REED

Model SD-947

4 Channel Thermometer Datalogger

Instruction Manual

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Table of Contents

Features

- Accepts Type K/J/T/E/R/S Thermometers
- Shows 4 channels on the Display
- Measures in °C & °F
- Offset adjustment for both Type K/J/T/E/R/S & Pt 100 measurements
- Real time SD memory card datalogger with a built-in clock and calendar
- Sampling time set from 1 second to 3600 seconds
- Meter can switch to a Manual Datalogging
- No extra software needed, just plug the SD card into the computer and it downloads directly to EXCEL
- SD card capacity: 1 GB to 16 GB
- Easy to read LCD with backlight
- Auto power off or manual power off
- Data hold, record max. and min. reading
- High accuracy microcomputer circuit
- Power by UM3/AA (1.5 V) x 6 batteries
- USB/RS232 Computer interface
- Separated probe for easy measurements of multiple environments
- Automatic temperature compensation

Specifications

Circuit:	Custom microprocessor LSI circuit
Display:	52mm x 38mm LCD with backlight
Channels:	T1, T2, T3, T4, T1-T2
Accepted Probes:	Type K, J, T, E, R, S Thermocouple Probe & PT 100 ohm Probe
Temperature units:	(°C, °F)

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Auto Sampling Time:	1, 2, 5, 10, 30, 60, 120, 300, 600, 1800, 3600 seconds
Memory Card:	SD memory card, 1 GB to 16 GB
Sampling Time:	Approx. 1 second
Data Output:	USB/RS232 PC computer interface
Temperature Range:	0-50°C (0-122°F)
Resolution:	0.1°C/0.1°F
Accuracy:	± 0.8°C/1.5°F
Pt 100 ohm Range:	-199.99 - 850.0°C (-327.9 - 1562.0°F)
Pt 100 ohm Accuracy:	±(0.4% + 1°C), ±(0.4% + 1.8°F)
Operating Temperature:	0-50°C (0-122°F)
Operating Humidity:	Less than 85% R.H.
Power Supply:	UM3/AA (1.5 V) x 6 batteries
Weight:	515g/1.13lb
Dimensions:	177 x 68 x 45mm (7.0 x 2.7 x 1.9”)
Optional accessories:	2G SD Card (SD-2GB) Type K thermocouple probe (TP-01) USB cable (USB-01) RS232 cable (UPCB-01) Data Acquisition Software (SW-U801-WIN) Tripod (BS-6) Soft carrying case (CA-05A)

Visit us at www.reedinstruments.com for more information on our optional accessories, or e-mail us at info@reedinstruments.com

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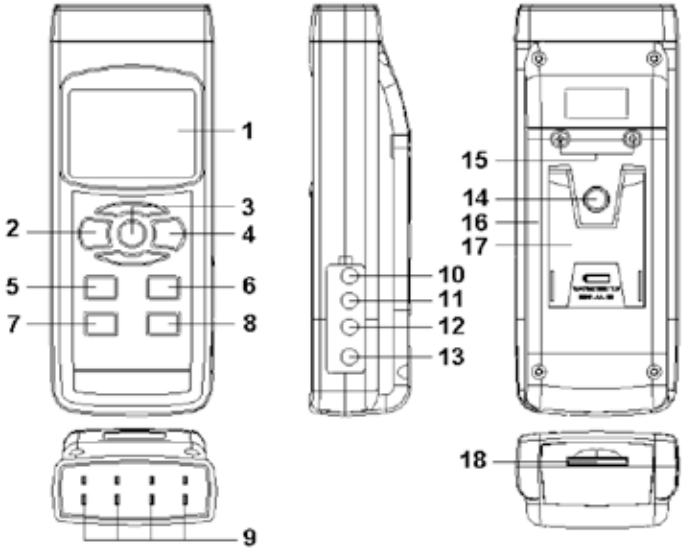
Sensor Type	Resolution	Range	Accuracy
Type K	0.1°C	-50.0 to 1300.0°C	± (0.4% + 0.5°C)
		-50.1 to -100.0°C	± (0.4% + 1°C)
	0.1°F	-58.0 to 2372.0°F	± (0.4% + 1°F)
		-58.1 to -148.0°F	± (0.4% + 1.8°F)
Type J	0.1°C	-50.0 to 1200.0°C	± (0.4% + 0.5°C)
		-50.1 to -100.0°C	± (0.4% + 1°C)
	0.1°F	-58.0 to 2192.0°F	± (0.4% + 1°F)
		-58.1 to -148.0°F	± (0.4 % + 1.8°F)
Type T	0.1°C	-50.1 to -100.0°C	± (0.4% + 1°C)
		-50.0 to 400.0°C	± (0.4% + 0.5°C)
	0.1°F	-58.1 to -148.0°F	± (0.4% + 1.8°F)
		-58.0 to 752.0°F	± (0.4 % + 1°F)
Type E	0.1°C	-50.1 to -100.0°C	± (0.4% + 1°C)
		-50.0 to 900.0°C	± (0.4% + 0.5°C)
	0.1°F	-58.0 to -148.0°F	± (0.4% + 1.8°F)
		-58.0 to 999.9°F	± (0.4 % + 1°F)
Type R	1°C	0 to 600°C	± (0.5% + 1°C)
		601 to 1700.0°C	± (0.5% + 1°C)
	1°F	32 to 1112°F	± (0.5% + 2°F)
		1113 to 3092°F	± (0.5 % + 2°F)
Type S	1°C	0 to 600°C	± (0.5% + 1°C)
		601 to 1500°C	± (0.5% + 1°C)
	1°F	32 to 1112°F	± (0.5% + 2°F)
		1113 to 2732°F	± (0.5% + 2°F)

