Paperless Recorders

RD1000/RD2000/RD3000 Series

OMEGA™

1 YEAR WARRANTY

RD1000, 4.3" display   RD2000, 5.6" display   RD3000, 12.1" display
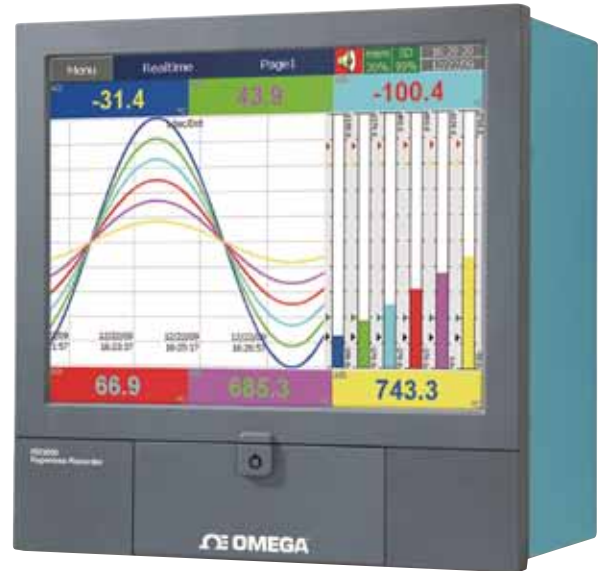
All models shown smaller than actual size.

Hardware Features

- RD1000 Series: 3 or 6 Universal Analog Inputs and 24 Optional External Channels
- RD2000 Series: 6, 12, 18 or 24 Universal Analog Inputs and 48 Optional External Channels
- RD3000 Series: 6, 12, 18, 24, 30, 36, 42 or 48 Universal Analog Inputs and 96 Optional External Channels
- TFT Color LCD, High Resolution Touch Screen
- 100 Millisecond Sample Rate and Data Logging
- High Accuracy 24-Bit A/D Analog Input
- 16-Bit D/A Analog Output
- Digital Input, 100 Hz Maximum
- Plug and Play I/O cards (AI, AO, DI, DO) for Easy Expansion
- On-Board SD Card Slot for Internal Memory
- USB Slot for External Storage
- 171 mm Short Depth Behind Panel
- Standard Ethernet with Optional RS232 or RS422/RS485 Communications
- Two USB Host Ports for Downloading Data or Connect to Printer
- IP65 (NEMA 4X) Water-Resistant

✔ **Color TFT Touch Screen Display: 4.3", 5.6" and 12.1"**

✔ **Expandable Inputs and Outputs via Plug and Play I/O Cards: RD1000/2000 Series– 4 Slots; RD3000 Series– 16 Slots**

✔ **Analog Inputs: RD1000 Series–Up to 6 RD2000 Series–Up to 24 RD3000 Series–Up to 48**

✔ **User Friendly with Bar Graph, Numerical, Vertical or Horizontal Trend Display**

✔ **Ethernet Interface Standard with Optional RS232/422/485 Communications**

✔ **Built-In Web Server for Remote Data Monitoring**

✔ **Stores Data on 256 MB Internal Flash Memory**

✔ **Windows® Graphical Software Standard and Optional Software for Real Time Monitoring**

The RD1000/2000/3000 Series paperless recorders offer real time display of data in a variety of formats on a high resolution TFT touch screen display. The user friendly unit with plug and play cards can easily be set to monitor, record, and evaluate any application. The user can access data on the screen, as well as from a remote site via the standard Ethernet, Web Server or optional RS232/422/485 serial interface. The historical data may be stored in a flash ROM, compact flash card, or collected in a remote host PC for evaluation and print out. The unit's compact size saves space and minimizes depth required behind the panel.

Firmware and PC Software Features

- Free Basic Software for Configuration, Historical Viewer
- Optional Extensive Data Acquisition Studio Software—for Configuration, Historical Viewer and Real Time Viewer
- Circular Trends in RD3000 Series
- Additional Panel Studio Software for Editing and Customizing Displays
- Display Values in Digital, Real Time Trends, Historical Trends, Bar Graphs
- Real Time and Historical Alarms
- Event Management, Jobs Linked with Events
- Reports (Daily, Weekly and Monthly)
- Timers – Optional: Counters, Totalizers, Math Channels and CFR-21
- Customized Messages for Alarms
- Alarms by Email Directly from Paperless Recorder
- Batch Control, Log Data in Batches
- 100 msec Data Logging and Historical Data Archival Tools
- Display Screen Rotation
- Dynamic Data Exchange via PC Software
- Search Data with Reference to Time and Period, then Export to Spreadsheets
- Data Logging by Value Change or Time Base
- Start/Stop Data Logging Functions Which Can Be Linked with Real Time Clock or Events

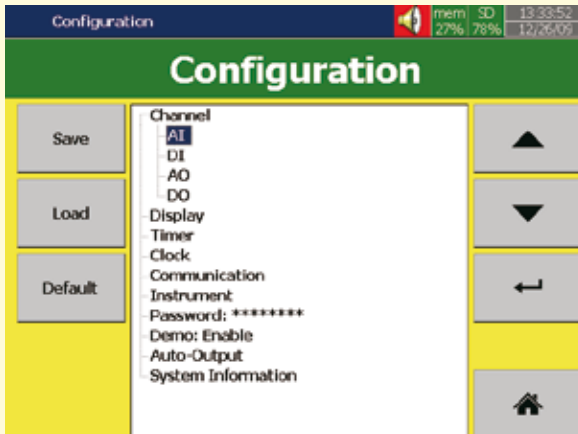**Recorder Input Name and Description Screen—Standard Firmware**

Input name and description: Large entry fields allow users to key in many characters.

