Paperless Recording System

PAPERLESS RECORDER
(built-in input modules)

MODEL **73VR2102 / 73VR2104 / 73VR2106**

MODEL & SUFFIX CODE SELECTION

73VR21❑–❑–❑

MODEL
73VR2102: 2-point inputs
73VR2104: 4-point inputs
73VR2106: 6-point inputs
LANGUAGE
E : English
N : Japanese
POWER INPUT
M2: 100 – 240V AC
R : 24V DC

A CF Card is required to store data in the 73VR210x. M-System will not guarantee the product's described performance if a CF Card other than purchased from M-System, or specified below, is used.
Manufacturer: Hagiwara Sys-Com
Model No.: CFI-xxxxDG
Capacity: 128 MB through 1 GB

ORDERING INFORMATION

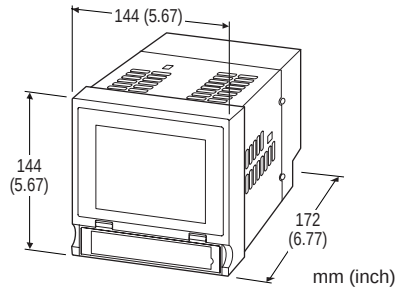
Specify code number and variables.
- **Code number** (e.g. 73VR2102-E-M2)

PACKAGE INCLUDES...

- 73VR Application Software CD (model: 73VRPAC2)
- Mounting brackets (two)

RELATED PRODUCTS

- CF Card (manufactured by Hagiwara Sys-Com)
- Resistor module (model: REM3-250)



Functions & Features
- 100 msec. storing rate
- Data stored in CF Cards
- CF card slot accessible at the front
- 'Quick Setup' helps you to start and program the recorder
- Real time monitor at the host PC via Ethernet
- Dedicated application software to view and analyze the data
- 5.5 inch TFT LCD display
- IP 65 front panel

GENERAL SPECIFICATIONS

■INPUT & OUTPUT

Number of signal input: 2, 4 or 6

Input types: DC mV and voltage, thermocouple, 3-wire RTD

Connection

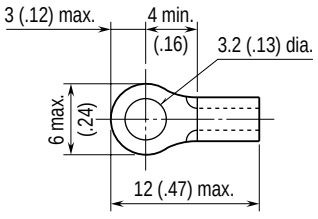
Power input, signal input, trigger input, alarm output: M3 screw terminal

Ethernet: 10BASE-T / 100BASE-TX automatically switched; Conforms to IEEE802 (10BASE-T) and IEEE802.3 (100BASE-TX) respectively

USB: Conforms to Version 1.1

Screw terminal material: Nickel-plated steel (torque 0.5 N·m)

Recommended solderless terminal: Refer to the drawing below (unit: mm (inch)). Applicable wire size 0.3 to 0.75 mm²



Isolation: Input 1 to input 2 to input 3 to input 4 to input 5 to input 6 to trigger input to alarm output to power input to FG to Ethernet

Operating mode setting: Application software; burnout type, cold junction compensation, line noise frequency, A/D conversion mode setting available

Burnout for T/C and RTD input: Upscale, Downscale or No burnout selectable

Select 'No Burnout' to minimize the measuring errors caused by the sensor/wire resistance and the burnout sensing current.
With RTD input, the signal may go transiently to the opposite direction from the burnout setting.
With DC input, the burnout setting is ignored and the burnout sensing current is cancelled.

Cold junction compensation (CJC) for T/C input: CJC can be enabled or disabled per each channel. CJC sensor attached to Input 1 terminals.

Line noise filter: NMNR ratio to the line frequency and its harmonic contents can be optimized. Factory set to 50/60 Hz mode for use with both frequencies.

Select either frequency for the most effective result.

A/D conversion mode: Fast, Medium or Slow selectable.

With Slow setting, data fluctuations are minimized with limited sampling time (speed).
With Fast setting, sampling tims (speed) can be high through data fluctuations increase.
[Note] With 100 msec. storing rate, measured value may be susceptible to inaccuracies due to the fast update cycle. If this is the case, please choose 500 msec. or slower rate.

■DISPLAY

Display device: 5.5-inch TFT LCD
Display colors: 256
Resolution: 320 × 240 pixels
Pixel pitch: 0.12 × 0.35 mm
Backlight: Cold-cathode tube

Backlight life: approx. 50000 hours (minimum) in 25°C (time before the brightness is reduced to 30%)
The backlight can be replaced in M-System factory. The LCD must be replaced at the same time.

■MATERIAL

Enclosure: Steel
Bezel: Polycarbonate
Front filter: Polyester

INPUT & OUTPUT

■DC VOLTAGE

Input resistance: 900kΩ minimum

Excluding the case in which, with range setting other than ±12V, ±6V or ±3V, a voltage exceeding ±1.3V is applied.

Input range: ±60mV, ±125mV, ±250mV, ±500mV, ±1000mV, ±3V, ±6V, ±12V

■THERMOCOUPLE

Input resistance: 900kΩ minimum
Input range: (PR), K (CA), E (CRC), F (IC), T (CC), B (RH), R, S, C (WRe 5-26), N, U, L, P (Platinel II)
Burnout sensing
Upscale: ≤130nA
Downscale: ≤220nA
No burnout: ≤10nA
Burnout sensing time
K, E, J, N, L, P (upscale): ≤20 seconds
Others: ≤10 seconds

■RTD (3-wire)

Excitation: 1.25V / (1.25kΩ + load resistance across the terminals A – C); 1.00mA with 10Ω across A – C; 0.55mA with 1000Ω across A – C
Allowable leadwire resistance: 20Ω per wire
Input range: Pt 100 (JIS '89), Pt 100 (JIS '97, DIN, IEC751), Pt 200, Pt 300, Pt 400, Pt 500, Pt 1000, Pt 50Ω (JIS '81), JPt 100 (JIS '89), Ni 100, Ni 120, Ni 508.4Ω, Ni-Fe 604, Cu 10 @25°C
Burnout sensing
Upscale or Downscale: ≤130nA
No burnout: ≤10nA
Burnout sensing time: ≤10 seconds

