
- 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.
- 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.

■ POWER INPUT RATING & OPERATIONAL RANGE

• Locate the power input rating marked on the product and confirm its operational range as indicated below: 100 - 240V AC rating: 85 - 264V, 50/60 Hz,

approx. 7VA at 100V AC approx. 10VA at 240V AC

24V DC rating: 24V ±10%, approx. 6W

- 110V DC rating: 85 150V, approx. 6W
- Supplying any level of power other than specified above can damage the unit or the power source.
- Power supply start-up characteristics must reach within 5 seconds to the operational voltage range of the unit.
- Power cables and signal I/O cables for the unit must be located separately.
- Power cables, signal I/O cables and communication cables for the unit should not be bundled together.
- To increase noise resistance of the power input wires, twist the strands before connecting.

■ GENERAL PRECAUTIONS

- Before you remove the unit, turn off the power supply and I/O signals for safety.
- Do not disassemble or modify the unit in any way. Doing so may result in a fire or an electrical shock.

• Do not block the unit's ventilation openings or use it in areas where heat accumulates.

Additionally, do not store or use it under high-temperature conditions.

- Do not use this unit in an environment where flammable/ corrosive gases are present.
- Do not store or use this unit in locations subject to direct sunlight, or where excessive dust, dirt or metal particles are present.
- This unit is a precision instrument. Do not store or use it where large shocks or excessive vibration can occur.
- Do not store or use this unit in environments subject to chemical evaporation (such as that of organic solvents), or where there are chemicals and/or acids present in the environment.
- Do not use paint thinner or organic solvents to clean this unit.
- Observe the environmental conditions when using this unit.
- Wait at least 15 seconds before turning on the power supply after it was turned off.

■ ENVIRONMENT

- Indoor use.
- This unit 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 -5 to $+55^{\circ}C$ (23 to $131^{\circ}F$) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

■ GROUNDING

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

MEMORY CARD

- Do not turn off the power supply to the unit or reset it during data recording or alarm history recording. The memory card may be destroyed.
- Observe the described procedure when you need to replace the memory card during recording.
- Confirm the sides and the connector position of the memory card when inserting one to the card slot.
- Do not touch the metal terminal with your hands or metallic tools.
- Memory cards have a life span. Back up your important data.

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 an-

- 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 unit and wait for a while 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.

■ 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. We recommend that you would conduct wiring to the unit with the following points of caution.
- Do not install cables close to noise sources (high frequency line, etc.).
- Do not bind the analog input cables together with those in which noises are present. Do not install them in the same duct.

DO NOT APPLY OVERRANGE INPUT

• Do not apply voltages exceeding $\pm 15V$ to terminals V – COM, A – C and B – C to prevent damage. Do not apply currents exceeding $\pm 30mA$ to terminals I – COM and B – C to prevent damage.

■ INTERNAL CLOCK

- The internal clock data is stored in memory powered by a backup battery while the unit is without external power supply.
- The data will be reset to its default status when the battery is used up while the unit is left without power supply for a long time period. The clock adjustment will be necessary once the power is restored.
- Once the power is restored, the unit starts recharging the battery. It will be full in approximately in 36 to 48 hours.
- Battery backup: approx. one month

CONNECTOR JACK

- The connector jack is covered with a cap. This cap protects against ingress of moisture or dust. Avoid moisture ingress into the jack.
- Do not operate the unit if moisture is inside the jack. Proceed cleaning blowing with air etc.
- To use the configurator cable, remove the cap of the jack and connect it after the conversion adapter is attached.
- Put the cap on the jack after operating with the configurator cable.

AND

- We recommend use of an UPS to supply power backups.
- The unit 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.

COMPONENT IDENTIFICATION



(6) F6 buttonMark to measured values, ENTER, execute commands.(7) Terminal 1Power supply terminals, contact output terminals, contact input terminals(8) Terminal 2Analog input terminals(9) Terminal 3Analog input terminals, external interface terminals(10) Memory card slotInsert a memory card.

INSTALLATION

PANEL CUTOUT unit: mm [inch]



Usable panel thickness: 0.5 - 10 mm [0.02 to 0.39 inch]

■ CAUTION

- Degree of protection, IP65 is applicable to the front panel of the unit with single mounting according to the specified panel cutout. Not applicable in case of re-mounting. After installation ensure waterproof of the mounting.
- Install the unit to vertical panel so that its function buttons are at the bottom side. Installing by other direction will cause degradation of life span or performance due to rise of the internal temperature.
- Ensure that there is sufficient space for ventilation inside a panel. Do not install above the devices that generate high heat such as heaters, transformers or resistors. Observe at the minimum of 30 mm (1.2") in all directions for maintenance purpose.

