Portable Paperless Recorders and Data Acquisition Stations

RD-MV1000 and RD-MV2000 Series
Starts at

$2940

RD-MV1006, $2940, shown smaller than actual size.

RD-MV2008, $4940, shown smaller than actual size.

- **Multi-Channel Universal Inputs, Up to 48 Input Channels**
- **Secure High Capacity Memory with Internal Memory of 200 MB**
- **Choice of Compact Flash and USB Removable Storage Media**
- **Detachable Input Terminals Simplify Field Wiring**
- **Advanced Network Connectivity with Email, File Transfer, and Web Server Functions**
- **Standard Equipped with 2 USB Ports**
- **High Speed Sampling (25 ms for Every Channel)**
- **Clear Wide-Angle LCD Monitor**
- **Integral Bar Graph Display**
- **Application Software (Optional)**
- **Compliance with Safety Standards and EMC Standards**
- **Isolated Channel Inputs for DC Voltage and Thermocouple Inputs**
- **Recorders Can Save Data Files in a Text File Format**

The RD-MV1000/MV2000 portable paperless recorders are high performance and easy-to-use test instruments that handle a wide range of measurements in your lab, plant, or test stand. These recorders have powerful stand-alone data logging capability. The units record on-site changes in temperature, voltage, current, flow and pressure. The RD-MV1000 features 24 channel-input and RD-MV2000 has 48 channels. Both models feature 200 MB of memory, allowing data to be stored for approximately 70 days at one-second intervals with a 12-channel model. The recorders feature guidance messages for set-up and entering of settings.

Measured data can be stored in text format on removable storage media for further processing and data back up on a personal computer using standard software. The RD-MV1000 features a 140 mm (5.5") color TFT-LCD display and the RD-MV2000 has a 264 mm (10.4") display.

The RD-MV1000/MV2000 series is a portable recorder that displays real-time measured data on a color LCD and saves data on a Compact Flash memory card (CF card). It can be hooked up to network via Ethernet, which enables to inform by E-mail and to monitor on Web site as well as to transfer files by using FTP. Also, it can communicate with Modbus RTU or Modbus TCP.

The data saved on a CF card can be converted by data conversion software to MS-Excel or text format file, facilitating processing on a PC. Not only this, the Viewer software allows a PC to display waveforms on its screen and to print out waveforms.

General Specifications

RD-MV1000

External Dimensions:
189 W x 177 H x 259 D mm
(7.4 x 7 x 10.2")

Weight: Approx. 3.5 kg (7.7 lb)
(MV1024)

RD-MV2000

External Dimensions:
307 W x 273 H x 260 D mm
(12.1 x 10.7 x 10.2")

Weight: Approx. 5.6 kg (12.3 lb)
(RD-MV2048)

Input

Number of Inputs:

RD-MV1000: 4, 6, 8, 12, or 24 channels

RD-MV2000: 8, 10, 20, 30, 40 or 48 channels

Measurement Intervals:

RD-MV1004, RD-MV1008, RD-MV2008: 125 ms, 250 ms, or 25 ms in high-speed mode*

RD-MV1006, RD-MV1012, RD-MV1024, RD-MV2010, RD-MV2020, RD-MV2030, RD-MV2040, RD-MV2048: 1 s (100 ms not possible for A/D integration time), 2 s, 5 s, or 125 ms in high-speed mode*

** A/D integration time is fixed at 1.67 ms in high-speed mode*

Points to Consider when Using High-Speed Mode: When using high-speed mode (an A/D integration time of 1.67 ms) with the RD-MV1000/MV2000, power supply noise and other factors may cause the measured values to fluctuate. If this is the case, then measure using Normal mode (an A/D integration time of 16.7 ms, 20 ms, or 100 ms)

Input Method: Floating unbalanced input, isolated between channels (b terminal of RTD input is common)

A/D Resolution: ±20000 (16 bits A/D)

Input Types:

DCV (DC Voltage): 20, 60, 200 mV, 2, 6, 20, 50 V, 1 to 5 V

TC (Thermocouple Type): R, S, B, K, E, J, T, N, W, L, U, WRe

RTD (Resistance Temperature Detector): Pt100, JPt100

DI: At the contact input or the TTL level

DCA: DC current; with external shunt resistor

Measuring range, measurement accuracy, and display resolution by typical input type