Recorder Touch Screen
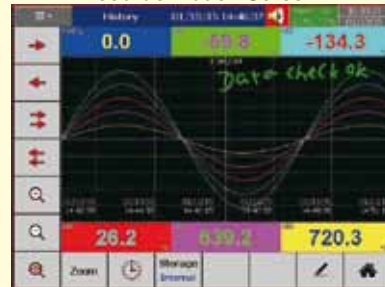
Touch-screen allows easy handwriting of notes and messages.

Recorder Configuration Screen

Configuration in tree layout is easy to operate.

AI: Analog input logging speed can be set from 100 ms, 1, 2, 5, 10, 20, 30 sec/dot;, 1, 2 min/dot

DI: Digital input is offered either normal logic or high frequency pulse

AO: In analog output, mA or V and its expression can be defined

DO: Digital output/relay output can be enabled. Each DO card has 6 relays

Display: Various display speeds are available from 100 ms, 1, 2, 5, 10, 20, 30 sec/dot, or 1, 2, 10, 30 min/page, 1, 2, 4, 8, 12 hour/page, or 1 day/page

Timer: Timer in countdown, repeat countdown, daily, weekly or monthly base, and various jobs can be defined

Clock: Date style of mm/dd/yy or dd/mm/yy, time synchronize via internet, and daylight saving time can be defined

Communication: Web server and email functions are available in communication in standard firmware

Instrument: Brightness adjustment and screen saver are available in instrument

Password: If normal security is chosen, then only one password is offered. If high security of CFR-21 is chosen, then 9 levels of password can be defined

Demo: Enable or disable the demonstration

Auto-output: Automatic output can be set to specify the printer, to print historical data & report data in specified period of time

System information: Gives firmware version number, internal and external memory status, IP address, and IO card status of each slot

Web Server: Available with all the recorders as a standard feature. When this feature is enabled the user can access real-time trends, data, events and alarms wherever an internet connection is available

Expandable Input

Each recorder is equipped with rear expansion slots (RD1000/RD2000 Series has 4 slots, RD3000 Series has 16 slots) which work flexibly with the following plug and play I/O cards:

Analog Input Cards (RD1000-3AI & RD1000-6AI): These two cards are used for 3 or 6-channel analog inputs. Each input is isolated from each other to avoid noise and to ensure stable measurement.

Relay Output Card (RD1000-6R): Each card includes 6 alarm relays. Contacts are rated 5 A/240 Vac

Digital Input Card (RD1000-6DI): Each card includes 6 channels. Logic Low: -5V minimum, 0.8V maximum, Logic High: 3.5V minimum, 24V maximum

Combination Relay Output and Digital Input Card (RD1000-3R-3DI): Each card includes 3 digital Inputs and 3 relay outputs. For digital inputs, Logic Low: -5V minimum, 0.8V maximum, Logic High: -3.5V minimum, 24V maximum. For relay outputs, the contacts are rated 5 A/240 Vac.

Analog Output Card (RD1000-6AO): Each card includes 6 channels. They are used for 4 to 20 mA, 0 to 20 mA current output, 0 to 5 V, 1 to 5 V, 0 to 10 Vdc voltage output.

Communication

The standard communication interface is Ethernet with protocol IEEE 802.3 – 10/100 Base T. RS232/422/485 serial communications is optional.

SPECIFICATIONS
GENERAL
Display: LCD, 65K color
Resolution: RD1000: 480 x 272; RD2000: 640 x 480; RD3000: 1024 x 768
Backlight: LED
MTBF Backlight @ 25˚C: RD1000, RD2000: 30,000 hrs; RD3000: 60,000 hrs
CPU: ARM Cortex-A8, 1 GHz
Internal Flash Memory: 256 MB
SD Card Slot: Standard
USB Host: 2 ports (one front, one back)
Start/Stop Key: Start/stop recording and turn off display only (for quick re-start), does not turn off power to the unit
Web Server: The recorder trend and digital data can be viewed in any place in the world with the recorder connected to Internet with a fixed IP address
Multilingual Programming: 19 languages including English, Japanese, Chinese (simplified, traditional), French, German, Spanish, Swedish, Danish, Italian, Polish, Russian, Dutch, Korean, Thai, Turkish, Portuguese, Brazil Portuguese and Czech
PC Software: Standard software supplied for historical data viewing and configuration; optional Data Acquisition Studio software for real-time monitoring; supports Windows XP/Vista/7/8 (32-bit and 64-bit)