Above specification tests under the environment RF Field Strength less than 3 V/M & frequency less than 30 MHz only

Instrument Description



1. Display
2. Power, ESC, & Backlight Button
3. Hold & Next Button
4. REC & Enter Button
5. Type, Up, & L Button
6. T1-T2, Down, & R Button
7. SET & Time Check Button
8. Logger, OFFSET, & Sampling Time Check Button
9. T1, T2, T3, T4 input sockets
10. PT1 input socket
11. PT2 input socket
12. USB/RS232 Output
13. AC/DC 9V Power Adapter Input Socket
14. Tripod Fix Nut
15. Battery Cover Screws
16. Battery Compartment/Cover
17. Stand
18. SD card slot

Operating Instructions

Type K Measurement

1) Turn on the meter by pressing the Power Button. To turn the meter off, hold the Power Button for over 2 seconds.
2) The Meter's default Temperature sensor is Type K, which will show on the Display as "K". Insert the optional Type K probes into the T1, T2, T3, T4 input sockets. The screen will show the 4 channels (T1, T2, T3, T4) and their temperature values. If an input socket is empty, the screen will display "- - - - -".

Type J/T/E/R/S Measurement

1) To change the Temperature Sensor, press the Type Button so the screen displays "J/T/E/R/S".
2) Insert the optional Probes into the T1, T2, T3, T4 input sockets. The screen will show the 4 channels (T1, T2, T3, T4) and their temperature values. If an input socket is empty, the screen will display "- - - - -".

Pt 100 ohm Measurement

1) To change the Temperature Sensor, press the Type Button so the screen displays "Pt".
2) Insert the optional Pt 100 ohm Probes into the PT1 and PT2 input sockets. The screen will show the temperature values. If an input socket is empty, the screen will display "- - - - -".

T1-T2 Measurement

1) Insert two probes into the meter, either a Thermocouple Probe in the T1 & T2 sockets, or a Pt 100ohm Probe in the PT1 & PT2 sockets.
2) Press the T1-T2 button and the display will show the difference value between T1, T2 (or PT1, PT2) on the bottom right of the screen.

Data Hold

While taking a measurement, press the Hold Button once and the measured value will hold on the screen, and a HOLD symbol will appear. Press the Hold Button once again will release the data hold function.

Data Record (Max., Min. reading)

The data record function records the maximum and minimum readings. Press the REC Button once to start the Data Record function and a “REC” symbol will appear on the display. With the “REC” symbol on the display:

1) Press the REC Button once, and a ”REC. MAX.” symbol along with the maximum value will appear on the display. To delete the maximum value, press the Hold Button once and the display will show a “REC.” symbol only and execute the memory function continuously.
2) Press the REC Button again, and a “REC. MIN.” symbol along with the minimum value will appear on the display. To delete the minimum value, press the Hold Button once, and the display will show a “REC.” symbol only and execute the memory function continuously.
3) To exit the memory record function, press the REC button for 2 seconds. The display will revert to the current reading.

Backlight ON/OFF

After powering the meter ON, the LCD Backlight will turn on automatically. While taking measurements, press the Backlight Button and the LCD Backlight will turn off. Press the Backlight Button once again to turn the LCD Backlight back ON.

