Instruction Manual

Single-Input Data Logging Thermistor Thermometer
(Model 91428-06)

DIGI-SENSE.

68X001353 Rev0 0717 1065DGMAN_91428-06

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1. INTRODUCTION

This versatile handheld instrument provides highly accurate temperature measurements. The instrument is designed for easy operation and includes the following features:

- Menu driven setup and operation
- Data logging for up to 2000 points
- USB output
- Operator selection of Celsius or Fahrenheit scale
- Resolution of up to 0.01°C/°F
- Large backlit LED and dot-matrix graphic LCD display
- Hold feature for temporarily retain a reading
- Displays minimum and maximum and average readings
- Field calibration capability
- Disabling of auto-off function
- Low-battery warning
- Bayonet connector input

2. SAFETY PRECAUTIONS

WARNING:

1. This instrument is designed to accept low level signals supplied by standard thermistors. Under NO circumstances should the input voltage exceed the specified 50V RMS.
2. To prevent ignition of a hazardous atmosphere, batteries must only be changed in an area known to be nonhazardous.

CAUTION:

1. Do not use or store this instrument in microwave ovens or any abnormally hot or cold areas.
2. Weak batteries should not be left in the instrument. Dead batteries can leak and cause damage to unit.

DANGER:

1. Voltages present at the thermistor may also be present at the battery terminals. Always disconnect the thermistor when changing batteries.

3. SPECIFICATIONS

Thermistor Thermometers

Type	Temperature range
400 series	–40 to 150°C
	(–40 to 302°F)

Out-of-range display: OPEN

Resolution:
0.01 or 0.1 °F/°C; auto-ranging to 0.1° above +99.99°

Accuracy:
From –40.00 to 99.99°F (–40.00 to 99.99°C): ±0.06°F (±0.03°C)
From 100.0 to 257.0°F (100.0 to 125.0°C): ±0.1°F (±0.1°C)
From 257.0 to 302.0°F (125.0 to 150.0°C): ±0.9°F (±0.5°C)

Display:
Backlit dot matrix, 50mm x 37.2mm

Data logging:
2000 points

Logging interval:
2 sec to 60 min

Min/Max/Avg function:
Yes

Auto off (adjustable time):
Enable/disable option available

Stability criteria:
Yes, upon stability of 5 seconds

Display update rate:
0.6 second per update

Input:
One bayonet connector

Input protection:
50V rms

Storage temperature:
–40°C to 65°C (–40°F to 149°F)

Humidity:
10% to 90% RH (noncondensing)

Battery life:
Size: Three AA, 1.5V; alkaline
Life: 400 hours continuous, typical, (without backlighting)

Dimensions:
Without armor:
175mm (L) x 97mm (W) x 42mm (H)
With armor:
180mm (L) x 102mm (W) x 52mm (H)

Weight with batteries:
Without armor: 267g
With armor: 362g

Ingress protection:
Meets IEC-529 IP-54 for dust and water resistant enclosures (probe attached)

CE Compliance:
EN61326-1/A1: 1998 (EU EMC Directive)

4. BATTERY INSTALLATION AND REPLACEMENT

The total battery life without backlighting is about 400 hours. Remaining battery power is indicated but the battery life indicator.

Indicator	Voltage
 Cell + 3 bars	More than 4.1 V
 Cell + 2 bars	More than 3.6 V
Cell + 1 bars	More than 3.0 V
Cell + empty bars flashing	More than 2.85 V
Adaptor power supply	Main power supply connected
USB power supply	USB power connected

Selected settings are stored in memory and will remain in memory even after power is turned off, or while batteries are being replaced.

1. Before changing battery, turn instrument off and disconnect thermistor.
2. Loosen screw and lift battery cover off back of case.
3. Remove the three AA batteries.
4. Insert three new batteries observing polarity.
5. Install cover and tighten screw.