Real Time Clock Accuracy vs. Temperature Inside of Housing: 18 sec typical error per month (10 to 40˚C); 52 sec typical error per month at 0˚C or 50˚C; 107 sec typical error per month at -10˚C or 60˚C
Power: 90 to 250 Vac, 47 to 63 Hz, 52 VA, 26 W max; 11 to 36 Vdc, 26 VA, 26 W max (optional)

ANALOG INPUT CARDS (RD1000-3AI AND RD1000-6AI)
Channels:
  RD1000-3AI: 3 channels
  RD1000-6AI: 6 channels
Resolution: 24 bits
Sampling Rate: 10 times/second
Maximum Rating:
RTD Input: ±20V
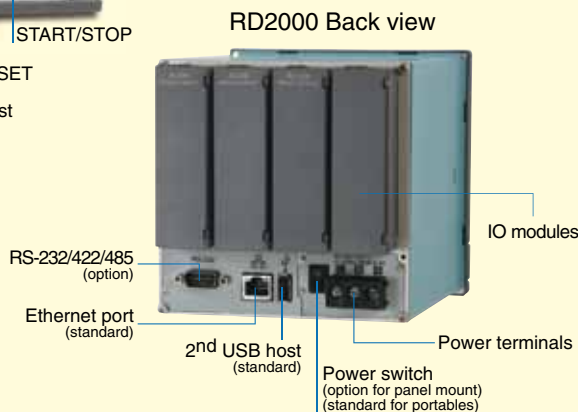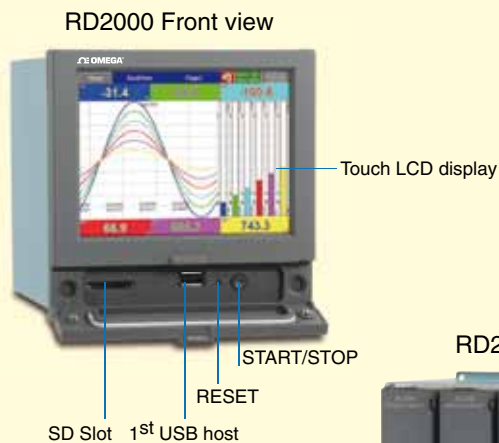**Thermocouple and Voltage Input:** ±65V
Current (mA) Input: ±10V
Temperature Effect: ±0.1 µV ±15 ppm of reading for all inputs except mA, ±30 ppm of reading for mA input
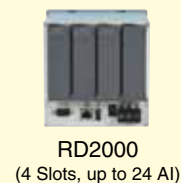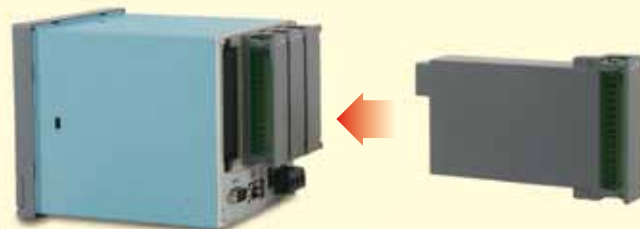**Sensor Lead Resistance Effect:**
  • **Thermocouple:** 0.32 ppm of reading/Ω
  • **3-Wire RTD:** 2.6˚C/Ω of resistance difference of two leads (based on ˚C measurement temperature for Pt100)
  • **2-Wire RTD:** 2.6˚C/Ω of resistance sum of two leads (based on ˚C measurement temperature for Pt100)
  • **Burn-Out Current:** 10µA

Expandable modules of inputs and outputs

IO modules easy for expansion

RD2000 Front view

Touch LCD display

START/STOP

RESET

SD Slot 1st USB host

RD2000 Back view

RS-232/422/485 (option)

Ethernet port (standard)

2nd USB host (standard)

Power switch (option for panel mount) (standard for portables)

Power terminals

IO modules

RD1000 (4 Slots, up to 6 AI)

RD2000 (4 Slots, up to 24 AI)

RD3000 (16 Slots, up to 48 AI)

Rejection Ratio
(CMRR): 120 dB
Normal Mode
Rejection Ratio
(NMRR): 55 dB

Channels: 1500 Vac min
Sensor Break Detection: Sensor opened for thermocouple, RTD and mV inputs; below 1 mA for 4 to 20 mA input, below 0.25V for 1 to 5V inputs, unavailable for other inputs

Sensor Break Response Time: Within 1 second for thermocouple, RTD and mV inputs; 0.1 second for 4 to 20 mA and 1 to 5V inputs