■ANALOG INPUT UPDATE CYCLE

LINE NOISE FILTER FREQ.	A/D CONVERSION (sec)			
	MEDIUM*1	SLOW	FAST	100 ms RATE
50 Hz	0.39	0.54	0.27	0.095
50/60 Hz*1	0.37	0.50	0.25	
60 Hz	0.34	0.46	0.23	

Multplied by two (2) for RTD and potentiometer input.
*1. Standard setting

■TRIGGER INPUT: Dry contact; detected ON at ≤0.8V
Voltage across the terminals: ≤2.5V
Current across the terminals: ≤4.0mA

■ALARM OUTPUT: PhotoMOSFET relay (no polarity); ≤50Ω at ON, ≥1MΩ at OFF; OFF when not powered
Peak load voltage: 50V max.
Continuous load current: 50mA max.
Peak load current: 300mA max. (≤0.1 sec.)

INSTALLATION

Power input

AC: Operational voltage range 85 – 264V, 47 – 66 Hz,
approx. 25VA at 100V; 35VA at 240V

DC: Operational voltage range 24V ±10%, ripple 10% p-p max.,
approx. 11W or 460mA

Operating temperature: 0 to 50°C (32 to 122°F)
Display quality (e.g. decreased contrast) may deteriorate when the recorder is used for a long time in an environment exceeding 50°C. However, it is only a temporary phenomenun. When the recorder is back in normal temperature, full legibility is recovered. No damage in performance.

Operating humidity: 30 to 85% RH (non-condensing)

Allowable dust particles: 0.1 mg/m^2
(no conductive particles)

Corrosive gas: Not allowed

Mounting: Panel flush mounting

External dimensions: W144×H144×D172 mm
(5.67"×5.67"×6.77")

Panel cutout dimensions: 137×137 mm (5.39"×5.39")

Usable panel thickness: 2 – 26 mm (0.08" – 1.02")

Usable panel material: Steel

Front panel protection: IP 65 (Cover must be closed. Except clustered mounting)

Weight: 2.3 kg (5.1 lbs)

Caution: Use of UPS is recommended to prevent data loss or CF card damage by a loss of power during recording.

PERFORMANCE

Calendar clock accuracy: Monthly deviation 3 minute at 25°C

Accuracy: See Tables 1 through 3.

Cold junction compensation error: (°C)
≤ ± [1.0 + | Ambient Temp. – 25 | × 0.04]
(in stable ambient temperature; e.g. ±1.4°C at 15°C and 35°C)
Applicable with balanced terminal temperature. Error will increase by imbalances caused by direct mounting of the REM3 to the terminals.

Temp. coefficient: See Table 4.

Response time

DC of ±1000mV or narrower ranges or T/C:
≤ [Sampling Time + 0.3 sec.] (0 – 90%)

DC of ±3V or wider ranges:
≤ [Sampling Time + 0.5 sec.] (0 – 90%)

RTD: ≤ [Sampling Time + 0.3 sec.] (0 – 90%)

Insulation resistance: ≥100MΩ with 500V DC
(input 1 to input 2 to input 3 to input 4 to input 5 to input 6 to trigger input to alarm output to power input to FG to Ethernet)

Dielectric strength: 500V$_{peak}$ @1 minute
(input 1 to input 2 to input 3 to input 4 to input 5 to input 6 to trigger input to alarm output to power input or FG)
Peak value including both AC and DC (e.g. 354V AC with 0V DC).
Nominal withstand voltage between I/O (analog input, trigger input and alarm output) and power input is described 500V peak. However, as far as FG terminal is appropriately grounded, no dielectric breakdown will occur between I/O (with or without grounding) and other terminals when 2000V AC is applied between FG and power input.

AC power input: 2000V AC @1 minute
(power input to FG or Ethernet)
500V AC @1 minute (FG to Ethernet)

DC power input: 1250V AC @1 minute
(power input to FG or Ethernet)
500V AC @1 minute (FG to Ethernet)

Line noise normal mode rejection: ≥100 dB
Magnitude of the effects of normal mode 50/60 Hz noise, with the most appropriate line noise filter frequency setting.
Each input circuit has a CR filter of sufficient large time constant so that there will be little effect of line noise such as 500mV AC superposed on a thermocouple or ±60mV input.

Common mode noise rejection
Magnitude of the effects of voltages applied across the terminal C and the ground terminal when there is no potential difference among all the C terminals.

DC: N/A

AC, ±3V, ±6V, ±12V: Approx. 86 dB

AC, other ranges: Approx. 120 dB

Common mode noise rejection between channels
Magnitude of the effects of DC/50/60 Hz voltages applied across the terminals C of the present and the last scanned channels.

DC, ±3V, ±6V, ±12V: Approx. 100 dB

DC, other ranges: Approx. 120 dB

AC, ±3V, ±6V, ±12V: Approx. 86 dB

AC, other ranges: Approx. 106 dB

INPUT TYPE & RANGE, ACCURACY* & TEMPERATURE COEFFICIENT

*Accuracy: Applicable with the common mode voltage 0V between C terminals of all channels and between C terminal of each channel and FG terminal.
The effects by the following factors are excluded: Fast A/D conversion mode; temperature drift with the REM3 directly mounted to the I/O terminals; wire resistance; burnout sensing current with upscale/downscale settings.
With 100 msec. storing rate, measured value may be susceptible to inaccuracies due to the fast update cycle. If this is the case, please choose 500 msec. or slower rate.