HOW TO MOUNT THE UNIT ON A PANEL

- 1) Remove the mounting brackets.
- 2) Remove the terminal cover and insert it into the panel cutout prior to insertion of the unit.
- 3) Insert the unit into the panel cutout. The watertight packing must be in place to conform degree of protection, IP65. Do not remove it.
- 4) Hang the hooks of the mounting brackets at the square holes on the upper and bottom side of the unit. Tighten screws of the brackets until the unit is fixed to the panel. (torque 0.5 N·m)



HOW TO REMOVE THE TERMINAL COVER

Insert the minus tip of a screwdriver into each hole at the four corners of the cover and pull it to the direction as indicated below to separate the terminal cover.



HOW TO REMOVE THE TERMINAL BLOCK

- The terminal block is separable in two pieces. Loosen two screws on top and bottom of the terminal block to separate.
- Be sure to turn off the power supply, input/output signal and communication signal before separating the terminal block.
- Each terminal block has ID keys so that it can be inserted to applicable terminal socket only.



TERMINAL CONNECTIONS

Connect the unit as in the diagram below or refer to the connection diagram on the terminal cover.

EXTERNAL DIMENSIONS unit: mm [inch]



■ CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FE terminal to ground. Caution: FE terminal is NOT a protective conductor terminal.



*1. Only with 5-points input

*2. Only with 2-points DC input

*3. When the device is located at the end of a transmission line

via twisted-pair cable, (when there is no cross-wiring), close across the terminals T2 - T3 with a leadwire.

■ Input Connection e.g.



Note: Short across the terminals V and I for Current Input.

Universal Input



COMMUNICATION CABLE CONNECTIONS



*1. Use a terminating resistor when the device is at the extreme end of a transmission line.

SYSTEM CONFIGURATION EXAMPLES

Paperless Recorder (model: 71VR1)



*1. Insert lightning surge protectors recommended in this example if necessary.

PREPARATION & WIRING TO THE UNIT

MEMORY CARD

- · How to insert a memory card
- 1) Initialize a memory card
- 2) Make sure the Lock switch is slid up (unlock position) so that the memory card is writable.
- 3) Insert the memory card into the memory card slot completely.
- 4) CARD in the sub display turns to green.

· How to remove a memory card

- 1) When the unit is recording, press STOP RECORDING button in the CONTROL MENU to stop recording.
- 2) Press the REMOVE MEMORY CARD button in the CONTROL MENU.
- 3) Push the memory card to remove it.

■ WIRING

Power supply

- Confirm the power input rating marked on the product.
- 1) Remove the terminal cover.
- 2) Loosen three screws on the power supply terminals.
- 3) Connect the power cables and the earth cable to the power supply terminals.
- 4) Replace the terminal cover.

Input/Output

Follow the procedure shown below when a DC signal is connected to DC Input Ai 1. For other input/output connections, similar procedure should be followed. 1) Turn the power off.

- 2) Remove the terminal cover.
- 3) Connect the (+) side of a signal source to V (21), connect the (-) side to COM (23).
- 4) Replace the terminal cover.

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

Terminal block: M3 screw terminal connection Screw terminal material: Nickel plated steel Appropriate wire size: 0.3 to 0.75 mm²



SETTING UP THE RECORDER

Basic setup procedure for 71VR1-E101-x is explained in this section, using an example of voltage input measurement at Input 1 displaying 0 to 100% to store data in a memory card in 500 msec. sample rate.

SYSTEM SETTING

- 1) Hold down F1 button on TREND display screen, DIGI-TAL display screen or CONTROL MENU until SET-TING MENU is displayed.
- 2) Press F2 or F3 button to select SYSTEM in the menu list, then press [ENTER] (F6) button to display SYSTEM SETTING menu.
- 3) Confirm the settings such as DATE, TIME, NUMBER OF DECIMALS, and MODBUS. If you need to change them, press F2 or F3 button to move to the setting you need to change.
- 4) Press [EDIT] (F6) button to change color of the value to magenta, then change the value by pressing F2 through F5 button. After changing the value, press [ENTER] (F6) to set the value.
- 5) Press [RETURN] (F1) button to return to TREND display screen.