Analog Input Types and Ranges

Type	Range	Accuracy @ 25˚C	Input Impedance
J	-120 to 1000˚C (-184 to 1832˚F)	±1˚C	3.12 MΩ
K	-200 to 1370˚C (-328 to 2498˚F)	±1˚C	3.12 MΩ
T	-250 to 400˚C (-418 to 752˚F)	±1˚C	3.12 MΩ
E	-100 to 900˚C (-148 to 1652˚F)	±1˚C	3.12 MΩ
B	0 to 1820˚C (32 to 3308˚F)	±2˚C (200 to 1820˚C)	3.12 MΩ
R	0 to 1768˚C (32 to 3214˚F)	±2˚C	3.12 MΩ
S	0 to 1768˚C (32 to 3214˚F)	±2˚C	3.12 MΩ
N	-250 to 1300˚C (-418 to 2372˚F)	±1˚C	3.12 MΩ
L	-200 to 900˚C (-328 to 1652˚F)	±1˚C	3.12 MΩ
U	-200 to 600˚C (-328 to 1112˚F)	±1˚C	3.12 MΩ
P	0 to 1395˚C (32 to 2543˚F)	±1˚C	3.12 MΩ
W5	0 to 2315˚C (32 to 4199˚F)	±1˚C	3.12 MΩ
W3	0 to 2315˚C (32 to 4199˚F)	±1˚C	3.12 MΩ
LR	-200 to 800˚C (-328 to 1472˚F)	±1˚C	3.12 MΩ
A1	0 to 2500˚C (-32 to 4532˚F)	±1˚C	3.12 MΩ
A2	0 to 1800˚C (-32 to 3272˚F)	±1˚C	3.12 MΩ
A3	0 to 1800˚C (-32 to 3272˚F)	±1˚C	3.12 MΩ
M	-200 to 100˚C (-328 to 212˚F)	±1˚C	3.12 MΩ
Pt50 (α = 0.00385)	-200 to 850˚C (-328 to 1562˚F)	±0.4˚C	2.0 KΩ
Pt100 (α = 0.00385)	-200 to 850˚C (-328 to 1562˚F)	±0.4˚C	2.0 KΩ
Pt200 (α = 0.00385)	-200 to 850˚C (-328 to 1562˚F)	±0.4˚C	2.0 KΩ
Pt500 (α = 0.00385)	-200 to 850˚C (-328 to 1562˚F)	±0.4˚C	2.0 KΩ
Pt1000 (α = 0.00385)	-200 to 350˚C (-328 to 662˚F)	±0.4˚C	2.0 KΩ
Pt50 (α = 0.00391)	-200 to 850˚C (-328 to 1562˚F)	±0.4˚C	2.0 KΩ
Pt100 (α = 0.00391)	-200 to 850˚C (-328 to 1562˚F)	±0.4˚C	2.0 KΩ
JPT50 (α = 0.003916)	-200 to 600˚C (-328 to 1112˚F)	±0.4˚C	2.0 KΩ
JPT100 (α = 0.003916)	-200 to 600˚C (-328 to 1112˚F)	±0.4˚C	2.0 KΩ
JPT200 (α = 0.003916)	-200 to 600˚C (-328 to 1112˚F)	±0.4˚C	2.0 KΩ
JPT500 (α = 0.003916)	-200 to 600˚C (-328 to 1112˚F)	±0.4˚C	2.0 KΩ
JPT1000 (α = 0.003916)	-200 to 350˚C (-328 to 662˚F)	±0.4˚C	2.0 KΩ
Cu50 (α = 0.00426)	-50 to 200˚C (-58 to 392˚F)	±0.4˚C	2.0 KΩ
Cu100 (α = 0.00426)	-50 to 200˚C (-58 to 392˚F)	±0.4˚C	2.0 KΩ
Cu50 (α = 0.00428)	-180 to 200˚C (-292 to 392˚F)	±0.4˚C	2.0 KΩ
Cu100 (α = 0.00428)	-180 to 200˚C (-292 to 392˚F)	±0.4˚C	2.0 KΩ
Ni100 (α = 0.00617)	-60 to 180˚C (-76 to 356˚F)	±0.4˚C	2.0 KΩ
Ni200 (α = 0.00617)	-60 to 180˚C (-76 to 356˚F)	±0.4˚C	2.0 KΩ
Ni500 (α = 0.00617)	-60 to 180˚C (-76 to 356˚F)	±0.4˚C	2.0 KΩ
Ni1000 (α = 0.00617)	-60 to 180˚C (-76 to 356˚F)	±0.4˚C	2.0 KΩ
Cu10 (α = 0.00427)	-200 to 260˚C (-328 to 500˚F)	±1.0˚C	2.0 KΩ
±20 mA	-26 to 26 mA	±0.05%	75 Ω
±60 mV	-122 to 122 mV	±0.05%	3.12 MΩ
±200 mV	-243 to 243 mV	±0.05%	3.12 MΩ
±1V	-1.58 to 1.58V	±0.05%	3.12 MΩ
±2V	-3.16 to 3.16V	±0.05%	3.12 MΩ
±6V	-6.32 to 6.32V	±0.05%	3.12 MΩ
±20V	-25.3 to 25.3V	±0.05%	3.12 MΩ
±50V	-50.6 to 50.6V	±0.05%	3.12 MΩ
0.4 to 2V	-3.16 to 3.16V	±0.05%	3.1 2MΩ
1 to 5V	-6.32 to 6.32V	±0.05%	3.12 MΩ