Table 1. DC Voltage Input

INPUT RANGE	ACCURACY (mV)
±60mV	±0.05
±125mV	±0.07
±250mV	±0.13
±500mV	±0.25
±1000mV	±0.5
±3V	±3
±6V	±5
±12V	±10

Table 2-1. Thermocouple Input, Celcius

T/C	USABLE RANGE (°C)	CONFORMANCE RANGE (°C)	ACCURACY (°C)
(PR)	0 to 1770	400 to 1770	±4.6
K (CA)	-270 to +1370	0 to 1370	±1.5
E (CRC)	-270 to +1000	0 to 1000	±0.8
J (IC)	-210 to +1200	0 to 1200	±1.0
T (CC)	-270 to +400	0 to 400	±1.3
B (RH)	100 to 1820	700 to 1820	±7.2
R	-50 to +1760	400 to 1760	±4.8
S	-50 to +1760	400 to 1760	±5.3
C (WRe 5-26)	0 to 2320	0 to 2320	±4.9
N	-270 to +1300	0 to 1300	±1.9
U	-200 to +600	0 to 600	±1.3
L	-200 to +900	0 to 900	±1.0
P (Platinel II)	0 to 1395	0 to 1395	±1.7

Table 2-2. Thermocouple Input, Fahrenheit

T/C	USABLE RANGE (°F)	CONFORMANCE RANGE (°F)	ACCURACY (°F)
(PR)	32 to 3218	752 to 3218	±8.3
K (CA)	-454 to +2498	32 to 2498	±2.7
E (CRC)	-454 to +1832	32 to 1832	±1.5
J (IC)	-346 to +2192	32 to 2192	±1.8
T (CC)	-454 to +752	32 to 752	±2.4
B (RH)	212 to 3308	1292 to 3308	±13.0
R	-58 to +3200	752 to 3200	±8.7
S	-58 to +3200	752 to 3200	±9.6
C (WRe 5-26)	32 to 4208	32 to 4208	±8.9
N	-454 to +2372	32 to 2372	±3.5
U	-328 to +1112	32 to 1112	±2.4
L	-328 to +1652	32 to 1652	±1.8
P (Platinel II)	32 to 2543	32 to 2543	±3.1

Remark 1) Measuring accuracy at 50μV emf.
Remark 2) CJC error is not included.

Table 3-1. RTD Input, Celcius

RTD	USABLE RANGE (°C)	ACCURACY	
		at ≤ 0°C	at ≥ 0°C
Pt 100 (JIS '97, DIN, IEC)	-200 to +850	±0.4°C	±[0.4°C + Measured Value × 0.1%] (±1.3°C at 850°C)
Pt 200	-200 to +850	±0.3°C	±[0.3°C + Measured Value × 0.17%] (±1.8°C at 850°C)
Pt 300	-200 to +850	±[0.4°C + Measured Value × 0.08%] (±0.3°C at -200°C)	±[0.4°C + Measured Value × 0.21%] (±2.2°C at 850°C)
Pt 400	-200 to +850	±[0.4°C + Measured Value × 0.11%] (±0.2°C at -200°C)	±[0.4°C + Measured Value × 0.21%] (±2.2°C at 850°C)
Pt 500	-200 to +850	±[0.4°C + Measured Value × 0.13%] (±0.2°C at -200°C)	±[0.4°C + Measured Value × 0.26%] (±2.6°C at 850°C)
Pt 1000	-200 to +850	±[0.4°C + Measured Value × 0.1%] (±0.1°C at -200°C)	±[0.4°C + Measured Value × 0.4%] (±3.8°C at 850°C)
Pt 100 (JIS '89)	-200 to +660	±0.4°C	±[0.4°C + Measured Value × 0.1%] (±1.1°C at 660°C)
JPt 100 (JIS '89)	-200 to +510	±0.4°C	±[0.4°C + Measured Value × 0.1%] (±1.0°C at 510°C)
Pt 50Ω (JIS '81)	-200 to +649	±0.5°C at ≤160°C, ±[0.4°C + Measured Value × 0.1%] at ≥160°C (±1.1°C at 649°C)	
Ni 100	-80 to +260	±0.3°C	
Ni 120	-80 to +260	±0.3°C	
Ni 508.4Ω	-50 to +280	±[0.25°C + Measured Value × 0.06%] (±0.3°C at -50°C, ±0.5°C at 280°C)	
Ni-Fe 604	-200 to +200	±0.9°C at -200°C, ±0.6°C at -150°C, ±0.5°C at ±100°C, ±0.7°C at 200°C	
Cu 10 @25°C	-50 to +250	±1.2°C	

Remark 1) The lower the temperature range, the better the accuracy is for Pt 300, Pt 400, Pt 500, Pt 1000 and Ni 508.4Ω. 'Measured Value' in the equations is not an absolute value. Include the minus sign when calculating accuracies.

Table 3-2. RTD Input, Fahrenheit

RTD	USABLE RANGE (°F)	ACCURACY	
		at ≤ 32°F	at ≥ 32°F
Pt 100 (JIS '97, DIN, IEC)	-328 to +1562	±0.8°F	±[0.72°F + Measured Value × 0.1%] (±2.4°F at 1562°F)
Pt 200	-328 to +1562	±0.6°F	±[0.54°F + Measured Value × 0.17%] (±3.3°F at 1562°F)
Pt 300	-328 to +1562	±[0.72°F + Measured Value × 0.08%] (±0.5°F at -328°F)	±[0.72°F + Measured Value × 0.21%] (±4.0°F at 1562°F)
Pt 400	-328 to +1562	±[0.72°F + Measured Value × 0.11%] (±0.4°F at -328°F)	±[0.72°F + Measured Value × 0.21%] (±4.0°F at 1562°F)
Pt 500	-328 to +1562	±[0.72°F + Measured Value × 0.13%] (±0.3°F at -328°F)	±[0.72°F + Measured Value × 0.26%] (±4.7°F at 1562°F)
Pt 1000	-328 to +1562	±[0.72°F + Measured Value × 0.1%] (±0.2°F at -328°F)	±[0.72°F + Measured Value × 0.4%] (±6.9°F at 1562°F)
Pt 100 (JIS '89)	-328 to +1220	±0.8°F	±[0.72°F + Measured Value × 0.1%] (±2.0°F at 1220°F)
JPt 100 (JIS '89)	-328 to +950	±0.8°F	±[0.72°F + Measured Value × 0.1%] (±1.7°F at 950°F)
Pt 50Ω (JIS '81)	-328 to +1200	±0.9°F at ≤320°F, ±[0.72°F + Measured Value × 0.1%] at ≥320°F (±1.9°F at 1200°F)	
Ni 100	-112 to +500	±0.6°F	
Ni 120	-112 to +500	±0.6°F	
Ni 508.4Ω	-58 to +536	±[0.45°F + Measured Value × 0.06%] (±0.4°F at -58°F, ±0.8°F at 536°F)	
Ni-Fe 604	-328 to +392	±1.7°F at -328°F, ±1.1°F at -238°F, ±0.9°F at ±212°F, ±1.3°F at 392°F	
Cu 10 @25°C	-58 to +482	±2.2°F	

Remark 1) The lower the temperature range, the better the accuracy is for Pt 300, Pt 400, Pt 500, Pt 1000 and Ni 508.4Ω. 'Measured Value' in the equations is not an absolute value. Include the minus sign when calculating accuracies.