Input Type	Range	Measuring Range
DC	20 mV	-20.000 to 20.000 mV
	60 mV	-60.00 to 60.00 mV
	200 mV	-200.00 to 200.00 mV
	2V	-2.0000 to 2.0000V
	6V	-6.000 to 6.000V
	1 to 5V	0.800 to 5.200V
	20V	-20.000 to 20.000V
	50V	-50.00 to 50.00V
T/C	R*1	0 to 1760°C (32 to 3200°F)
	S*1	0 to 1760°C (32 to 3200°F)
	B*1	0 to 1820°C (32 to 3308°F)
	K*1	-200 to 1370°C (-328 to 2498°F)
	E*1	-200 to 800°C (-328 to 1472°F)
	J*1	-200 to 1100°C (-328 to 2012°F)
	T*1	-200 to 400°C (-328 to 752°F)
	N*1	0 to 1300°C (32 to 2372°F)
	W*2	0 to 2315°C (32 to 4199°F)
	L*3	-200 to 900°C (-328 to 1652°F)
	U*3	-200 to 400°C (-328 to 752°F)
	WRe *4	0 to 2400°C (32 to 4352°F)
RTD	Pt100*5	-200 to 600°C (-328 to 1112°F)
	JPt100*5	-200 to 550°C (-328 to 1022°F)
DI	DCV	OFF: less than 2.4V
	Input	ON: more than 2.4V
	Contact	Contact ON/OFF
	Input	

Display

Display Device:

RD-MV1000: 140 mm (5.5") TFT color LCD (320 x 240 dots)

RD-MV2000: 264 mm (10.4") TFT color LCD (640 x 480 dots)

Note: *The LCD may contain some pixels that are always lighted or that never light, and variations in brightness may occur due to the characteristics of liquid crystals. Please note that these are not defects.*

Trend Display: Vertical, horizontal, horizontal wide, separated horizontal

Digital Display

Update Rate: 1 s

Tag Display: Number of characters 16 maximum

Message Display: Number of characters 32 maximum

Historical Display Function: Allows for the display of data stored to internal or external memory

Data Saving Function:

External Storage Media: Compact flash memory card (CF card)

Internal Memory Media: Flash memory

Memory Size: 200 MB

Sample Time: Examples of internal memory sample times with the MV1012 recording only event data files for 12 measuring channels and no calculation channels (approx)

Save Interval	Sample Time (200 MB)
125 ms	9 days
1 s	75 days
5 s	370 days
10 s	750 days
60 s	12.5 years

Manual Save: Saves data files to the internal memory manually; save all data or only selected data

Auto Save: Save displayed data to the CF card at a set interval

Save Event Data: Saves data to the CF card at a set interval (in free trigger mode); save when finished sampling (when setting the trigger)

Data Formats: When saving to external media, both event data and display data can be saved in either binary or text format (data is always stored to internal memory in binary format)

Event Data Sampling Period:

RD-MV1004/RD-MV1008/ RD-MV2008: Selectable from 25, 125, 250, 500 ms; 1, 2, 5, 10, 30, 60, 120, 300, 600 s

RD-MV1006/RD-MV1012/ RD-MV1024/RD-MV2010/ RD-MV2020/RD-MV2030/ RD-MV2040/RD-MV2048: Selectable from 125, 250 ms; 1, 2, 5, 10, 30, 60, 120, 300, 600 s

Trigger Function: Data can be saved using Free mode or Trigger mode

Trigger Mode: The user must set the data length, pre-trigger, and trigger source

Snapshot Function: Saves the displayed screen image data to a CF card

Data File Loading: Data files saved to a CF card or to USB memory can be loaded and displayed

Loading and Saving Setup Data: Settings data can be saved and loaded in binary format

Alarm Functions

Number of Alarm Levels: Up to 4 levels for each channel

Alarm Types: High/low limit, delay high/low limit, difference high/low limit, high/low limit on rate of change

Display: When an alarm occurs, the state (the alarm type) or common alarm state appears on the digital display

Security Features

Description: You can customize key lock and login security functions for any transmission or key command

Key Lock: Sets a password-protected key lock on all command keys and FUNC screen operations

Login: Limits access to the RD-MVAdvanced with a login that prompts for username and password

Communication Features (Ethernet)

Electrical Specifications: IEEE 802.3 compliant (DIX frame)

Transmission Media: Ethernet (10BASE-T)

Protocols: TCP, UDP, IP, ICMP, ARP, DHCP, HTTP, FTP, SMTP, SNTP, Modbus, and MV dedicated protocol

E-mail Transmission Functions (E-mail Client): Automatically sends an e-mail in response to alarms and other events