DIGITAL INPUT CARD (RD1000-6DI)

Channels: 6 per card
Logic Low: -5V min, 0.8V max
Logic High: 3.5V min, 24V max
External Resistance:
  Pull-Down: 1 KΩ max
  Pull-Up: 1.5 MΩ min
Frequency: 100 Hz max

RELAY OUTPUT CARD (RD1000-6R)

Channels: 6 per card
Contact Form: NO/NC (form C)
Relay Rating: 5A/240 Vac; life cycles 200,000 for resistive load

ANALOG OUTPUT CARD (RD1000-6AO)

Channels: 6 per card
Range: 4 to 20 mA, 0 to 20 mA, 0 to 5V, 1 to 5V, 0 to 10V
Resolution: 16-bits
Accuracy: ±0.05% of span ±0.0025% /˚C
Load Resistance: 0 to 500 Ω (current), 10 KΩ min (voltage)
Output Regulation: 0.01% for full load change
Output Setting Time: 0.1 second (stable to 99.9%)
Isolation Breakdown Voltage: 1500 Vac at 50/60 Hz for 1 minute
Integral Linearity Error: ±0.005% of span
Temperature Effect: ±0.0025% of span/˚C

STANDARD ETHERNET COMMUNICATIONS

Protocol: Modbus® TCP/IP, 10/100 Base T
Ports: AUI (Attachment Unit Interface) and RJ-45, auto-detect capability

WEBSERVER

Description: Used to view the RD1000/RD2000/RD3000 Series paperless recorder from a remote location via the Internet
Browser Requirements: Internet Explorer 10 or higher, Google Chrome™
IP Address: A Static IP address is required for the recorder. Obtain a Static IP address from your Internet service Provider (ISP). This IP address should be unique.

COMM MODULE (OPTIONAL RS232/422/485 COMMUNICATIONS)

Interface: RS232 (1 unit), RS485 or RS422 (up to 247 units)
Protocol: Modbus protocol RTU mode
Address: 1 to 247
Baud Rate: 9.6 to 115.2 K bits/sec
Measured Data Bits: 7 or 8-bits
Parity Bit: None, even or odd
Stop Bit: 1 or 2 bits

ENVIRONMENTAL AND PHYSICAL

Operating Temperature: 0 to 50˚C (32 to 122˚F)
Storage Temperature: -30 to 70˚C (-22 to 158˚F)
Humidity: 20 to 90% RH (non-condensing), maximum relative humidity of 90% RH is for ambient temperature up to 38˚C (100˚F) decreasing linearly to 50% RH at 50˚C (122˚F)
Altitude: 2000 M maximum
Insulation Resistance: 20 MΩ min @ 500 Vdc
Dielectric Strength: 2300 Vac, 50/60 Hz for 1 minute between power terminal and earth
Vibration Resistance: 10 to 55 Hz, 10m/s² for 2 hours