Table 4. Temperature Coefficient

INPUT TYPE	TEMPERATURE COEFFICIENT	
DC Voltage	±[Nominal Input Range × 0.015%]/°C or ±[Nominal Input Range × 0.008%]/°F (e.g. ±0.018mV/°C with ±60mV range)	
Thermocouple	±[Accuracy / 3] °C/°C or ±[Accuracy / 3] °F/°F (e.g. ±0.27°C/°C with E thermocouple)	
RTD	at ≤ 0°C or 32°F	at ≥0°C or 32°F
Pt 100 (JIS '97, DIN, IEC)	±0.041°C/°C ±0.041°F/°F	±[0.041°C + Measured Value × 0.026%]/°C ±[0.041°F + Measured Value × 0.026%]/°F
Pt 200	±0.044°C/°C ±0.044°F/°F	±[0.044°C + Measured Value × 0.033%]/°C ±[0.044°F + Measured Value × 0.033%]/°F
Pt 300	±0.047°C/°C ±0.047°F/°F	±[0.047°C + Measured Value × 0.04%]/°C ±[0.047°F + Measured Value × 0.04%]/°F
Pt 400	±0.05°C/°C ±0.05°F/°F	±[0.05°C + Measured Value × 0.052%]/°C ±[0.05°F + Measured Value × 0.052%]/°F
Pt 500	±0.053°C/°C ±0.053°F/°F	±[0.053°C + Measured Value × 0.053%]/°C ±[0.053°F + Measured Value × 0.053%]/°F
Pt 1000	±[0.068°C + Measured Value × 0.025%]/°C ±[0.068°F + Measured Value × 0.025%]/°F	±[0.068°C + Measured Value × 0.087%]/°C ±[0.068°F + Measured Value × 0.087%]/°F
Pt 100 (JIS '89)	±0.041°C/°C ±0.041°F/°F	±[0.041°C + Measured Value × 0.024%]/°C ±[0.041°F + Measured Value × 0.024%]/°F
JPt 100 (JIS '89)	±0.041°C/°C ±0.041°F/°F	±[0.041°C + Measured Value × 0.023%]/°C ±[0.041°F + Measured Value × 0.023%]/°F
Pt 50 (JIS '81)	±0.039°C/°C ±0.039°F/°F	±[0.039°C + Measured Value × 0.021%]/°C ±[0.039°F + Measured Value × 0.021%]/°F
Ni 100	±0.028°C/°C ±0.028°F/°F	±[0.028°C + Measured Value × 0.01%]/°C ±[0.028°F + Measured Value × 0.01%]/°F
Ni 120	±0.028°C/°C ±0.028°F/°F	±[0.028°C + Measured Value × 0.01%]/°C ±[0.028°F + Measured Value × 0.01%]/°F
Ni 508.4Ω	±0.046°C/°C ±0.046°F/°F	±[0.046°C + Measured Value × 0.018%]/°C ±[0.046°F + Measured Value × 0.018%]/°F
Ni-Fe 604	±0.058°C/°C at ≤-200°C, ±0.043°C/°C at -150°C, ±0.04°C/°C at -100°C, ±[0.047°C + Measured Value × 0.023%]/°C at ≥0°C ±0.058°F/°F at ≤-328°C, ±0.043°F/°F at -238°C, ±0.04°F/°F at -148°C, ±[0.047°F + Measured Value × 0.023%]/°F at ≥32°C	
Cu 10 @25°C	±0.07°C/°C or ±0.07°F/°F	

APPLICATION SOFTWARE CD

■**73VRPAC2** (included in the product package)

•**73VR210x Builder Software**: Model 73VR21BLD

Used to configure parameters on the PC.

- Parameter configurations can be downloaded to the recorder via Ethernet.
- Present setting on the 73VR210x can be uploaded and displayed on the PC.
- Configuration files can be converted into CSV.

•**73VR Data Viewer**: Model 73VRWV

Used to show and analyze recorded data on the PC.

- Data stored in the CF Card can be called up on the PC screen via the CF Card Reader.
- Data stored in the CF Card can be sent by FTP and called up on the PC screen.
- Various analyzing functions
- Data and alarm history files can be converted into CSV.

•**PC Recorder Software**: Model MSR128-V5

The 73VR210x data can be sampled and stored in real time via Ethernet by the MSR128-V5.

•**Instruction Manuals**

- 73VR210x users manual
- 73VR21BLD users manual
- 73VRWV users manual
- MSR128-V5 users manual

■PC REQUIREMENTS (provided by the user)

•73VR210x Builder Software: Model 73VR21BLD

OS	Windows 2000 or Windows XP SP2
Screen area	1024 by 768 pixels
Display color	65000 colors (16 bits)
CD-ROM drive	Windows supported CD-ROM drive is used to install the software programs.
Card reader	Used to read/write the CF Card
Mouse	Windows supported
LAN card	LAN card required to connect to Ethernet; 10BASE-T or 100BASE-T cable

•73VR Data Viewer: Model 73VRWV

OS	Windows 2000 or Windows XP SP2
Screen area	1024 by 768 pixels or higher
Display color	65000 colors (16 bits)
Main memory (RAM)	512 MB or higher recommended
CD-ROM drive	Windows supported CD-ROM drive is used to install the software programs.
Card reader	Used to read/write the CF Card
Mouse	Windows supported (Certain functions of the 73VR may be compromised if the mouse's software driver is not Windows standard.)
LAN card	LAN card required to connect to Ethernet; 10BASE-T or 100BASE-T cable