Type K/J/T/E/R/S Offset Adjustment

1) Set the function to Type K (or J/E/R/T/S).
2) Insert the optional thermocouple probe into the T1 input socket.

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3) Press and hold the Offset Button for about two seconds then release and the display will show: “SEt” with the Measuring Value under it, and “oFS” with the Adjustment Value under it. Use the Up and Down Buttons to change the Adjustment Value. Press the Enter Button to save the Adjustment Value and return to the measuring. This can be done for the T1, T2, T3, T4 inputs at the same time.

Pt 100 ohm offset adjustment

1) Set the function to Pt 100 ohm.
2) Insert the optional Pt 100 ohm Probe into the PT1 (or PT2) input socket.
3) Press and hold the Offset Button for about two seconds then release. The screen will show: “SEt” with “Pt1” under it, and “oFS” with “Pt2”under it.
4) To make the Offset Adjustment for Pt 1, place the probe in the PT1 input socket and press the L button. To make the Offset Adjustment for Pt 2, place the probe in the PT2 input socket and press the R button once. The display will show: “SEt” with the Measuring Value under it (for eiter Pt1 or Pt2), and “oFS” with the Adjustment Value under it. Use the Up and Down Buttons to change the Adjustment Value. Press the Enter Button to save the Adjustment Value and return to the measuring. The Pt 100 ohm Offset Adjustment can only be done one at a time.

Datalogger

Preparation Before Executing the Datalogger Function:

1) Insert the optional SD card into the SD card socket.
2) Before you use an SD card with this meter for the first time, it is recommend to format the SD card. See Advanced Settings section of this manual for instructions.
3) If this is the first time the meter is used you need to adjust the clock. See Advanced Settings section of this manual for instructions.

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4) Now you need to set the decimal format. The numerical data structure downloaded to the SD card is defaulted used the ". " as the decimal, for example "20.6" "1000.53". But in certain countries the " , " is used as the decimal point, for example "20,6" "1000,53". See Advanced Settings section of this manual for instructions on how to change the Decimal Character.

Auto Datalogger (Set sampling time ≥1 second)

1) Start Datalogging; press the REC Button, and the "REC" symbol will appear on the LCD screen, then press the Logger Button, the "REC" symbol will flash while the measuring data and time information is being saved in memory. To set the sampling time, and to toggle the beeper sound on or off, refer to the Advanced Settings section of this manual.
2) Pause the Datalogging; while Datalogging, if press the Logger Button once. While paused, the "REC" symbol will stop flashing. Press the Logger Button again to resume Datalogging, and the "REC" symbol will begin to flash again.
3) Stop Datalogging; while the Datalogger function is paused, press the REC Button for 2 seconds. The "REC" symbol will disappear indicating the Datalogging function has stopped.

Manual Datalogger (Set sampling time = 0 seconds)

1) Set sampling time is to 0 second; Press the REC Button, and the "REC" symbol will appear on the LCD screen. Press the Logger Button, and the "REC" symbol will flash once and one Beep will sound, at the same time the measuring data along the time information will be saved in memory. The lower Display will show the Position (record) number, which is saved as well.
2) To Change the Position Number; press the Down Button and the lower position number will flash on the display. Press the Up or Down Buttons to set the Position Number (1 to 99) to help identify the measurement location. The lower Display will show P x (x = 1 to 99). After the position number is selected, press the Enter Button to confirm.

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3) Stop Datalogging; press the REC Button for 2 seconds, and the "REC" symbol will disappear indicating the Datalogging function has stopped.

Checking the Time

During normal functions (not Datalogging), press the Time Check Button and the lower LCD display will show the Year, Month/Date, Hour/Minute.

Check Sampling Time Information

During normal functions (not Datalogging), press the Sampling Button and the lower LCD display will show the Sampling Time Information.

SD Card Data Structure

1) The first time the SD card is used in the meter, the SD card will generate a folder: TMA01
2) The first time you use the Datalogger, in the folder TMA01, a new file name TMA01001.XLS will be created. The Datalogger will use this file until the Data has reached to 30,000 rows. The meter will then will generate a new file with a subsequent number, for example TMA01002.XLS.
3) The folder PHA01can hold 99.XLS files. When that number has been reached, the meter will then will generate a new folder with a subsequent number, for example TMA02. Max number of TMA--folders is 10.

Data Transfer from SD card to Computer (EXCEL Software)

1) After Datalogging, remove the SD card from the SD card slot.
2) Plug in the SD card into the Computer's SD card slot or insert the SD card into the optional SD card adapter and connect to your Computer. Turn your computer on and a folder will appear on your desktop representing you SD card.

