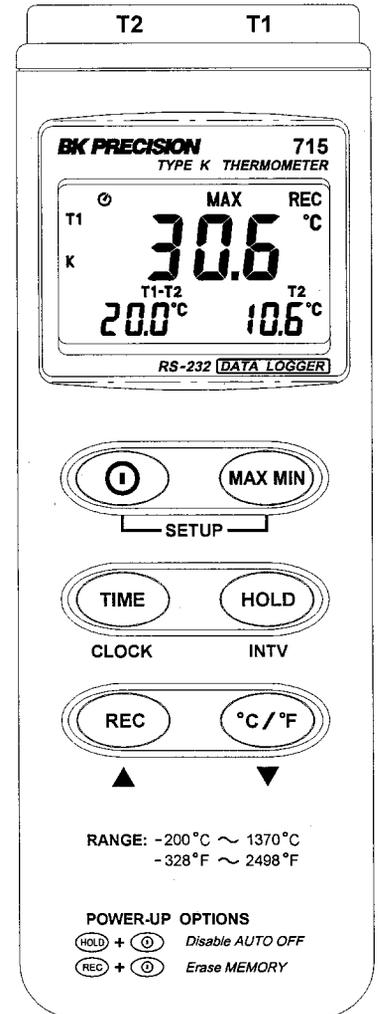


BK PRECISION® 715

Instruction Manual



CE RS-232

DATALOGGER THERMOMETER

CONTENTS

| TITLE | PAGE |
|--|------|
| I. Introduction | 1 |
| II. Specifications | 1 |
| III. Symbol Definition and Button Location | 2 |
| IV. Operation Instructions | 3 |
| 4.1 Power-Up..... | 3 |
| 4.2 Connecting the Thermocouples..... | 3 |
| 4.3 Selecting the Temperature Scale..... | 3 |
| 4.4 Data-Hold Operation..... | 3 |
| 4.5 DataLogger..... | 3 |
| 4.6 Clock Setup..... | 3 |
| 4.7 Recording Interval Setup..... | 4 |
| 4.8 Time Operation..... | 4 |
| 4.9 MAX/MIN Operation..... | 4 |
| 4.10 Auto Power Off..... | 4 |
| 4.11 Low Battery Condition..... | 4 |
| 4.12 Calibration Point..... | 4 |
| 4.13 Digital Output..... | 5 |
| V. Setup ThermoLog (Thermo DataLogger)—RS232 interface software | 7 |
| Service Information | 9 |
| limited one-Year Warranty | 9 |

I. Introduction:

This instrument is a digital thermometer for use with any K-type thermocouple as temperature sensor. Temperature indication follows National Bureau of Standards and IEC584 temperature/voltage table for K-type thermocouples. Its internal memory can keep up to 16312 records.(note1.) It uses RS232 interface to perform bi-directional communication with PC.

II. Specifications:

Numerical Display: 4 digital Liquid Crystal Display

Measurement Range: -200°C ~ 1370°C -328°F ~ 2498°F

Resolution: -200°C~ 200°C 0.1°C; 200°C ~1370°C 1°C
-200°F~ 200°F 0.1°F; else 1°F

Input Protection at Thermocouple Input: 60V DC, or 24Vrms AC

Environmental:

- Operating Temperature and Humidity: 0°C ~50°C (32°F ~ 122°F) ; 0 ~ 80% RH
- Storage Temperature and Humidity: -10°C to 60°C (14°F ~ 140°F); 0 ~ 80% RH
- Altitude up to 2000 meters.

Accuracy: at (23 ± 5°C)

| Range | Accuracy |
|-----------------|-----------------------|
| -200°C ~ 200°C | ±(0.2% reading + 1°C) |
| 200°C ~ 400°C | ±(0.5% reading + 1°C) |
| 400°C~1370°C | ±(0.2% reading + 1°C) |
| -328°F ~ -200°F | ±(0.5% reading + 2°F) |
| -200°F ~ 200°F | ±(0.2% reading + 2°F) |
| 200°F ~ 2498°F | ±(0.3% reading + 2°F) |

Temperature Coefficient:

For ambient temperatures from 0°C ~ 18°C and 28°C ~ 50°C, for each °C ambient below 18°C or above 28°C add the following tolerance into the accuracy spec.