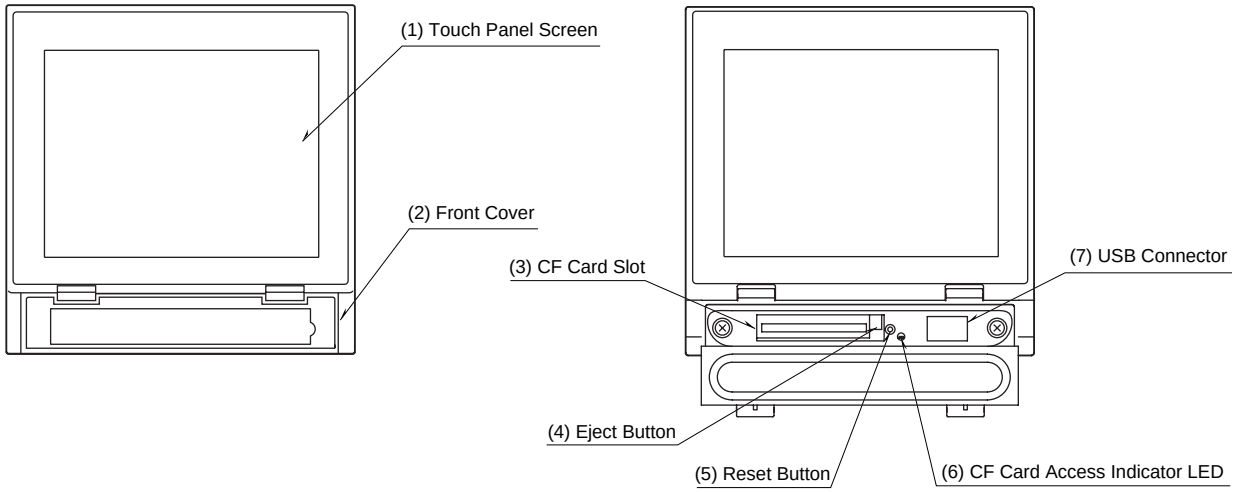
•PC Recorder Software: Model MSR128-V5

	NORMAL MODE (storing rates ≥500 ms)	HIGH SPEED MODE (storing rates 100 / 200 ms)
PC	IBM PC/AT or compatible	
Operating system	Microsoft Windows 2000 or Windows XP SP1, SP2	
CPU	Pentium III 800 MHz or higher	Pentium IV 2.0 GHz or higher
Screen area	1024 by 768 pixels or better resolution	
Display color	65000 colors (16 bits)	
Video memory	2 MB minimum; 4 MB recommended	4 MB minimum
Main memory	128 MB minimum; 256 MB recommended for Windows XP	256 MB minimum; 512 MB recommended for Windows XP
Hard disk area	Use an internal hard disk. *1 Max. approx. 100 MB required per day.	Use an internal hard disk. *1
I/O hardware	R1M-GH2, R1MS-GH3, R1M-J3, R1M-D1, R1M-A1, R1M-P4, R2M-2H3, R2M-2G3, 50HR, 73ET, 74ET, 75ET, R5-NM1, R5-NE1, R3-NM1, R3-NE1, RZMS-U9, RZUS-U9, 73VR210x, 73VR3000*2, 73VR3100	R3-NE1, 73VR3000*2, 73VR3100
Printer	Use a printer for Windows. The programs use Standard System Fonts used in Windows. Use a printer driver for Standard System Fonts.	
CD-ROM drive	Used when installing the software program.	
Card reader drive	Used reading data from Compact Flash Card (50HR, 73ET, 74ET, 75ET, 73VR210x)	
Communication port	RS-232C port (COM1 through COM5) supported by Windows, LAN card	LAN card

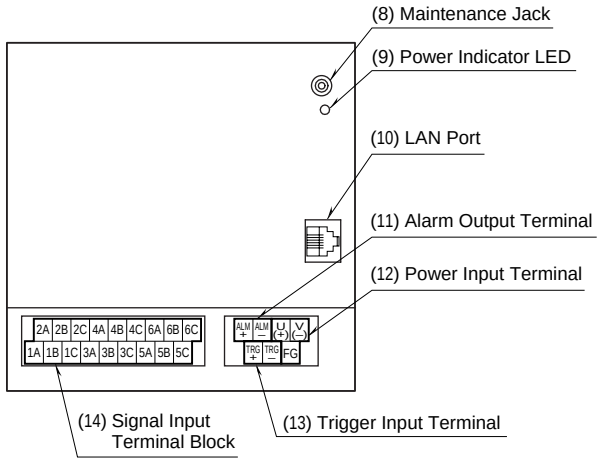
*1. External (e.g. SCSI) devices may impair appropriate performance.
*2. Real time data trending via Ethernet is possible but the data stored in a CF Card cannot be read in the MSR128-V5.

COMPONENT IDENTIFICATIONS

■ **FRONT VIEW**



■ **REAR 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
(4) Eject Button
Used to retrieve the CF Card.
(5) Reset Button
Used to restart the 73VR210x.
(6) CF Card Access Indicator LED
Red light turns on during the CF Card is accessed.
(7) USB Connector
Connect an USB flash-memory.
(8) Maintenance Jack
Unused
(9) Power Indicator LED
Light turns on whle the power is supplied.
(10) LAN Port
Connects the LAN cable (10BASE-T or 100BASE-TX)
(11) Alarm Output Terminal
(12) Power Input Terminal
(13) Trigger Input Terminal
(14) Signal Input terminal Block

SOFTWARE FUNCTIONS

■NUMBER OF INPUT CHANNELS

73VR2102: 2 points
73VR2104: 4 points
73VR2106: 6 points

■INPUT SIGNALS

Analog: DC mV and voltage, thermocouple and RTD
Discrete: Trigger input (1 point)

■STORING RATE

0.1*, 0.5, 1, 2, 5, 10 seconds, 1, 10 minutes
*DC voltage input only

■DATA STORING METHOD

Normal: Recording is manually initiated and stopped. Data is continuously stored while the recording is on.
Auto: Recording is automatically initiated and stopped at a predefined time.
Event recording: The 73VR210x detects an external event by trigger signal, and stores preset number of samples (max. 1200 respectively) before and after the moment of event.
Remote trigger: Data is automatically recorded while the external trigger condition (input) is true.

