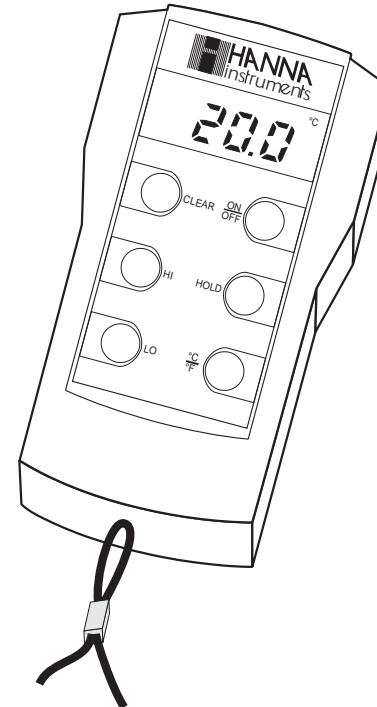


Instruction Manual

HI 93501 - HI 93502 HI 93503 - HI 93510 Portable Microprocessor Thermistor Thermometers



PRINTED IN ITALY

MAN93R2
03/97



<http://www.hannain.com>



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These Instruments are in
Compliance with the CE Directives


Dear Customer,
 Thank you for choosing a Hanna product.
 Please read this instruction manual carefully before using the instrument.
 This manual will provide you with the necessary information for a correct use of the instrument, as well as a more precise idea of its versatility. If you need additional technical information, do not hesitate to e-mail us at techserv@hannacan.com.
 These instruments are in compliance with the **CE** directives EN 50081-1 and EN 50082-1.

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 **HANNA** ISO 9000 Certified
 instruments Company since 1992

CE DECLARATION OF CONFORMITY

	
 DECLARATION OF CONFORMITY	
We Hanna Instruments Srl V.le delle industrie 12 35010 Ronchi di Villafranca (PD) ITALY	
herewith certify that the thermometers HI 93501 HI 93502 HI 93503 HI 93510	
have been tested and found to be in compliance with the following regulations:	
IEC 801-2 IEC 801-3 EN 55022	Electrostatic Discharge RF Radiated Radiated, Class B
Date of Issue: <u>02-10-1995</u>	 D. Volpato - Engineering Manager On behalf of Hanna Instruments S.r.l.

Recommendations for Users

Before using these products, make sure that they are entirely suitable for the environment in which they are used.

Operation of these instruments in residential area could cause unacceptable interferences to radio and TV equipments, requiring the operator to take all necessary steps to correct interferences.

Any variation introduced by the user to the supplied equipment may degrade the instruments' EMC performance.

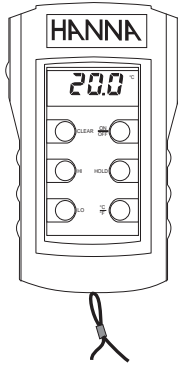
To avoid electrical shock, do not use these instruments when voltages at the measurement surface exceed 24VAC or 60 VDC.

To avoid damages or burns, do not perform any measurement in microwave ovens.

SHOCKPROOF RUBBER BOOTS

These rubber boots are specially made to prolong the life of your instruments and to prevent damages due to bangs and falls. They measure 155 x 90 x 45 mm (6.1x3.5x1.8") and are available in two colors for your convenience:

- HI 710007 = blue colored
- HI 710008 = orange colored.



OTHER ACCESSORIES

- HI 710004 Soft carrying case (for meter only)
- MANL93R2 Instruction manual

WARRANTY

All Hanna Instruments meters are warranted for two years against defects in workmanship and materials when used for their intended purpose and maintained according to instructions. The probes are warranted for a period of six months.

This warranty is limited to repair or replacement free of charge.

Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered.

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure.

First obtain a Returned Goods Authorization number from the Customer Service department, then return the instrument with the Authorization # included along with shipment costs prepaid.

If the repair is not covered by the warranty, you will be notified of the charges.

When shipping any instrument, make sure it is properly packaged for complete protection.

