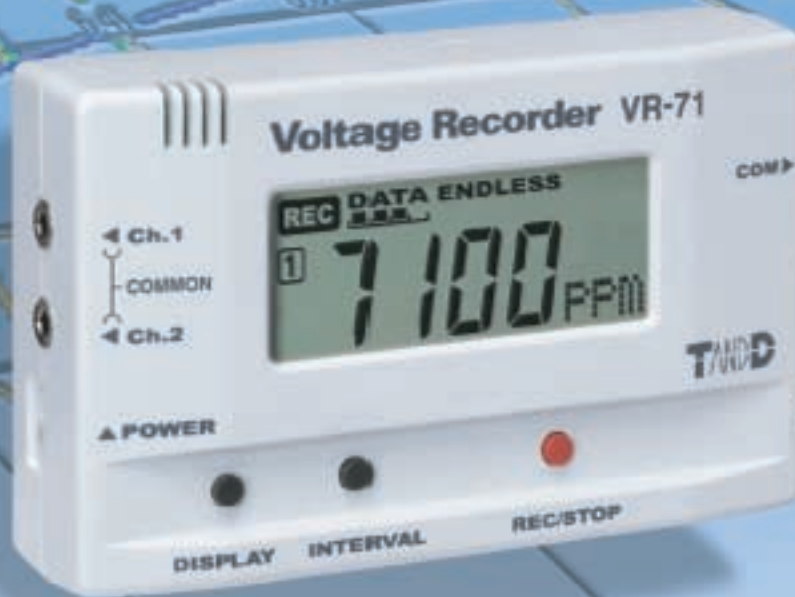


# Voltage Recorder

CE



**All Types of Sensors can be Connected for  
the Recording of Various Data:  
Giving you a Low Cost yet  
High Performance Versatile Data Logger.**

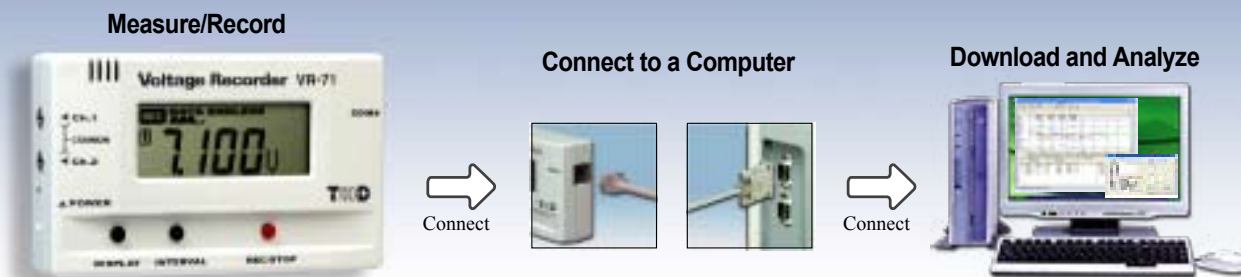
## Voltage Data Logger

## VR-71

Display is a composite.

# Voltage Recorder

The VR-71 data logger measures and records voltage signals within a measurement range of DC ( $\pm$ ) 15V. It can record signals of 1-5V / 4-20mA as well as output signals from a variety of sensors. The most impressive feature is the software function that allows you to create your own dot matrix patterns for unit display and then change the recorded voltage signal into the desired unit and display accordingly to match your measurements.



## Features

### Measure and Record with 2 Channels on 1 Unit

It is possible to measure and record on two channels with 1 unit. These two channels make it possible to obtain reliable readings when measuring two related phenomena.

By pressing the DISPLAY button, you can choose to set the LCD display to show both channels' readings alternatively, show one channel as a fixed display or show neither channel.

### Choose the Display Unit

Of course you can display the voltage reading as is, or by using the software to select the desired scale, convert and display the readings in the unit of your choice.

#### Scale Conversion

You can specify to convert the scale by specifying values at 2 voltage points or by using the conversion equation of  $y=Ax+B$ .

(y stands for the value after conversion and x is the voltage input directly from the sensor.)

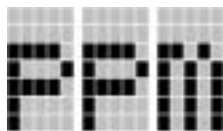
EX: At 2 specified points: convert input voltage of 0v to 100 and input of 5v to 5000.