■DATA STORAGE

Data file: Stores momentary values in the storing rate and their calculation result.
Alarm history file: Records time index information when alarms are triggered and reset.
Configuration file: Stores the 73VR210x setting.
Alarm history data is overwritten with new event data when the number of events reaches its limit.
File format: Binary
Oldest measured data is overwritten with new data or data recording is stopped when the card memory is full.

■ALARM

•Analog Alarm

Alarm setpoints: Max. 4 points per channel
Alarm type: High / Low
Deadband: Set in engineering unit values
Output: 1 point at Alarm Output Terminal
Stored information: Date/time of alarm events (trip and reset), Pen No., Tag Name and Alarm Message
Number of stored alarm events:
Depends upon the CF Card capacity.

128 MB	250 events
256 MB	500 events
512 MB or 1 GB	1000 events

■CALCULATION FUNCTIONS

Number of channels: 12 channels
Operations
Arithmetic: Addition/subtraction, Multiplication, Division
Logical: AND, OR, NOT, XOR
Mathematical: Square root extractor, Power
Accumulation: Analog accumulation
Filter: Moving average, First order lag
Hold: Peak (maximum) hold (tracking increasing signal), Peak (minimum) hold (tracking decreasing signal)
Alarm: Alarm trip can be programmed for calculated results.

■DATA DISPLAY FUNCTIONS

•Trend View

Chart direction: Perpendicular or horizontal
Number of pens displayed: 2, 4, 6, 8 per view selectable
Number of display views: 4
Chart speed: 4, 1, 1/5, 1/32, 1/160**, 1/480** or 1/960** (pixel(s)/samples***)
Display rate: 1 second
Pen thickness: Normal and wide
Digital indicator: Shows momentary value.
Alarm indicator: Shows alarm status of the channels displayed on the screen.
Scale: Linear and square root;
Switchable to the engineering unit scale.
**Not selectable with 0.1 sec. storing rate
***Chart speed is described as number of pixels to plot single data sample.

•Bargraph View

Bargraph direction: Perpendicular or horizontal
Number of pens displayed: 2, 4, 6, 8 per view selectable
Number of display views: 4
Display rate: 1 second
Digital indicator: Shows momentary value.
Alarm indicator: Shows alarm status of the channels displayed on the screen.
Scale: Linear and square root;
Switchable to the engineering unit scale.

•Overview

Number of pens displayed: 2, 4, 6, 8, 16 per view selectable
Display rate: 1 second
Alarm indicator: Shows alarm status and date/time of the last alarm trip and reset for the channels displayed on the screen.

•Retrieve View: Shows data stored in the CF Card.
Number of pens displayed: 2, 4, 6, 8 per view selectable
Number of display views: 4
Data search: Scrolling the chart, specifying a specific time index, or searching by maximum/minimum values.

•Alarm History View: Shows data stored in the alarm history file.
Number of displayed alarm events: 16
Number of display views: 1
Display update: Automatically updated by a new event
Data search: Scrolling the chart or specifying a specific time index.

■**COMMUNICATIONS**: Monitoring data and setup of the 73VR210x is possible on the PC connected via Ethernet.

Real time communication: Transmits specific data to a host PC installed with the PC Recorder Software (model: MSR128-V5).

FTP communication: Transmits data stored in the CF Card using the FTP protocol to a host PC by the 73VR Data Viewer (model: 73VRWV) installed in it. Data can be transmitted even during recording.

Download, Upload: A software configuration created on the 73VR210x Configuration Builder (model: 73VR21BLD) can be downloaded to the 73VR210x. The configuration set up on the 73VR210x can be uploaded and displayed on the 73VR21BLD.

■**OTHER FUNCTIONS**

•Operation Lockout

With a password setting, unauthorized operations on the Trend View, Bargraph View and Overview can be locked out.

•Data File Used Volume Information

A bargraph with % indication is provided on the screen to show how much percent of the data file memory has been used up.

0 – 49% used: Green bargraph
50 – 79% used: Amber bargraph
80 – 100% used: Red bargraph

•Hot Swapping of the CF Card

The CF Card is hot swappable: removable during data recording. However, there may be a slight disturbance in storing rate when the card is inserted.

•Screen Saver

The backlight is automatically turned off if the screen is untouched for a certain time period.

•Bus Error Alert

An alarm is output at Alarm Output Terminal in case of internal bus error.

•Writing/Reading Setting

The 73VR210x's present setting can be stored in a USB flash-memory. Setting stored in the memory can be read in to the 73VR210x.