Shock Resistance: 30m/s² (3g) for operation, 20 g for transportation
Operation Position: no inclined restriction
Dimensions (Panel Mount Style):
  RD1000/RD2000 Series:
  144 H x 144 W x 189 mm D (5.67 x 5.67 x 7.44")
  RD3000 Series:
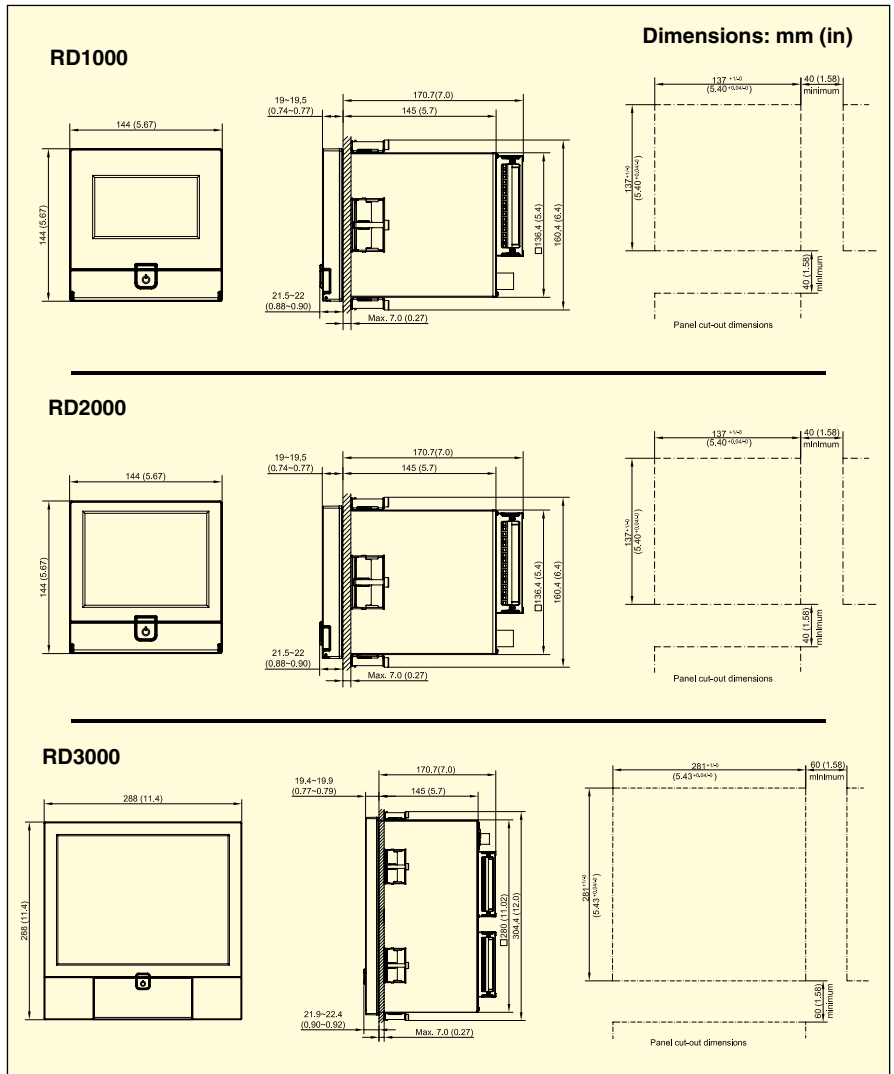 288 H x 288 W x 189 mm D (11.34 x 11.34 x 7.44")
Standard Panel Cutout:
  RD1000/RD2000 Series:
  137 x 137 mm (5.39 x 5.39")
  RD3000 Series: 281 x 281 mm (11.06 x 11.06")
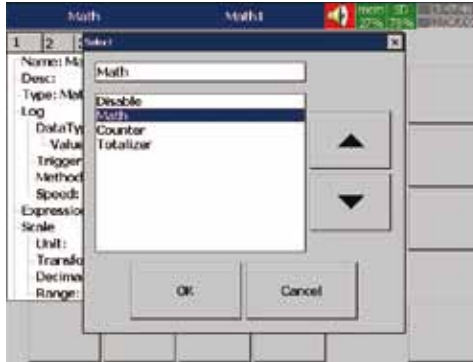**Mounting Depth Behind Panel:** 171 mm (6.73")
Enclosure: IP65 front panel for indoor use; IP20 housing and terminals

Dimensions: mm (in)

Plus Version of Firmware—Supports Additional Features Including Math Channels, External Channels, Custom Display, Batch Control and FDA 21 CFR Part 11 Compliance
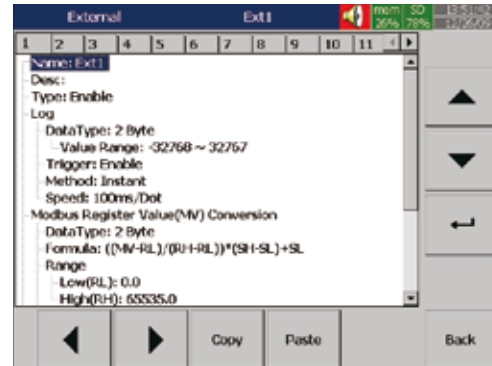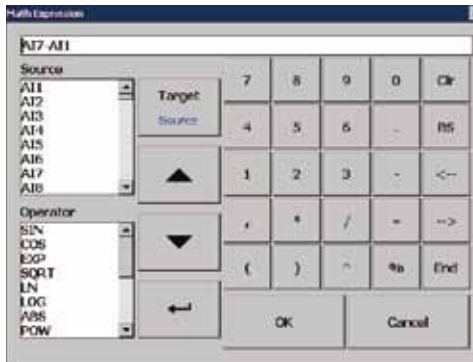
Math

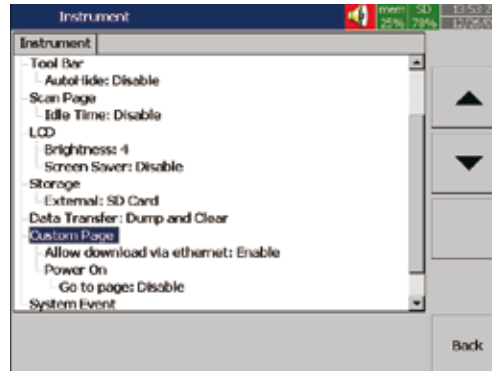**Includes Math, Counter and Totalizer.**

External Channels.

Besides AI and DI inputs, these recorders accept inputs through communication called External Channels. RD1000, RD2000, and RD3000 Series recorders can accept up to 24, 48 and 96 channels respectively.

Math expression is easily keyed in.

Custom Edited Display.

In Plus versions, Panel Studio software allows the user to edit the specific display instead of the standard display. It can then be downloaded to the recorder.

Batch Control: Batch production record is constantly required for more strict production, for example food and drugs.

FDA 21 CFR part 11: This feature complies with U.S. Food and Drug Administration. All data can not be manipulated after recording.