EX: Using the equation  $y=Ax+B$ :  $y=10x+15$ .

#### Unit Display

It is possible using the software to create and edit dot matrix patterns to be used in the LCD as the unit of measurement.

Example of Created Dot Matrix Pattern



Example of Created Unit Display



### Auto-Range Function / $\pm$ Input

You can manually set the range or can set to have the auto-range function automatically select the best range from the 4 input ranges  $\pm 1V$ ,  $\pm 2V$ ,  $\pm 6V$ ,  $\pm 15V$ .

**Note:** If the recording interval is 0.5 seconds or less the auto-range function cannot be used.

### Select from 20 Recording Intervals / Shortest at 0.02 seconds

Recording interval can be selected from 20 choices (0.02sec to 60min). There are also two Recording Modes to choose from: One-time or Endless.

### Data Capacity: 8000 Readings x 2 Channels

Each channel can record up to 8000 readings. At a recording interval of 60 min, (the longest possible recording interval) that gives you one year of continuous recording capability.

### 9 Months of Continuous Use on 2 AAA Batteries\*

Using our specially designed low energy consumption circuit this unit can run on two AAA alkaline batteries for up to one year of continued use. No need to worry about where you place it as the battery will allow you to measure and record over long periods of time whether the unit is in transit or in a distant place.

**\*Note:** Battery life will depend on the recording environment, recording interval, communication frequency, and ambient temperature. The above battery life test was carried out using brand new batteries and in no way do we guarantee a battery's life.

### Reliable Backup Function

We have eliminated the worry of losing data due to power loss or the switch being accidentally turned off.

#### When Battery Power becomes Low

When battery power becomes low a battery life warning will appear on the unit's display indicating that the battery should be changed. If within a short time the battery is changed, measurement and recording will not be interrupted and there will be no data loss. If the battery is not changed the unit will automatically go into SLEEP mode whereby measurement and recording will stop but, due to our BACK UP FUNCTION, data will not be lost and will remain saved for up to one year.

Battery Life Warning Indicator



Sleep Mode Indicator



#### When the Switch is turned OFF


If while recording, the power switch is accidentally turned OFF, data will not be lost but will be saved for up to one year from the time it was switched OFF.

**Note:** Even if the unit is in sleep mode it needs battery power. Hence, a total loss of battery power or removal of the battery will result in the loss of data.

### Easy to Read Multi-Functional Display

The easy to read LCD displays the current readings, recording status, battery life warning, and unit of measurement.



- (1) The channel number of the measurement being displayed will appear.
- (2) The recording status will appear.  
ON: Recording in progress. BLINKING: Waiting for programmed start.
- (3) After every 2000 readings the scale will be marked from left to right.
- (4) ONETIME: When the number of recorded readings reaches 8000, "FULL" will appear in the unit's LCD display and recording will automatically stop.  
ENDLESS: When the number of recorded readings reaches 8000, the oldest data reading will be overwritten and recording will continue.
- (5) When the battery power becomes low, this will appear in the LCD display. If the battery power becomes even lower, SLP will appear and normal operations will stop. If the  signal appears, please change the battery as soon as possible.
- (6) The unit of measurement for the display will appear.
- (7) Current measurements or operational messages such as FULL or SLP will appear.

## Software included with VR-71

## Voltage Recorder for Windows

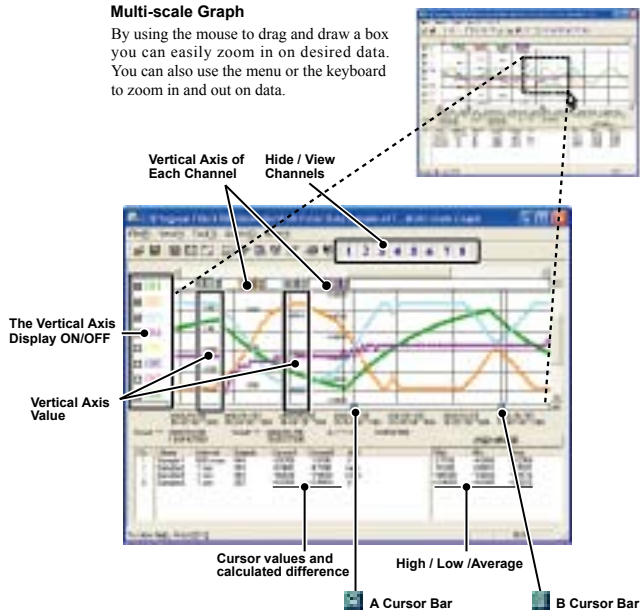
Our easy-to-use software included with this product offers a variety of useful functions at your fingertips including: the control of all aspects of data downloading, control of recording settings, graph display, printing, and file output.