•Hardware Setting

Burnout, Cold junction compensation, AD conversion mode, line noise filter

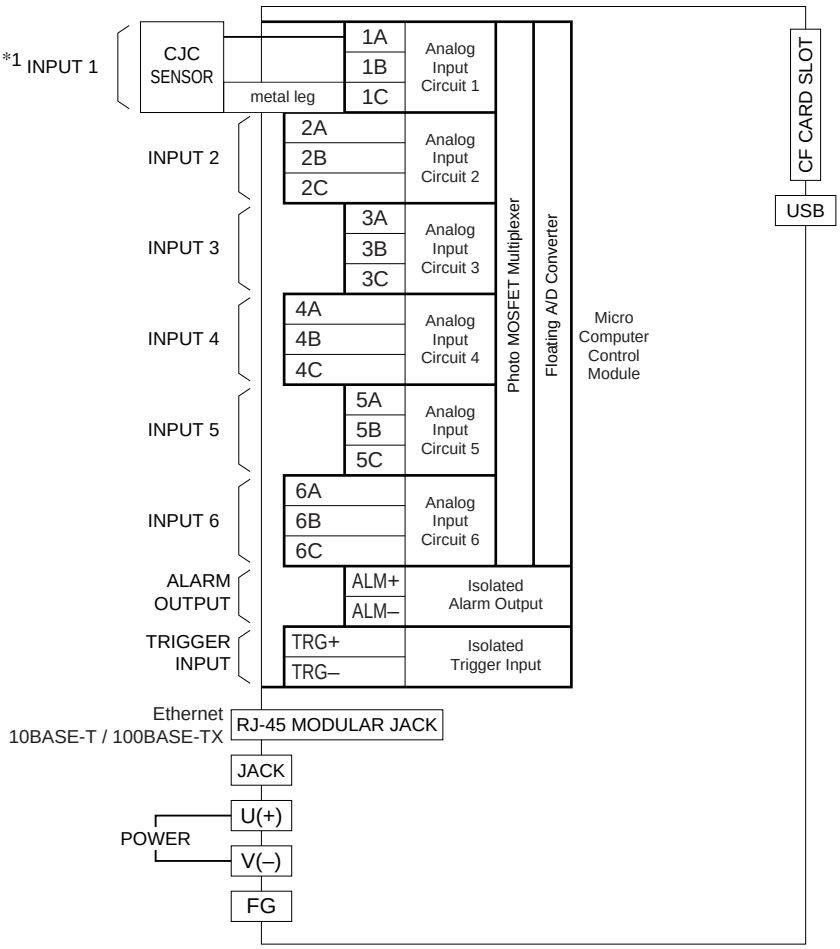
■**STORABLE TIME DURATION IN 128MB CF CARD**

STORING RATE	APPROXIMATE TIME DURATION		
	2 ch input	4 ch input	6 ch input
0.1 second	8 days 20 hours	5 days 18 hours	4 days 9 hours
0.5 second	44 days 9 hours	28 days 22 hours	22 days 7 hours
1 second	89 days 12 hours	57 days 20 hours	44 days 16 hours
10 seconds	2 years 146 days	1 year 211 days	1 year 73 days
1 minute	---	9 years 126 days	7 years 127 days

--- : Exceeds 10 years

Note 1) Data are calculated ones, and thus not guaranteed.
Note 2) Assuming 4 bytes per data per channel.
Note 3) A year is calculated as 365 days.

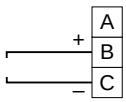
CONNECTION DIAGRAM



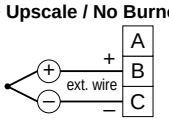
*1. Input 1 and 2 are used for the 73VR2102. Input 3 thr. 6 are Not used.
Input 1 thr. 4 are used for the 73VR2104. Input 5 and 6 are Not used.