Firmware Options (for Additional Cost)

| Add Suffix to Model No.	Description
-FW1	Plus version 1 with extra math, external channels, batch and FDA 21 CFR Part 11
-FW2	Plus version 2 with custom edited display and Panel Studio editing software
-FW3	Plus version 3 includes all items in Plus versions 1 and 2

Mounting Options (for Additional Cost)
Standard Configuration is Panel Mount, No Power Cord, No Power Switch

Add Suffix to Model No.	Description
-1	Panel mount, no power cord, power switch (no additional cost)
-2	Portable, power cord, power switch
-3	Portable, VDE power cord, power switch
-4	Portable, SAA power cord, power switch
-5	Portable, BS power cord, power switch
-6	Portable, GB power cord, power switch

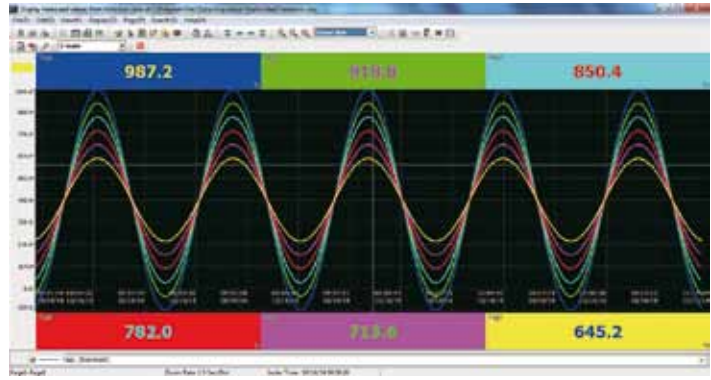## Standard Software (Included)—Consists of Configurator

Configuration screen
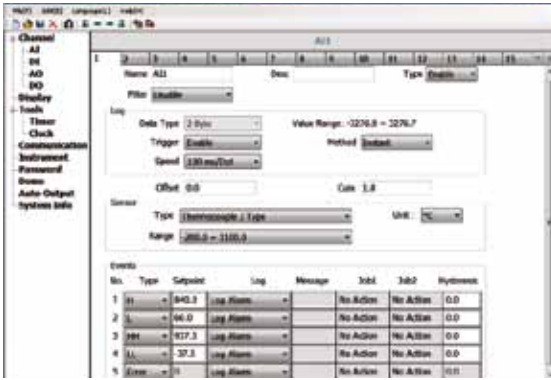
User can easily configure the recorder on a PC and then send the configuration files to the recorder.
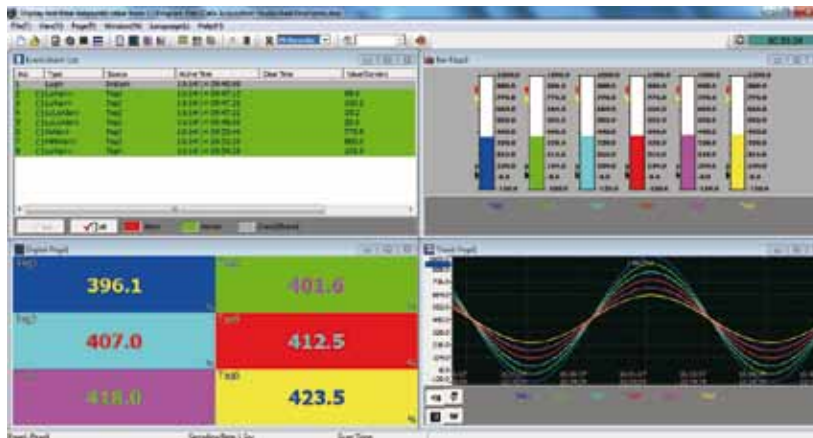
Historical viewer

Displays historical trends, alarms, events and then print it. Use it to search data by time, time period, tag, alarm, events and remarks. Data can also be exported in CSV format.

Enhanced Data Acquisition Studio Software (Optional)

Real time viewer

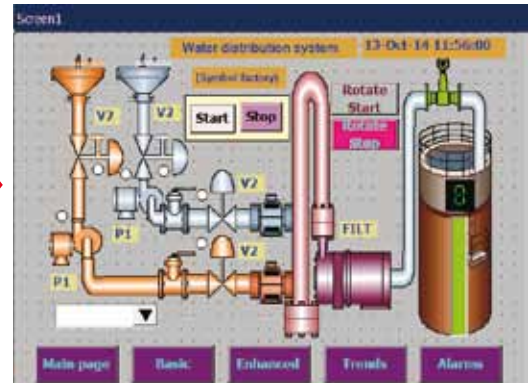RD1000-SW Data Acquisition Studio Software (ordered separately)—adds Real Time Viewer