### Up to 8 Channels of Data can be Processed at One Time

By simply downloading the data from the main unit a colorful graph representing that data will be automatically created. Up to 8 channels (4 units of data) can be represented in one graph. The data scale and unit to be used in the display can be set with the scale settings.

#### Multi-scale Graph

By using the mouse to drag and draw a box you can easily zoom in on desired data. You can also use the menu or the keyboard to zoom in and out on data.



- By moving the cursors on to a specific date and time you can easily view recorded data as well as the calculated differences between date A and B.
- By selecting a calculation range you can have displayed the High, Low and Average readings for that chosen period.

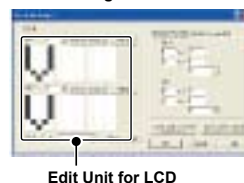
### Programmed Recording Start Function / Scale and Unit Conversion Function

By setting a date and time in the main unit you can easily program to start recording on that date at the set time. In the Scale Settings you can set the unit of measurement and the values for the scale and these settings will be reflected in the LCD on the logger and in Graphs. It is also possible to edit and create the unit of measurement for display in the logger LCD.

#### Recording Start Settings

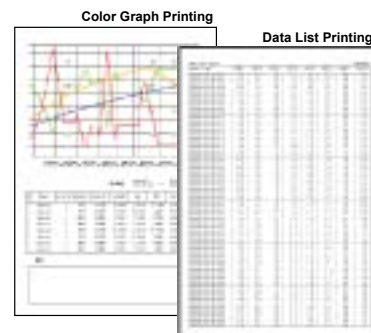


#### Scale Settings



### Graph / Table Printing Function

You can print out in color or monochrome the graphs just as they appear on your screen. You can also print out in table form all of the data in order of date and time.



### Creating Text Files

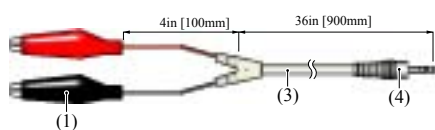
You can create Text Files (CSV format, etc...) to allow you the option of processing and managing your data using Excel, Lotus or any other popular spreadsheet software.

## Optional Accessories

### VR-7101

#### Input Cable

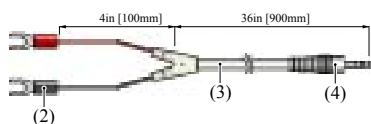
Cable Length: 40 in (1.0m)



### VR-7102

#### Input Cable

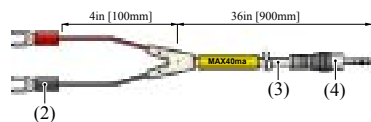
Cable Length: 40 in (1.0m)



### VR-7103

#### 4-20mA Probe

Maximum Current Input: MAX 40 mA  
Internal Resistance: 100 Ohm  
Output: 2V at 20mA / 0.4V at 4 mA  
Conversion Accuracy: 0.5%  
Cable Length: 40 in (1.0m)

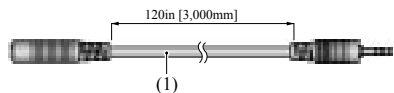


Materials: (1) Clip (2) M3.5 Crimp Terminal (3) Vinyl Coated Electrical Wire (4) Stereo Mini Jack