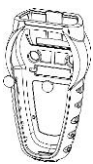
5. INSERTING AND REMOVING RUBBER ARMOR

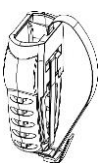
1. To insert thermometer into the optional rubber armor, slide in from the top of meter before pushing the bottom edges of meter down to set it into position. Lift up the stand at the back of meter for bench top applications if necessary.

2. To remove thermometer from armor, push out from the bottom edges of meter until it is completely out of boot.

6. ASSEMBLING OPTIONAL HANDS-FREE ACCESORIES

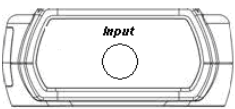
You can use the optional magnets and strap in the Hands-Free Kit accessories for hands-free operations.





7. CONNECTING A THERMISTOR

Use the correct 400 series thermistor for your instrument. Using an incorrect probe type will result in erroneous readings. Insert the bayonet plug into the mating connector on the top of the instrument.



If no probe is connected the display will read “open”.

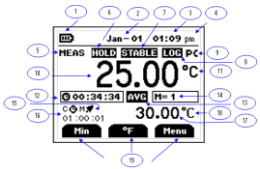
Thermistors are sensitive at the tip or sensing element. When taking measurements, allow time for the reading to stabilize. Multiplying the time constant of the probe by 5 will give you the approximate time required.

8. KEY FUNCTIONS

F1	Step through Min, Max and Avg readings.
F2	Toggle between F and C display
F3	Toggle between menu and measure mode
hold	Freeze display
on/off light	Turns meter on and off (press and hold for 3 seconds to turn off) Press momentarily to turn on backlight
recall▲	Recalls and steps through stored readings
log▼	Stores current measured value to memory

Note: Function keys change in setup mode to provide advanced operation flexibility. Text above key will indicate function.

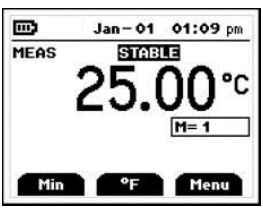
9. DISPLAY OVERVIEW



The dot matrix display features a large primary display, smaller secondary displays for channel info or min/max/avg, and helpful annunciators for added measurement data.

1	Power supply indicator (Battery/Main adapter/USB)
2	Date (format of mmm – dd)
3	Time (hour:min)
4	Time format (am/pm/hrs)
5	Measurement mode
6	Hold function indicator
7	Stable indicator
8	Data logging indicator
9	PC data logging indicator
10	Main reading display
11	Current reading unit indicator
12	Min/Max/Avg elapsed time
13	Current Min/Max/Avg reading indicator
14	Meter logging memory location
15	Measurement alarm active indicator
16	Countdown time indicator with countdown time
17	Min/Max/Avg display
18	Min/Max/Avg unit indicator
19	Function keys

10. MEASUREMENT MODE



On initial start-up, the meter will display the measured value for in the primary display.

Pressing the **F2** key will toggle reading between F and C display.

Pressing the **F1** key initiates and toggles through Minimum, Maximum, and Average reading modes.

Pressing **F3** enter accesses Setup mode.

11. HOLD FUNCTON

Press the **hold** key to retain the reading on the display. Press the **hold** key again for normal operation.

12. MIN, MAX, and AVE FUNCTION

Press the **F1** key to toggle between the minimum, maximum, and average readings. The minimum and maximum reading function is ideal for monitoring unattended operations while continually displaying every temperature change that occurs. The minimum and maximum values are sensed and automatically stored.

To exit and clear this function, press the **F3** to access the Menu functions.
See the Clear Reset menu section for more details.

13. DATA LOGGING

Press the **log** ▼ key to store the current reading to memory. The memory indicator M = 1234 shows the memory location for the next stored reading.

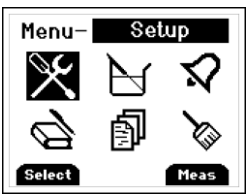
Press the **recall** ▲ key to review stored readings.

See section on Data Logging for timed logging, and logging to a computer.

See section on Clear/Reset for information on clearing stored readings.