Input Connection Examples

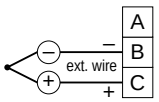
■DC INPUT



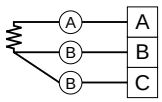
■T/C INPUT
• Upscale / No Burnout



■T/C INPUT
• Downscale Burnout

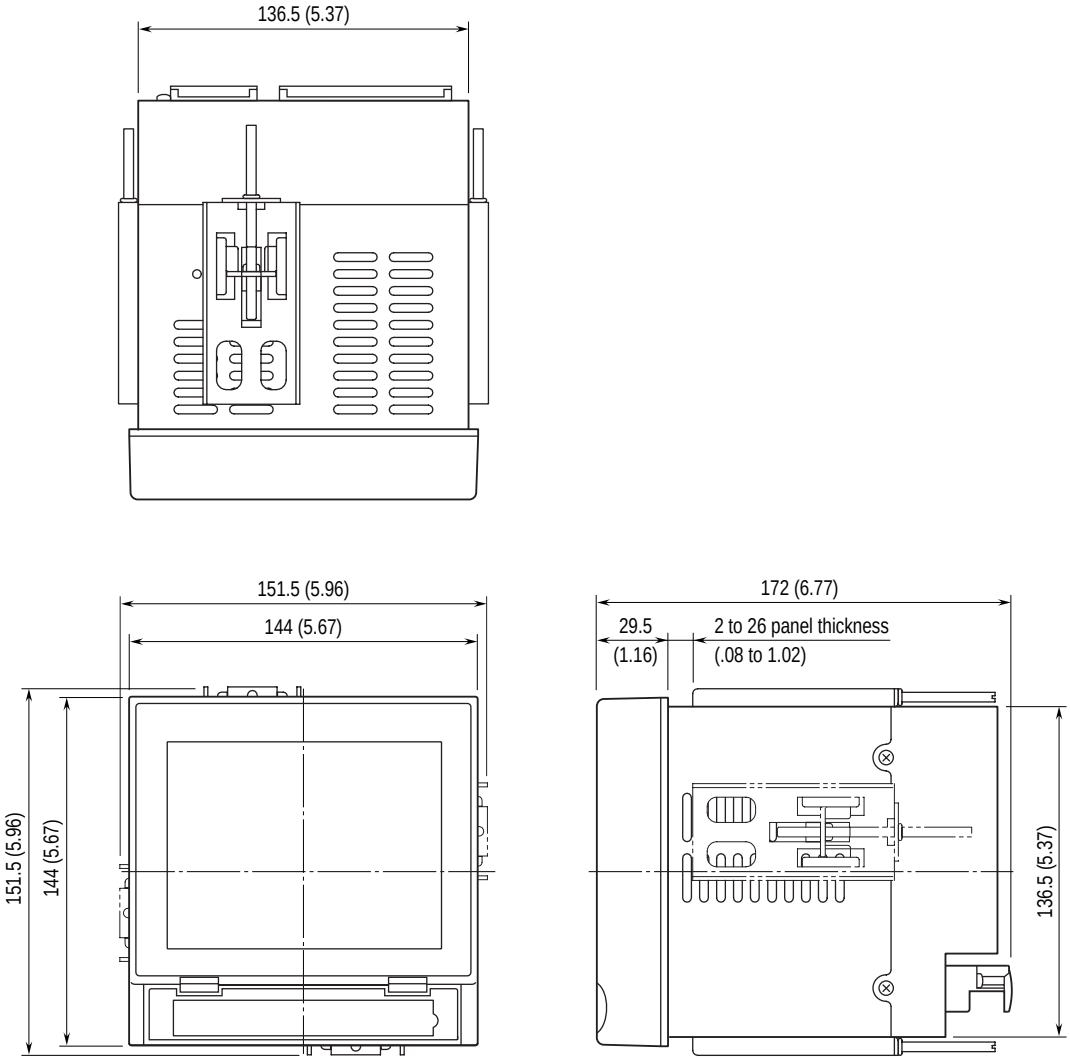


■RTD INPUT



Remark 1: In order to prevent instability in measured values caused by noise entering through the I/O terminals, grounding the signal shield to a most stable earth point in the environment is recommended.
Remark 2: The smaller is common mode voltage (DC and AC) between C terminals and between C and FG, the better is measuring accuracy. Connecting between C terminals and if possible to FG will yield the best accuracy.
Remark 3: Resistor modules (model: REM3-250) can be connected to 1A through 6C terminals 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.
Remark 4: When the internal temperature sensors are used for CJC, temperature imbalance around the terminal block affects greatly the CJC accuracy. In order to minimize such imbalance, do not use wires of large diameter which has large heat dissipation. Be sure to close the terminal cover. Do not expose the module directly in the line of wind from a cooling fan.

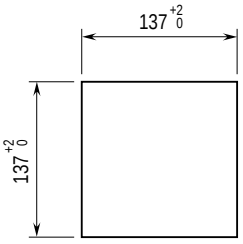
EXTERNAL DIMENSIONS mm (inch)



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

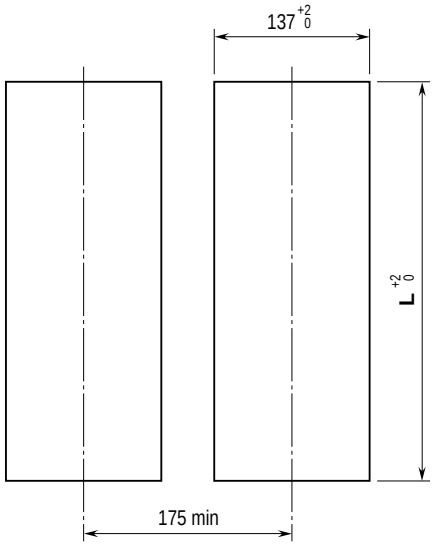
PANEL CUTOUT unit: mm

■ **SINGLE MOUNTING**

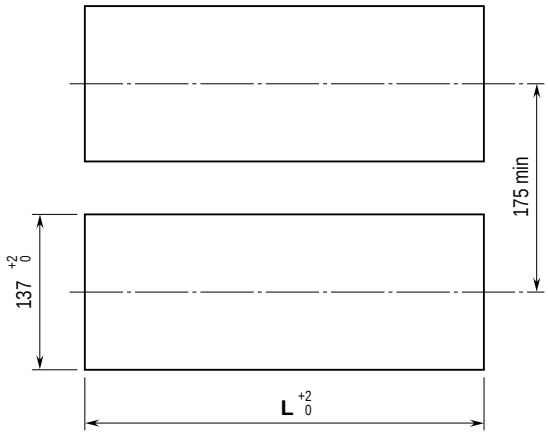


Number	L +2 0 (mm)
2	282
3	426
4	570
5	714
6	858
7	1002
8	1146
9	1290
10	1434
n	(114 × n) – 6

■ **VERTICAL CLUSTERED MOUNTING (max. 3 units)**



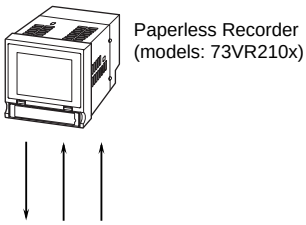
■ **HORIZONTAL CLUSTERED MOUNTING**



Dimensional tolerance ±3% unless otherwise specified.
(±0.3 mm for <10 mm)

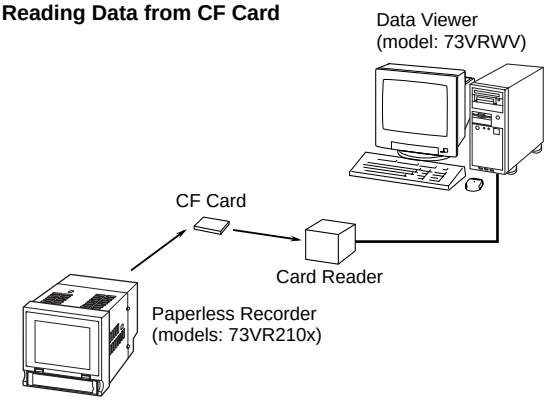
SYSTEM CONFIGURATION EXAMPLES

■INDEPENDENTLY USED

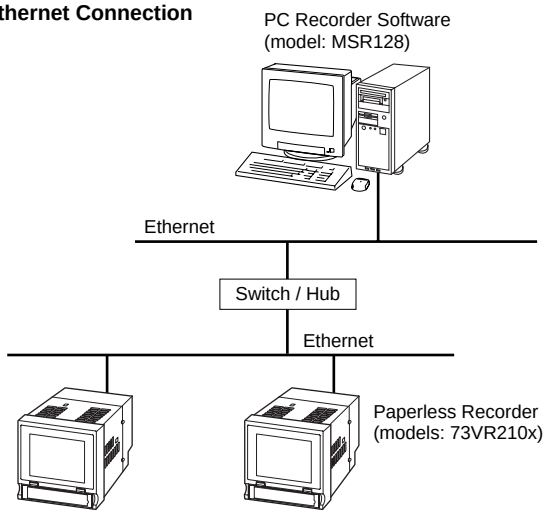


■INTERFACING WITH A PC

• Reading Data from CF Card



• Ethernet Connection



Note: It is recommended to connect the 73VR210x to the PC using straight cables via a switch/hub on the Ethernet.