### TR-1C30

#### Sensor Extension Cable

Cable length: 120 in (3m)  
Splash Resistant

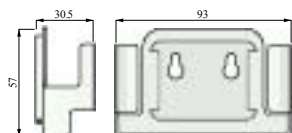


Materials: (1) Vinyl Coated Electrical Wire

### TR-00K2

#### Wall Attachment

Screws x 2  
Double-sided Tape x 1

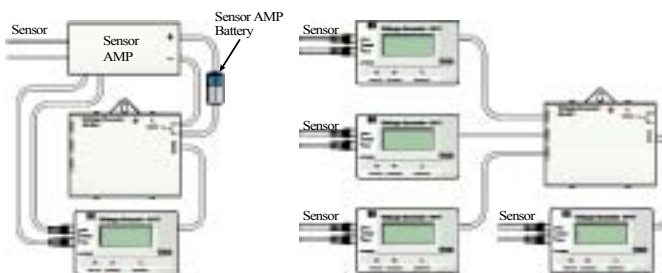


Materials: ABS Resin

## Optional Products

### VR-00P1

#### Expansion Unit



<Example of Preheat Connection>

<Example of Simultaneous Recording Connection>

The expansion unit greatly increases the application possibilities. It not only allows you to transmit a preheat signal that is synchronized with the VR-71 recording timing to turn sensors or other devices ON and OFF, but also allows you to simultaneously record with up to 4 VR-71 units.

Preheat Output Terminal Contact Capacity: DC30V 100mA ON Resistance: MAX 15Ω  
Power Source: 1 AA Alkaline Battery (LR6)  
Weight: about 230g (including 1 AA Alkaline Battery)  
Items Included: Connection Cables x 2 [VR-1C01 (15cm) x 1 and VR-1C10 (1m) x 1]  
Wall Attachment Unit (TR-00K2) x 1, AA Alkaline Battery (LR6) x 1

**Note:** When using to simultaneously record with 4 units, it is necessary to purchase separately 2 VR-1C10 connection cables.



## ■ Specifications for VR-71

Measurement Item	Voltage
Number of Channels	2 (common ground)
Measurement Range	Range: ±1, 2, 6, 15 V Auto Range / Fixed Range
Measurement Accuracy	± 0.5% ± 5 dgt. (10°C - 30°C)
Display Resolution	Min 1mV
Recording Interval	20 selections: 0.02 sec - 60 min.
Recording Capacity	8000 readings x 2 channels
Recording Mode	Endless / One-time
LCD Display Items	Measurement Reading / Recording Status / Time / Memory Capacity
Power Source	Battery Life Warning / Unit of Measurement / 2 AAA Alkaline Batteries (LR03)
Battery Life	About 5-9 months *
Interface	Serial communication (RS-232C)
Dimensions	H 55mm x W 88mm x D 24mm
Weight	About 93g (Including 2 batteries)
Temperature and Humidity	Temp: 0 - 50°C
Durability of the Unit	Humidity: 90% RH or less (non-condensing)
Waterproof	None
Attached Sensor / Cable	2 Input Cables (VR-7101)
Included in Kit	Software Set / Serial Communication Cable x 1 / AAA Alkaline Batteries x 2 User's Manual and Warranty x 1
Other	It is possible to measure electrical current.
Compatible OS	Windows 98SE / Me / 2000 / XP

\* Note: At recording interval of 1 sec: about 5 months / at rec. interval of more than 2 seconds: 9 months / at a recording interval of 0.02 seconds: about 13 days.

## FCC Compliance Statement for American Users

This device complies with Part 15 of the FCC Rules.

Operation is subject to following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### Warning:

This equipment has been verified to comply with the limits for a Class A personal digital device, pursuant to Subpart B of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified or verified to comply with the Class A or B limits may be attached to this equipment.

Operation with non-certified or non-verified personal computer and/or peripherals is likely to result in interference to radio and TV reception. The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment.

You are cautioned that changes or modifications not expressly approved by party responsible for compliance could void your authority to operate the equipment.