14. SETUP MODE

To access the setup mode from measurement mode, press the ***F3*** key (Menu).



Press ▲▼ keys on the meter key pad to scroll through options.

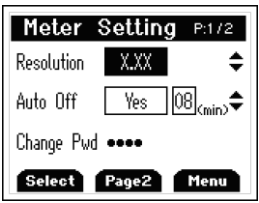
To enter a setup screen, press Select ***F1*** key.

To return to measurement mode, press Meas ***F3*** key. Following menu options are listed

1. General Setup
2. User field calibration
3. Alarm settings
4. Data logging settings
5. View user calibration report
6. Clear/Reset options

15. GENERAL SETUP SCREEN

The first page of the General Setup screens let you set Resolution, auto-off time, and password.



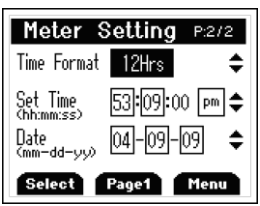
Press ***F1*** to indicate you want to change the setting of the current parameter or recall▲ or log▼ to move to the next parameter.

Press **recall▲** or **log▼** to change the options.

Press **F2** to choose the next setting. Whenever set the options, press **F1** for accepting the choice.

This screen below is used to reset/change password. In the event if uses forget his/her password, 5586 can be used to reset to a new value.

On the second page, you can set time and date.



16. CALIBRATION SCREEN

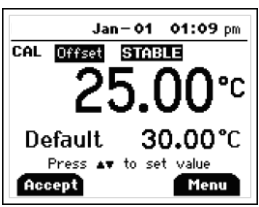
The thermometer is factory calibrated and does not require calibration before use. The Calibration function allows single-point calibration of the thermometer, at any temperature point to compensate for thermistor off-set error. It is NOT necessary to perform a field calibration to obtain specified meter accuracy. Use the field calibration feature to improve thermometer/probe accuracy or to compensate for thermistor drift.

Before go into the calibration mode, must enter the password. Press F2 to change to the next digit. (Default Password is 9900).

There are two calibration options:

Offset – adjusts at a single point. Offset calibration can be performed at any temperature in the offset range of ±5.00°C or 9.00°F.

Slope – adjusts at two points. The two calibration points must be at least 20.00°C (36.00°F) apart. The 2nd calibration point should be at a higher value than the 1st calibration point.

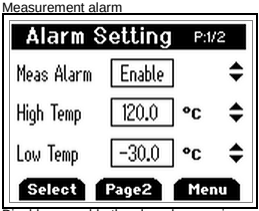


Use the ▲ or ▼ keys to adjust the value to match known temperature standard. Press ***F1*** to accept.

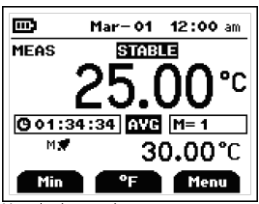
17. ALARMS SCREEN

There are two kind of alarm setting is available under the alarm setting options

Measurement alarm



Disable or enable the alarm by pressing recall▲ or log▼and F1 to accept. Increase or decrease individual limit by pressing recall▲ or log▼.

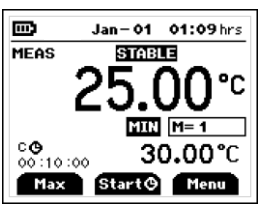


Meter in alarm mode

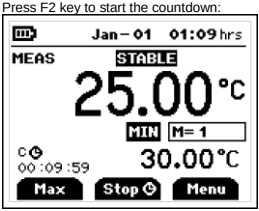
Countdown alarm

You can enable/disable the countdown alarm and set the countdown time from 5 sec to 1 hour.