■ INPUT CHANNEL SETTING

- 1) Hold down F1 button on TREND display screen, DIGI-TAL display screen or CONTROL MENU until SET-TING MENU is displayed.
- 2) Press F2 or F3 button to select CHANNEL in the menu list, then press [ENTER] (F6) button to display CHANNEL MENU.
- 3) Select OPERATING MODE and press [ENTER] (F6) button to display CHANNEL/OPERATING MODE menu.
- 4) SAMPLE RATE is selected. Press [EDIT] (F6) button. Press F2 or F3 button to select 500 ms of sample rate. Press [ENTER] (F6) button to set the sample rate.
- 5) NORMAL/DEMO is for selecting NORMAL mode or DEMO mode. Confirm it is NORMAL.
- 6) Press [RETURN] (F1) button to return to the CHANNEL MENU.

CHANNEL/ANALOG INPUT/CHANNEL SETTING CHANNEL/ANALOG INPUT menu 1/3

- 1) Press F2 or F3 button in CHANNEL MENU to select ANALOG INPUT, then press [ENTER] (F6) button to display CHANNEL/ANALOG INPUT menu.
- 2) Press [EDIT -> ->] (F6) button to select "AI 1" for INPUT CHANNEL.
- 3) Press F2 or F3 button to select FIELD CHANNEL, then press [EDIT $\rightarrow \rightarrow$] (F6) button to enable editing.
- 4) Press F2 or F3 button to select Ai1, then press [ENTER] (F6) button to set the field channel to Ai1.
- 5) Press F2 or F3 button to select TYPE, then press [EDIT $\rightarrow \rightarrow \rightarrow$] (F6) button to enable editing.
- 6) Press F2 or F3 button to select "-10 10V", then press [ENTER] (F6) button to set the type to "-10 10V".
- 7) Press F2 or F3 button to select MIN, then press [EDIT \rightarrow ->] (F6) button to enable editing.
- 8) Press F2 through F5 button to change the value to 0.000, then press [ENTER] (F6) button. The number of decimal places displayed here is fixed by the setting in the SYS-TEM SETTING menu.
- 9) Press F2 or F3 button to select MAX, then press [EDIT \rightarrow \rightarrow] (F6) button to enable editing.
- 10)Press F2 through F5 button to change the value to 10.000, then press [ENTER] (F6) button.

• CHANNEL/ANALOG INPUT menu 2/3

To change ENGINEERING UNIT and TAG NAME, the Configurator Software (model: 71VRCFG) is required.

- 1) Press F4 or F5 button to display CHANNEL/ANALOG INPUT menu 2/3.
- 2) Press F2 or F3 button to select SCALE MIN, then press [EDIT $\rightarrow \rightarrow$] (F6) button to enable editing.
- 3) Press F2 through F5 button to change the value to 0.000, then press [ENTER] (F6) button.
- 4) Press F2 or F3 button to select SCALE MAX, then press [EDIT -> ->] (F6) button to enable editing.
- 5) Press F2 through F5 button to change the value to 10.000, then press [ENTER] (F6) button.

• CHANNEL/ANALOG INPUT menu 3/3

- 1) Press F4 or F5 button to display CHANNEL/ANALOG INPUT menu 3/3.
- 2) PRESENT VALUE displays current measured value. Use ZERO/SPAN to adjust the measured value.
- 3) Press [RETURN] (F1) button twice to return to SET-TING MENU.

■ PEN SETTING

- 1) Press F2 or F3 button to select PEN in the menu list, then press [ENTER] (F6) button to display PEN SET-TING menu.
- 2) Confirm that P1 is displayed at PEN column.
- 3) Press F2 or F3 button to select INPUT, then press [EDIT $\rightarrow \rightarrow \rightarrow$] (F6) button to enable editing.
- 4) Press F2 or F3 button to select "AI 1", then press [ENTER] (F6) button.
- 5) Press [RETURN] (F1) button twice to return to TREND display screen.

Basic procedure is mostly the same as the above example.

LET'S START RECORDING

DISPLAY MEASURED VALUE

Press F1 to select TREND display screen or DIGITAL display screen and display measured value.

■ RECORD MEASURED VALUE

- 1) Press F1 button several times to display CONTROL MENU.
- 2) Press F2 or F3 button to select START CONTINUOUS RECORDING, then press [ENTER] (F6) button. The unit starts recording to memory card.
- 3) Press F1 button to confirm REC in the sub display of TREND display screen or DIGITAL display screen turns to red.

STOP RECORDING

- 1) Press F1 button several times to display CONTROL MENU.
- 2) Press F2 or F3 button to select STOP RECORDING, then press [ENTER] (F6) button. The unit stops recording.

Use the memory card, or the PC Configurator Cable (model: COP-US) and the PC configurator software (model: 71VRCFG) to transfer the recorded files to a Personal Computer.

LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protector for protection against induced lightning surges. Please contact us to choose appropriate models.