## ■ Software Specifications [Voltage Recorder for Windows]




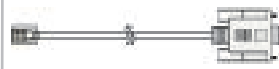

Compatible Devices	VR-71
Number of Channels	8 channels simultaneous display and processing possible to process a mixture of up to 4 VR-71 units
Communication Functions	Recording Start (Programmed Start / Immediate Start) • Recording Stop Main Unit Setting (Channel Name Recording Interval • Recording Method • Upper and Lower Limits • Downloading of Recorded Data • Expansion Unit Settings • Create display unit and transmit to logger (dot matrix pattern) Voltage input conversion equation (2-point or y=Ax+B) setup and transmission to logger. Auto detect of Serial COM Port.
Graph Display	Graphs for each Channel (Zoom in / out and scroll with mouse or keyboard) Vertically Scroll Graph for Each Channel • Channel Graph Color • Background Color Customize Graph Scale Lines • Turn ON and OFF Channel Display Move Vertical Scale to Desired Position in Graph (View / Hide Scale For Each Channel) Display Current Data in Trend Graph (no saving to file)
Data Display	Channel Name • Recording Interval • Number of Readings Highest, Lowest and Average Readings • Unit of Measurement. AB Cursor Dates / Times and Data Readings Calculated Difference between Cursor A and B
File Output	T&D Common Data File • Text File (CSV, etc.) (Selected Range or File for Entire Period)
Printing	Graphs / Tables
Other	Data List Display • Change Scales • Calculation Range Settings Set Display Range for Vertical Axis Edit Recording Conditions / Delete Data by Channel / Re-order Data by Channel
Compatible OS	Microsoft Windows 98SE / Me English Microsoft Windows 2000 / XP English
PC/CPU	IBM Compatible with higher than Pentium 90MHz Serial Port (RS232-C D-sub 9pin)
Memory	More than 16MB
Hard Disk	More than 2 MB of free space (Data will need more space)
Monitor	Recommend VGA / SVGA (800x600) or higher / more than 256 colors

## ► About problems downloading data with Voltage Recorder for Windows

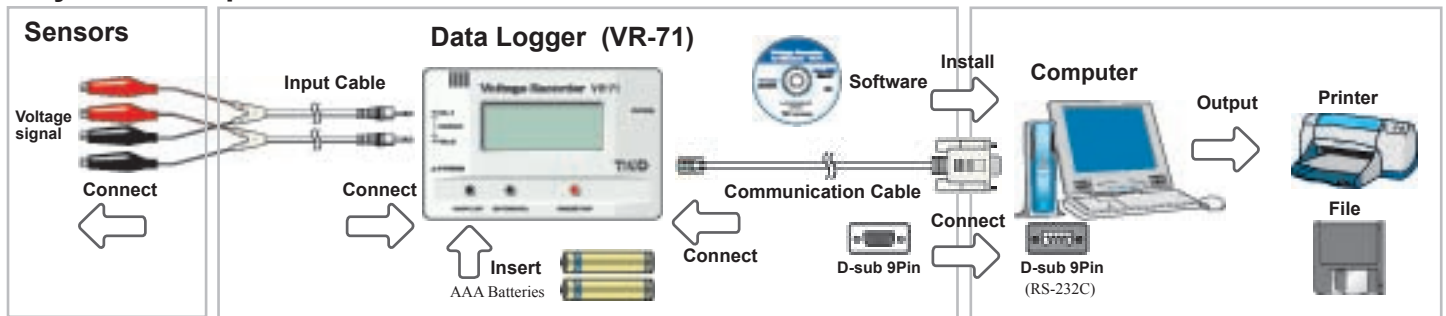
On computers where the Hyper-Threading function is activated, problems have been found to occur when downloading data with a USB-Serial Cable conversion adaptor. There are two solutions to this problem. The first is to turn off the Hyper-Threading function (usually done in the BIOS settings). The second possible solution is to download data on a computer that has a serial port.

Contact your local authorized T&D sales representative about USB-Serial conversion adaptors.

## ■ Standard Kit for VR-71

<b>Manual (Warranty)</b> Voltage Data Logger VR-71 	<b>Battery</b> AAA Alkaline Batteries x2 (LR03) 	<b>Input Cable x 2</b> (VR-7101) 	<b>Serial Communication Cable</b> RS-232C (D-sub 9Pin) 	<b>Software (CD)</b> Voltage Recorder for Windows 
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## ■ System Setup



## Caution regarding safety

To ensure safe operation, carefully read instructions before using this unit.



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