FTP Client Functions: Automatically sends data files to a FTP server

FTP Server Functions: Can transfer and delete files, manipulate directories, and produce file lists remotely from a network computer

Web Server Function: Displays MV screen images on a Web browser

SNTP Client Function: Queries a set SNTP server for the time and synchronizes with it

SNTP Server Function: Transmits the MV time settings via SNTP protocol

DHCP Client Function: Automatically retrieves the network address settings from a DHCP server

Modbus Server Function: Data can be read from the MV using the Modbus protocol

USB Interface

USB Interface: USB specification 1.1 host

Ports: 2 (front and back)

Connectable Devices: 104 keyboards (US) compliant with USB HID Class Version 1.1

External Media: USB flash drive (not all types of USB memory are guaranteed to work)

Power Supply

AC Power Supply: Rated supply voltage 100 to 264 Vac (auto switching)

Operating Supply Voltage Range: 90 to 132, 180 to 264 Vac

DC Power Supply: Rated supply voltage 12 Vdc/24 Vdc

Operating Supply Voltage Range: 10.0 to 28.8 Vdc

Other Specifications

Dielectric Strength

Power Supply to Ground Terminal 100 Vac/240 Vac: 2300 Vac (50/60 Hz), 1 min

Power Supply to Ground Terminal, 12 Vdc: 500 Vac (50/60 Hz), 1 min

Contact Output Terminal to Ground Terminal: 1600 Vac (50/60 Hz), 1 min

Measuring Input Terminal to Ground Terminal: 1500 Vac (50/60 Hz), 1 min

Between Measuring Input Terminals: 1000 Vac (50/60 Hz), 1 min (except for b-terminal of RTD input of RD-MV1006, RD-MV1012, RD-MV1024, RD-MV2010, RD-MV2020, RD-MV2030, RD-MV2040 and RD-MV2048)

Between Remote Control Terminal to Ground Terminal: 1000 Vdc, 1 min

Between Pulse Input Terminal to Ground Terminal: 1000 Vdc, 1 min

Safety and EMC Standards

CSA: CSA22.2 No1010.1 Installation category II*, pollution degree 2**

UL: UL61010B-1 (CSA NRTL/C)

CE:

EMC Directive: EN61326 compliance (Emission: Class A, Immunity: Annex A); EN61000-3-2 compliant; EN61000-3-3 compliant; EN55011 compliant

Low Voltage Directive: EN61010-1 compliant, measurement category II***, pollution degree 2**

C-Tick: AS/NZS CISPR11 compliant, Class A Group 1

** Installation category (over voltage category) II: describes a number which defines a transient over voltage condition. It implies the regulation for impulse withstand voltage. "II" applies to electrical equipment which is supplied from fixed installations like distribution boards.*

*** Pollution degree: describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. "2" applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs.*

**** Measurement category II: applies to measuring circuits connected to low voltage installation, and electrical instruments supplied with power from fixed equipment such as electric switchboards.*

Power Consumption

RD-MV1000 Power Consumption			
Supply Voltage	**LCD Off**	**Normal**	**Maximum**
100 Vac	15 VA	30 VA	45 VA
240 Vac	25 VA	40 VA	60 VA
12 Vdc	7 VA	14 VA	24 VA
RD-MV2000 Power Consumption			
Supply Voltage	**LCD Off**	**Normal**	**Maximum**
100 Vac	28 VA	40 VA	65 VA
240 Vac	38 VA	54 VA	90 VA
12 Vdc	9 VA	18 VA	35 VA

Input	Range	Measurement Accuracy**	Display Resolution
DCV	1 to 5V	±0.05% of rdg + 3 digits	1 mV
Thermocouple*	K	±0.15% of rdg + 0.7°C (33.3°F)	0.1°C (32.2°F)
RTD	Pt100	±0.15% of rdg + 0.3°C (32.5°F)	0.1°C (32.2°F)

** Does not include the accuracy of reference junction compensation.*
*** When the integration time is 16.7 ms or more.*

Normal Operating Conditions

Supply Voltage:
- **AC Power Supply:** 90 to 132, 180 to 250 Vac
- **DC Power Supply:** 10.0 to 28.8 Vdc
- **Supply Frequency:** 50 Hz ±2%, 60 Hz ±2%
- **Ambient Temperature:** 0 to 40°C (32 to 104°F)
- **Ambient Humidity:** 20 to 80% RH @ 5 to 40°C (41 to 104°F)

Warm-Up Time: At least 30 minutes

Standard Performance

Measuring Accuracy: The following specifications apply to operation of the recorder under standard operation conditions
- **Temperature:** 23 ±2°C (36°F)
- **Humidity:** 55% ±10% RH
- **Power Supply Voltage:** 90 to 132 or 180 to 250 Vac
- **Power Supply Frequency:** 50/60 Hz ±1%
- **Warm-Up Time:** At least 30 min

Other ambient conditions such as vibration should not adversely affect recorder operation.