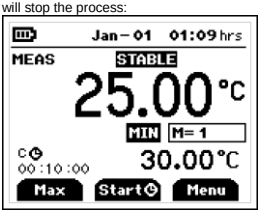
After setting (enabling) the countdown alarm, the measurement screen should look like this:



Press F2 key to start the countdown:

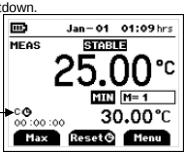


Press F2 key in the middle of a countdown will stop the process:



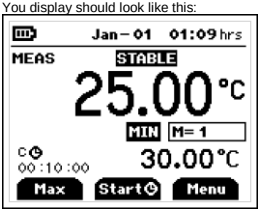
You will need to restart the countdown by selecting the “start” key (F2). Alternatively, you can also choose “Menu” to go into the timer menu and disabling the alarm.

The buzzer will sound for 30 seconds, or until the reset (**F2**) is pressed, at the end of the countdown.



Flashing annunciator indicates that the countdown has expired

To reset the timer, select “restart” (F2) it. You display should look like this:



To repeat the functions, select F2.

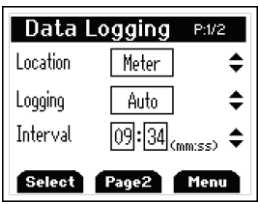
Note:
The °C/°F function is disabled when the count down function is enabled. To activate the °C/°F function on measurement screen, please go into the

“Alarm Setting page 2” and disable the count down alarm function.

When activated, the countdown timer temporarily over-rides the Auto-shutoff until the countdown is completed or manually stopped. If the meter is manually or auto shutoff,

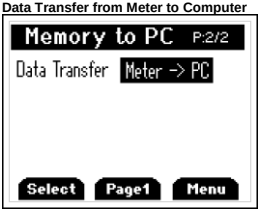
The Countdown Alarm is automatically reset to “Disable” each time the meter is shut off. The “Timer” key will revert back to the “°C/°F” key.

18. DATA LOGGING SCREEN



Press recall▲ or log▼to choose the logging methods as auto or manual. If it is auto logging, using recall▲ or log▼to set time interval. Its range is from 0 min to 60 min.

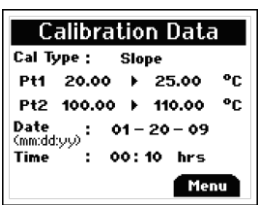
Data Transfer from Meter to Computer



Once the USB connection is established with PC, press the Start button to download data from Meter to PC using HyperTerminal.

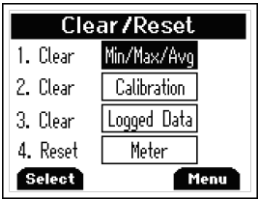
*****NOTE: METER MUST BE TURNED ON PRIOR TO CONNECTING USB CABLE OR COMPUTER MAY NOT RECOGNIZE THE INSTRUMENT.*****

19. CALIBRATION REPORT SCREEN



The Calibration report will show the time and date along with results of the last user calibration.

20. CLEAR / RESET SCREEN



Press F1 to choose which data you want to clear or reset. For calibration, logged data and reset all, you will have to enter the password to proceed. (Default Password is 9900).

21. MAINTENANCE

Properly used, the thermometer should maintain calibration indefinitely and not require service other than occasional cleaning of the housing and changing of the batteries.

22. CLEANING

WARNING:
TO PREVENT IGNITION OF A HAZARDOUS ATMOSPHERE BY ELECTROSTATIC DISCHARGE, CLEAN WITH DAMP CLOTH.

Do not clean with abrasives or solvents. Use mild detergents, never immerse nor use excessive fluid.

23. BATTERIES

If there is no display when the meter is turned on, check condition of the three AA batteries. Also check that the battery terminals are clean and batteries are properly installed.

If replacement is necessary, refer to the BATTERY INSTALLATION AND REPLACEMENT section for replacement procedure.

24. TROUBLE SHOOTING

The following chart lists the most probable faults. There are no internal adjustments or user-replaceable parts.