Panel Studio Software (Included with Plus Version of 2 or 3 of Firmware)
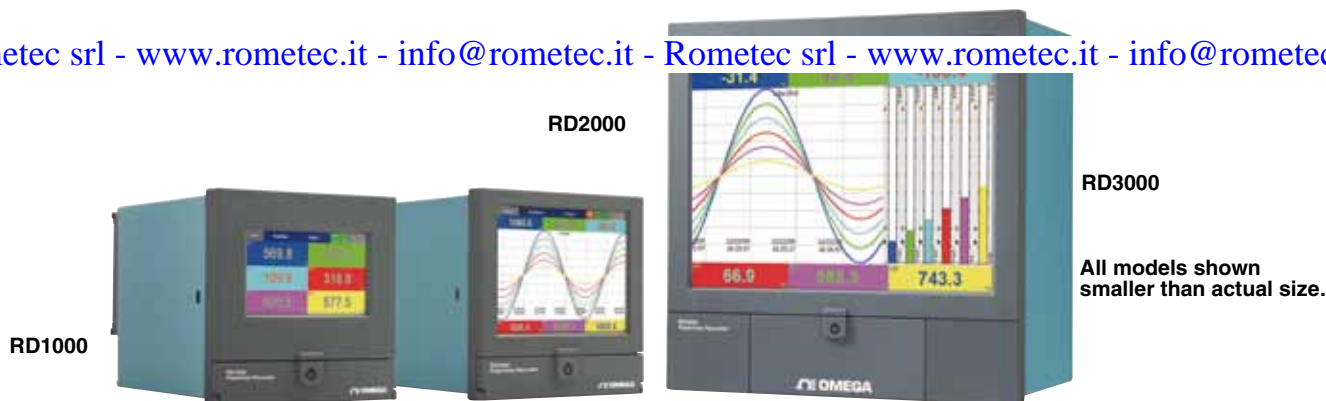
Panel Studio software

Use Panel Studio for easy custom display editing on a PC, then download to the recorder. The custom edited displays can be viewed in addition to the standard displays.

Custom display downloaded to the recorder

RD2000

RD3000

**All models shown
smaller than actual size.**

RD1000

To Order

Model No.	Description
RD1000 Series Paperless Recorders with 4.3" TFT Display, 4 Slots, up to 6 Analog Inputs	
RD1003	Recorder, 3-input, 3 spare I/O slots (includes one RD1000-3AI card)
RD1006	Recorder, 6-input, 3 spare I/O slots (includes one RD1000-6AI card)
RD2000 Series Paperless Recorders with 5.6" TFT Display, 4 Slots, up to 24 Analog Inputs	
RD2003	Recorder, 3-input, 3 spare I/O slots (includes one RD1000-3AI card)
RD2006	Recorder, 6-input, 3 spare I/O slots (includes one RD1000-6AI card)
RD2012	Recorder, 12-input, 2 spare I/O slots (includes two RD1000-6AI cards)
RD2018	Recorder, 18-input, 1 spare I/O slots (includes three RD1000-6AI cards)
RD2024	Recorder, 24-input, no spare I/O slots (includes four RD1000-6AI card)
RD3000 Series Paperless Recorders with 12.1" TFT Display, 16 Slots, up to 48 Analog Inputs	
RD3006	Recorder, 6-input, 15 spare I/O slots (includes one RD1000-6AI card)
RD3012	Recorder, 12-input, 14 spare I/O slots (includes two RD1000-6AI cards)
RD3018	Recorder, 18-input, 13 spare I/O slots (includes three RD1000-6AI cards)
RD3024	Recorder, 24-input, 12 spare I/O slots (includes four RD1000-6AI cards)
RD3030	Recorder, 30-input, 11 spare I/O slots (includes five RD1000-6AI cards)
RD3036	Recorder, 36-input, 10 spare I/O slots (includes six RD1000-6AI cards)
RD3042	Recorder, 42-input, 9 spare I/O slots (includes seven RD1000-6AI cards)
RD3048	Recorder, 48-input, 8 spare I/O slots (includes eight RD1000-6AI cards)
Options (Field Installable in Spare I/O Slots, One Slot Required for Each Module)	
RD1000-3AI	Analog input card, 3 channel
RD1000-6AI	Analog input card, 6 channel
RD1000-6DI	Digital input card, 6 channel
RD1000-6R	Relay output card, 6 relays
RD1000-3R-3DI	Relay output/digital input card, 3 relays, 3 inputs
RD1000-6AO	Analog output card, 6 outputs

Accessories

Model No.	Description
RD1000-SW	Data acquisition studio software
2GB-SD	Spare 2GB SD card

Comes complete with operator's manual, panel mounting brackets and standard software.

Notes: *Recorder offers Ethernet interface as standard. To include RS232 communications add **"-RS232"** suffix to model number for an additional cost. To include RS422/485 communications add **"-RS422/485"** suffix to model number for an additional cost. Standard power for recorders is 90 to 250 Vac, 47 to 63 Hz. To order recorder with optional 11 to 36 Vdc power, add suffix **"-DC"** to model number, no additional cost.*

Ordering Example: RD1006, *recorder with 6 inputs, plus **RD1000-DI6,** digital input card, plus **RD1000-SW** data acquisition studio software*