0.01% of reading + 0.03°C
(0.01% of reading + 0.06°F)

⚠ Note:

The basic accuracy Specification does not include the error of the probe. Please refer to the probe accuracy specification for additional details.

Sample Rate: 1.25 times per second

Dimension: 184x64x30mm

Weight: 210g Approx.

Accessory: K Type Bead Probe, Battery, Carrying Case, Instruction Menu, Soft Ware Package (Program, RS232 Connection Cable)

Power requirement: 9 Volt Battery

Battery Life: Approx. 100hrs with alkaline battery

AC Adapter: 9VDC ±15% 100mA

Plug Diameter: 3.5mmx1.35mm

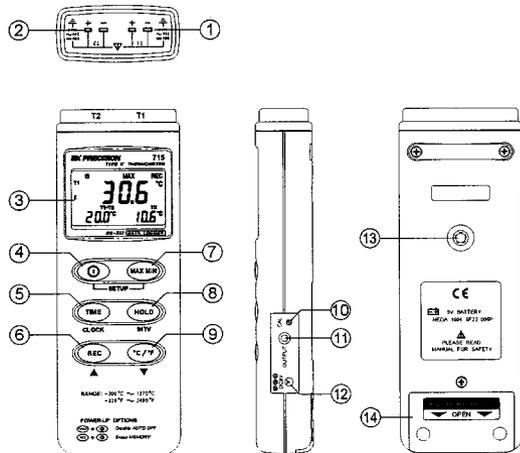
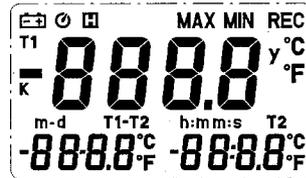
Option : AC Adapter

note1:

Every time you press "REC" button to start recording data and press "REC" button again to stop recording, there will be a data set in memory, you can store as many data sets as you want until memory is full.

III. Symbol Definition and Button Location:

-  : This indicates that the minus temperature is sensed.
- °C/F** : Centigrade and Fahrenheit indication.
- K** : Thermocouple Type Indication
- MAX** : The Maximum value is now being displayed
- MIN** : The Minimum value is now being displayed
-  : This indicates auto power off is enabled.
-  : This indicates that the display data is being held.
- m-d** : it indicates the value below is month and day
- h:m** : it indicates the value below is hour and minute
- m:s** : it indicates the value below is minute and second
- y** : it indicates year is displayed in the main window.
-  : The Battery is not sufficient for proper operation.
- REC** : This indicates that the tester is recording. If it blinks, it indicates the memory is full.



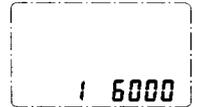
Button Location:

- ① K type temperature sensor T1 input connector
- ② K type temperature sensor T2 input
- ③ LCD display
- ④ ON/OFF button
- ⑤ Time display button
- ⑥ Record button
- ⑦ MAX MIN function control button
- ⑧ HOLD button
- ⑨ °C, °F control button
- ⑩ Offset calibration screw
- ⑪ Digital output connector
- ⑫ AC power adapter connector
- ⑬ Tripod connector
- ⑭ Battery cabinet cover

IV. Operation Instructions:

4.1 Power-Up

Press the power button to turn the thermometer ON or OFF. When the user powers on, the LCD will show how much memory space is available to use.



For example: It indicates that there are 16,000 records memory space available.

4.2 Connecting the Thermocouples

For measurement, plug the thermocouple into the input connectors.

4.3 Selecting the Temperature Scale

When the meter is first powered on, the default scale setting is set at Celsius (°C) scale. The user may change it to Fahrenheit (°F) by pressing "°C/°F" button and vice versa to Celsius. Next time you power on, the scale setting will be the same as which when you power off last time.

4.4 Data-Hold Operation

The user may hold the present reading and keep it on the display by pressing the "HOLD" button. When the held data is no longer needed, one may release the data-hold operation by pressing "HOLD" button again.