FAULT	ACTION
NO Display	Check condition of batteries. Check that batteries are inserted properly.
Display shows OPEN	No thermistor connected in the connector.
Display shows Err	If display shows this message other than during the field calibration mode, please return the instrument for servicing
Cannot connect to PC	Ensure that the meter is powered on and measuring prior to connecting to USB port. Before and after the driver is installed, your PC may not recognize the meter if it is not powered on prior to connecting the USB to the computer.

25. ACCESSORIES

Replacement Meter and Meter Accessories

Item	Part Number
Single-input data logging thermistor thermometer	91428-06
Rubber armor with stand	35427-80
Hands-free kit (two magnets and a strap)	35427-85
General-purpose probe (Immersion into liquids)	08491-06
Flexible general-purpose probe (vinyl sheath)	08491-02
USB cable	35427-86
Adapter, 100 to 240 VAC	91427-99

26. WARRANTY

The Manufacturer warrants this product to be free from significant deviations from published specifications for a period of **three years**. If repair or adjustment is necessary within the warranty period, the problem will be corrected at no charge if it is not due to misuse or abuse on your part as determined by the Manufacturer. Repair costs outside the warranty period, or those resulting from product misuse or abuse, may be invoiced to you.

27. PRODUCT RETURN

To limit charges and delays, contact the seller or Manufacturer for authorization and shipping instructions before returning the product, either within or outside of the warranty period. When returning the product, please state the reason for the return. For your protection, pack the carefully and insure it against possible damage or loss. The Manufacturer will not be responsible for damage resulting from careless or insufficient packing.

28. INNOCAL® CALIBRATION AND REPAIR SERVICES

Optimum performance of your temperature-measuring instrument is not a timeless condition. To ensure quality measurements, have your instrument calibrated regularly. Trust InnoCal to satisfy your calibration and equipment repair needs. With over a decade of service, we've helped thousands of customers meet ISO, FDA, EPA, GLPs/cGMPs and other quality standards.

Conformity*
ISO/IEC 17025:2005 accredited
NIST Handbook 150, 2000 Edition
ANSI/NCSL Z540-2-1997
NIST Technical Note 1297
ISO 9000:2000

Fast Service
Our substantial inventory of replacement parts ensures a fast turnaround and prevents costly downtime. Most instruments serviced in five business days!

Excellent Value
Get quality at a fair price. Our InnoCal NIST-traceable certificates offer extensive test data on a broad range of measurement parameters without breaking the bank!

Reliable Support

Trust in our free diagnostic support and troubleshooting advice. Our factory-trained metrologists and technicians are armed with years of experience and extensive technical data.

Convenient Reminders

It's so easy to keep your instruments functioning properly. Based on your requirements, InnoCal will send you a reminder when it's time to recertify or service your instrument.

We provide you with the documentation you need to meet your most stringent quality requirements for the control of inspection, measuring, and test equipment.

Certification includes certificate of calibration with test data, including:

- Description and identification of the item certified
- Condition of the item
- Issue date
- Identification of calibration procedure
- Calibration date
- As found/as left test data (where applicable)
- Signature of technician
- Statement of estimated uncertainty
- List of equipment used to perform calibration (including their calibration dates)

With today's high quality standards such as ISO 9000, certification is becoming increasingly important. Traceability is not a timeless condition. It must be verified and maintained over the life of the calibration to ensure the highest accuracy possible. When you have your calibration done by InnoCal, we will send you an automatic reminder when it is time to recalibrate your instrument.

Are your calibration certificates good enough?

InnoCal surpasses the competition by providing the most complete certificates as required by NIST. All of our certificates include measured data and point-by-point measurement uncertainty, and by request, we'll provide test accuracy and test uncertainty ratios at no extra cost. Call us today and see why InnoCal is The Choice of Quality.

*See our Scope of Accreditation for any limitations.

Calibration test points against NIST-traceable standards	Meter only	Probe only	System (meter + probe)*
Four test points across range of instrument. 0, 100, 165, 230 C (-4, 32, 446, 770F)	17000-06	17001-06	17002-06

InnoCal—The Choice of Quality
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