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3) Open “Microsoft EXCEL”. Download the EXCEL files from the SD Card to the computer by opening up the SD folder and selecting the desired EXCEL files, and drag-and-drop them onto your Computer. Open the files with EXCEL (File – Open).
4) The EXCEL file will have the following column headers in this order: Place (Position Number), Date (Year/Month/Day), Time (in 24h clock), Value, and Unit.

Advanced Settings

During normal functions (not Datalogging), press and hold the SET Button for 2 seconds to enter the “Advanced Setting” mode. Press the Next Button scroll through eight main functions, shown on the lower display:

dAtE Set clock time (Year/Month/Date, Hour/Minute/Second)
dEC Set SD card Decimal character
PoFF Auto power OFF management
bEEP Set beeper sound ON/OFF
t-CF Select the temperature unit to °C or °F
SP-t Set sampling time (Hour/Minute/Second)
Sd F SD memory card Format

While in the “Advanced Setting” function, press the Esc Button to exit and to return to normal functioning.

Set Clock Time

1) When the lower display shows “dAtE”, press the Enter Button. Use the Up and Down Buttons to adjust the Year. After the desired value is set, press the Enter Button to adjust the Month, Date, Hour, Minute, and Second values.
2) After all the time values have been set the screen will jump to “SD card Decimal character” setting screen. To exit “Advanced Settings”, press the Esc Button.

Note: After the time value is set, the internal clock will run even when the power is off, if the battery is under normal conditions.

Setting the Decimal point on the SD Card

1) When the lower display shows “dEC”, use the Up or Down Buttons to toggle between “bASIC” (“.” Decimal Point) or “Euro” (“,” Decimal Point).
2) After the Decimal point character has been selected, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

Auto power OFF management

1) When the lower display shows “PoFF”, use the Up or Down Buttons to select the value “yES” (Enable Auto Power Off) or “no” (Disable Auto Power Off.
2) After selecting “yES” or “no”, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

Set Beeper Sound ON/OFF

1) When the lower display shows “bEEP”, use the Up or Down Buttons to select “yES” (Beeper Sound is ON) or “no” (Beeper Sound is OFF).
2) After selecting “yES” or “no”, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

Select the Temperature unit to °C or °F

1) When the lower display shows “t-CF”, use the Up or Down Buttons to select “C” (for °C) or “F” (for °F).
2) After selecting “C” or “F”, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

Set sampling time

1) When the lower display shows “SP-t”, use the Up or Down Buttons to adjust the value to either 0, 1, 2, 5, 10, 30,60, 120, 300, 600, 1800, or 3600 seconds.
2) After the Sampling value is selected, press the press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

SD memory card Format

Please Note: Formatting the SD card erases all data from that SD card.

1) When the lower display shows “Sd F”, use the Up or Down Buttons to select “yES” (format the SD card) or “no” (do not format the SD card).
2) To format your SD card, select “yES” and press the Enter Button. The Display will show “yES Enter”, to confirm. Press the Enter Button to confirm.

PC Serial Interface

The instrument features an PC output via 3.5 mm terminal. The connector output is a 16 digit data stream which can be utilized to the user's specific application. An USB RS232 lead with the following connection will be required to link the instrument with the PC serial input.

Meter (3.5mm Jack Plug)	PC (9W "D" Connector)
Center Pin	Pin 2
Ground/Shield	Pin 5

The 16 digit data stream will be displayed in the following format:
D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

D0	End Word
D1 to D4	Upper Display reading, D1= LSD, D4= MSB
D5 to D8	D5=? D6=? D7=? D8=?
D9	Decimal Point (DP) for display 0 = No DP, 1 = 1 DP, 2 = 2 DP, 3 = 3 DP
D10	D10 = 0
D11	D11 = 0
D12	D12 = 0
D13	D13 = 0
D14	D14 = 0
D15	Start Word

System Reset

If an error occurs, press the Reset Button with a Pin. If the Reset Button does not fix the error, please send in the unit to our Calibration Lab for repair. E-mail info@reedinstruments.com for more information.

Battery Replacement

1) When the left corner of LCD display shows  , it is necessary to replace the battery
2) Loosen the screws of the Battery Cover and remove
3) Remove the batteries and replace with Six DC 1.5 V batteries (UM3, AA, Alkaline/heavy duty)
4) Make sure the battery cover is properly secured after changing the battery

For service on this or any other REED product or information on other REED products, contact REED Instruments at info@reedinstruments.com

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