When the meter is under Data Hold operation, the "TIME", "MAX MIN" and "°C/°F" button are disabled. (when you press "TIME", "°C/°F" and "max min" button in HOLD mode, there will be two continuous beeps)

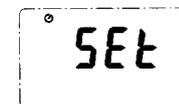
To exit the MAX/MIN mode, one may press and hold "MAX MIN" button for two seconds.

4.5 DataLogger:

When one presses the "REC" button, the meter will start recording, and pressing the "REC" button again will stop recording. If you want to clear the memory, power off the meter, then press and hold "REC" button and then press power button and hold at least 2 seconds, then release all buttons, then LCD will show "CLR" to clear the memory.

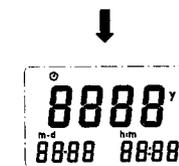


4.6 Clock Setup :



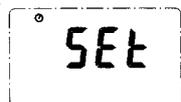
1: press and hold "MAX MIN" button and then power on the meter:

2: press "TIME"(clock):



3: press "REC" ▲ or "°C/°F" ▼ to increase or decrease number, press "TIME"(clock) to adjust next item. The adjusting order is year→month→day→hour→minute, then press "TIME" (clock) to finish adjusting. If you want to abort during a setup process, press power button to cancel.

4.7 Recording Interval Setup :



1: press and hold "MAX MIN" button and then power on the meter:

2: press "HOLD"(INTV)



3: press "REC" ▲ or "°C/°F" ▼ to increase or decrease number, press "HOLD" (INTV) to adjust next item, then press "HOLD" (INTV) to finish. If you want to abort during a setup process, press power button to cancel.

4.8 Time Operation:

When pressing the "TIME" button, the LCD will display time , it will show year on top of the LCD, show month and day on the left bottom of the LCD, show hour and minute on the right bottom of the LCD. Press "TIME" button or any other button will exit this mode. This operation will not interrupt the recording and "MAX MIN" operation.

4.9 MAX/MIN Operation:

When pressing the "MAX MIN" button the meter will enter the MAX/MIN mode. Under this mode the maximum value, minimum value is kept in the memory simultaneously and updated with every new sample of data.

When the MAX symbol is displayed, the Maximum is shown on the display.

Press "MAX MIN" again, then the MIN symbol is on the display and also the minimum reading.

Press "MAX MIN" again, MAX, and MIN will blink together. This means that all the data is updated in the memory and the reading is the present temperature.

One may press "MAX MIN" to circulate the display mode among these options.

When the meter is under "MAX MIN" operation and " °C/°F " button are disabled.(when you press " °C/°F " button in "MAX MIN" mode, there will be two continuous beep)

To exit the MAX/MIN mode, one may press and hold "MAX MIN" for two seconds.

4.10 Auto Power Off:

By default, when the meter is powered on, it is under auto power off mode. The meter will power itself off after 30 minutes if no key operation and no RS232 communication and no recording. Combination at power on can disable auto power off.

One may press and hold "HOLD" button and then power on the meter and there will be two successive beeps to indicate that auto power off is disabled and the will not show up.

4.11 Low Battery Condition

When the battery voltage is under proper operation requirements, the symbol will show on the LCD and the battery will need to be replaced with a new one.

4.12 Calibration Point:

| input | Adjust VR | tolerance |
|---------|-----------|-----------|
| 0 °C | VR1 | ± 0.1 °C |
| 190 °C | VR2 | ± 0.1 °C |
| 1000 °C | VR3 | ± 1 °C |
| 1900 °F | VR4 | ± 1 °F |

P.S

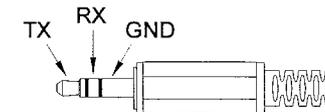
Normally, performing offset Calibration with thermal stabled ice water through VR1 will give a very good calibration result.

4.13 Digital Output:

The Digital Output is a 9600bps N 81 serial interface.

The RX is a 5V normal high input port.

The TX is a 5V normal high output port.