Measurement Accuracy: In case of scaling (digits) = measurement accuracy (digits) x scaling span (digits)/ measurement span (digits) + 2 digits; decimals are rounded off to the next highest number

Reference Junction Compensation Accuracy:
- **Types R, S, W, WRe:** ±1°C (34°F)
- **Types K, J, E, T, N, L, U:** ±0.5°C (31°F)
- **Types B:** Internal RJC is fixed to 0°C (32°F) (above 0°C (32°F), input terminal temperature is balanced)

Maximum Allowable Input Voltage: ±60 Vdc (continuous) for all input ranges

Input Resistance:
- **DCV Ranges of 200 mVdc or Less and TC:** Approx 10 MΩ or more
- **More Than 2 Vdc Ranges:** Approx 1 MΩ

Input Source Resistance:
- **DCV, TC:** 2 kΩ or less
- **RTD (Pt100):** 10Ω or less per wire (the resistance of all three wires must be equal)

Input Bias Current: 10 nA or less (approx 100 nA for TC range with burnout function)

Maximum Common Mode Noise Voltage: 250 Vrms AC (50/60 Hz)

Maximum Noise Voltage Between Channels: 250 Vrms AC (50/60 Hz)

Interference Between Channels: 120 dB (when the input source resistance is 500Ω and the inputs to other channels are 60 V)

Common Mode Rejection Ratio:
- **A/D Integration Time 20 ms:** More than 120 dB (50 Hz ±0.1%, 500Ω imbalance between the minus ground)
- **A/D Integration Time 16.7 ms:** More than 120 dB (60 Hz ±0.1%, 500Ω imbalance between the minus ground)
- **A/D Integration Time 1.67 ms:** More than 80 dB (50/60 Hz ±0.1%, 500Ω imbalance between the minus ground)

Normal Mode Rejection Ratio:
- **A/D Integration Time 20 ms:** More than 40 dB (50 Hz ±0.1%)
- **A/D Integration Time 16.7 ms:** More than 40 dB (60 Hz ±0.1%)
- **A/D Integration Time 1.67 ms:** 50/60Hz is not rejected

Optional Specifications

Alarm Output Relays (/A2, /A4, /A6, /A12*)

Output points: Choose from 2, 4, 6, or 12*

** Only with the RD-MV2000.*

Serial Communication (/C2, /C4)

Media: EIA RS-232 (/C2) and RS-422/485 (four wire) (/C3) compatible

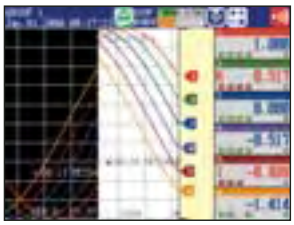
Protocols: The dedicated protocol and the Modbus (master/slave) protocol

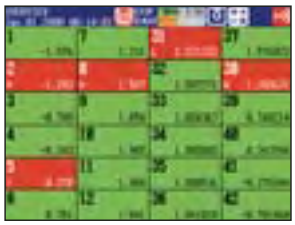
Settings/Measurement Server Functions: Using the dedicated protocol, the following functions are available
- **Settings and Commands:** Equivalent to the unit's key commands

Display Types

Digital Display


Bar Graph Display


Historical Trend Display


Overview Display


Information Display


4-Split Screen

Application Software

DAQSTANDARD (DXA120)

Operating Environment:
- **OS:** Microsoft Windows 2000/XP/Vista*

** Home Premium and Business (except for 64 bits version)*

Processor: Pentium 4.3 GHz or higher

Memory: 2 GB or more

Hard Disk: Free area of at least 100 MB

Display Card: Compatible with Windows 2000/XP/Vista®

Configuration Software:
- **Setting Mode:** Configuration of setting mode and basic setting mode
- **Configuration via Communication:** Configuration of setting mode and basic setting mode without communication configuration (ex. IP address)

Data Viewer Software:
- **Number of Display Channels:** 32 channels per group, 50 groups maximum

Viewer Function: Waveform display, digital display, circular display, list display, report display etc.

Data Conversion: File conversion to ASCII, Lotus 1-2-3 or MS-Excel format

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