The command of Digital Output is list below:

| RS232 command | Function | Remarks |
|---------------|--------------------------------|------------------------|
| K(ASC 4BH) | Ask for model No. | Return 4 bytes |
| A(ASC 41H) | Inquire all encoded data | Return encoded 10 byte |
| H(ASC 48H) | Hold button | |
| M(ASC 4DH) | MAX/MIN button | |
| N(ASC 4EH) | Exit MAX/MIN mode | |
| T(ASC 52H) | TIME button | |
| C(ASC 43H) | C/F button | |
| U(ASC 55H) | Dump all memory of thermometer | return 32768 bytes |
| P(ASC 50H) | Load recorded data | |

- **Command K:** Return 4 bytes. For example, when sending command "K" to the meter, it will return "3","0","6", ASCII(13) .
- **Command U:** Return 32768 bytes .
- **Command P:** Instead of returning all 32768 bytes, it only return recorded data .
- **Command H:** Equivalent to one pushing on the HOLD button and no message is returned.
- **Command M:** Equivalent to one pushing on the MAX/MIN button and no message is returned.
- **Command N:** Equivalent to one pushing and hold the MAX/MIN button for two seconds to exit MAX/MIN mode.
- **Command T:** Equivalent to one pushing on the TIME button and no message is returned.
- **Command C:** Equivalent to one pushing on the °C/°F button and no message is returned.
- **Command A:**

1st BYTE:

The first byte is the start byte , it value is 2.

2nd BYTE:

| bit7 | bit6 | bit5 | bit4 | bit3 | bit2 | bit1 | bit0 |
|------|---------|------|------|------|---------|------|------|
| C/F | Low Bat | Hold | | TIME | MAX/MIN | | REC |

bit 0: 1→recording mode, 0→not recording

bit 2 bit 1:

- 0 0 →Normal mode
- 0 1 →MAXIMUM mode
- 1 0 →MINIMUM mode
- 1 1 →calculate MAX/MIN in background mode .

bit3: 1→Indicates the LCD is displaying time.

bit4: no use

bit5: 1→HOLD, 0→not HOLD

bit6: 1→LOW BATTERY , 0→BATTERY NORMAL

bit7: 1→°C 0→°F

3th BYTE:

| | | | | | | | |
|----------------|-------------|------------|------|------|------------|------|------|
| bit7 | bit6 | bit5 | bit4 | bit3 | bit2 | bit1 | bit0 |
| Auto Power Off | memory full | resolution | sign | OL | resolution | sign | OL |

bit0: 1→T1 is OL, 0→not OL

bit1: 1→T1 value is minus, 0→T1 value is plus.

bit2: 1→4th byte and 5th byte represent ####, 0→4th byte and 5th byte represent ###.#

bit3: 1→T2 is OL, 0→not OL

bit4: 1→T2 value is minus, 0→T2 value is plus.

bit5: 1→8th byte and 9th byte represent ####, 0→8th byte and 9th byte represent ###.#

bit6: 1→Memory is full. 0→Memory is not full.

bit7: 1→Auto power off enabled. 0→Auto power off disabled.

4th BYTE: first two BCD code of T1 value.

5th BYTE: last two BCD code of T1 value

6th BYTE:

If bit3 of 2nd BYTE =0 : first two BCD code of T1-T2 value.

If bit3 of 2nd BYTE =1 : two BCD code of month.

7th BYTE:

If bit3 of 2nd BYTE =0 : last two BCD code of T1-T2 value.

If bit3 of 2nd BYTE =1 : two BCD code of day.

8th BYTE:

If bit3 of 2nd BYTE =0 : first two BCD code of T2 value.

If bit3 of 2nd BYTE =1 : two BCD code of hour.

9th BYTE:

If bit3 of 2nd BYTE =0 : last two BCD code of T2 value.

If bit3 of 2nd BYTE =1 : two BCD code of minute.

10th BYTE: end byte, it value is 3, 1st and 10th are used to check frame error.

Appendix: Thermo couple probe specification

| Model | Range | Tolerances | Description |
|------------|----------------|--------------------|--|
| TP-K01 | -50°C to 200°C | ±2.2°C or ±0.75% | with Teflon tape insulation Maximum insulating temperature : 260°C |
| Bead probe | -58°F to 392°F | (±3.6°F or ±0.75%) | |

TP-K01:

probe for general condition measurements, especially for complex and hard to reach places.



V. Setup ThermoLog (Thermo DataLogger)—RS232 interface software:

• The ThermoLog package contains:

1. Two 3.5" diskettes
2. Custom designed RS232 cable for ThermoLog.

• System Required:

Windows 95 or Windows 98 or Windows NT 4.0 above.

• Minimum Hardware Required:

486-100 MHz PC compatible , 16 MB RAM ;
At least 5 MB hard disk space available to install ThermoLog program. Recommended display resolution is 800X600.

• Install ThermoLog:

1. We recommend to close all other applications before installing ThermoLog software.
2. Insert setup diskette 1 to floppy disk drive.
3. Choose the Start button on the Taskbar and select Run.
4. Type A:\SETUP and choose OK, then it will copy ThermoLog.exe (executable file) and help file to your hard disk (default is c:\program files\ThermoLog).

For other operation instruction, please refer to the on-line help while executing ThermoLog.

Main Menu

Link Test :

Open Link Test window to search for thermometer connected to PC. When you start the ThermoLog, this window will display first and search for thermometer. The result will be shown in the text box.

Control Panel:

By opening the Control Panel Window, the user can control thermometer via the button in this window.

DataLogger:

By opening the DataLogger Window, the user can load the recorded data from thermometer.

Tabular:

By opening the Tabular window, the present data from the thermometer will be listed in a scrolling table. This data can be stored as a file or the table can be copy to other software such as EXCEL for further analysis.

Graph:

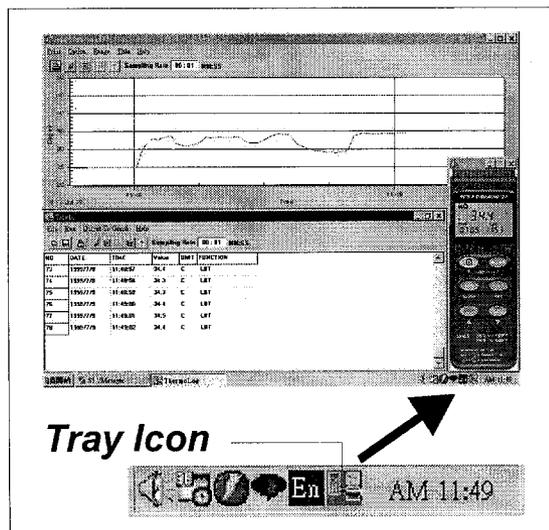
Open Real-Time Graph window to show the present data in graph.

Exit:

Terminates ThermoLog program.

Tray Icon:

When ThermoLog is running , there will be an icon displayed on the Windows Tray area (see figure below), you can click this icon then it will show a pop-up menu.



Service Information

Warranty Service: Please return the product in the original packaging with proof of purchase to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device.

Non-Warranty Service: Return the product in the original packaging to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device. Customers not on open account must include payment in the form of a money order or credit card. For the most current repair charges contact the factory before shipping the product.

Return all merchandise to B&K Precision Corp. with pre-paid shipping. The flat-rate repair charge includes return shipping to locations in North America. For overnight shipments and non-North America shipping fees contact B&K Precision Corp..

B&K Precision Corp.
 1031 Segovia Circle
 Placentia, CA 92870
 Phone: 714- 237-9220
 Facsimile: 714-237-9214
 Email: service@bkprecision.com

Include with the instrument your complete return shipping address, contact name, phone number and description of problem.

Limited one-Year Warranty

B&K Precision Corp. warrants to the original purchaser that its product and the component parts thereof, will be free from defects in workmanship and materials for a period of one years from the date of purchase.

B&K Precision Corp. will, without charge, repair or replace, at its' option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form of a sales receipt.

To obtain warranty coverage in the U.S.A., this product must be registered by completing and mailing the enclosed warranty card to B&K Precision Corp., 1031 Segovia Circle, Placentia, CA 92870 within fifteen (15) days from proof of purchase.

Exclusions:
 This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alternations or repairs. It is void if the serial number is alternated, defaced or removed.

B&K Precision Corp. shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

Model Number: _____

Date Purchased: _____