To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it to make sure that no damage has occurred during shipping. If there is any damage, notify your Dealer or the nearest Hanna Customer Service Center.

Note: Save all packing material until you are sure that the instrument functions correctly. All defective items must be returned in the original packing with the supplied accessories.

GENERAL DESCRIPTION

HI 93501, HI 93502, HI 93503 and HI 93510 are powerful and flexible instruments which have been designed using the latest microprocessor technology to provide you with reliable and accurate measurements.

Standard features include interchangeable probes, low battery detection, auto-off capability, long battery life and two year warranty.

HI 93501, HI 93502, HI 93503 have been designed specifically by Hanna Instruments for use in the food industry.

HI 93501, HI 93503, HI 93510 come supplied complete with a temperature probe and a 9V battery.

HI 93502 is supplied with a 9V battery.

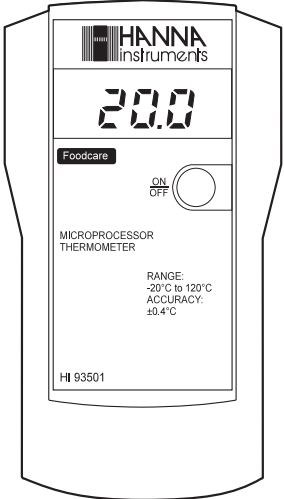
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Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice.

SPECIFICATIONS OF HI 93501

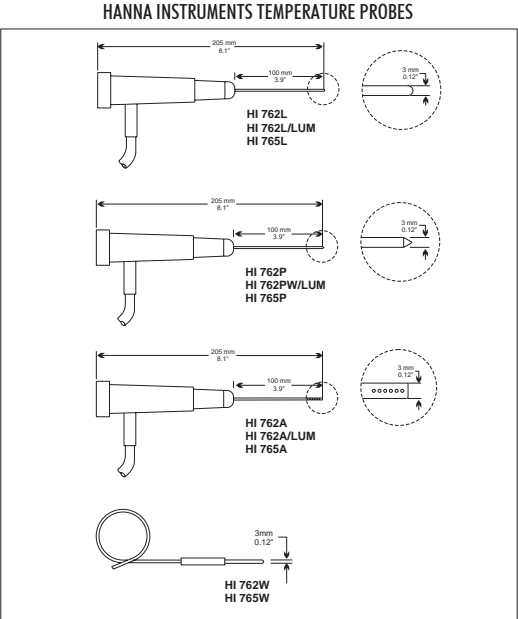
Main features:

- Interchangeable HI 762 probes
- Interchangeable HI 762 calibration test plugs
- Range -20 to +120°C
- Display of temperature in Celsius
- Low battery detection
- Auto-off capability



SPECIFICATIONS	
Range	-20.0 to 120.0°C
Resolution	0.1°C
Accuracy (@20°C/68°F)	±0.4°C (-20 to 80°C) ±0.4% of Full Scale (outside) for one year, excluding probe error
Typical EMC Deviation	±0.4°C with HI 762PW probe
Battery	9 Volt battery, 1000 hours of continuous use
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Dimensions	143 x 80 x 38mm (5.6 x 3.2 x 1.5")
Weight	320 g (11.3 oz.)

- HI 765L/10 General purpose liquid probe, with 10 m (33') cable and white handle
- HI 765PBL Penetration probe with 1 m (3.3') cable and blue handle
- HI 765PBL/10 Penetration probe with 10 m (33') cable and blue handle
- HI 765PG Penetration probe with 1 m (3.3') cable and green handle
- HI 765PG/10 Penetration probe with 10 m (33') cable and green handle
- HI 765PR Penetration probe with 1 m (3.3') cable and red handle
- HI 765PR/10 Penetration probe with 10 m (33') cable and red handle
- HI 765PW Penetration probe with 1 m (3.3') cable and white handle
- HI 765PW/10 Penetration probe with 10 m (33') cable and white handle
- HI 765W Wire probe without handle for hard-to-reach places with 1 m (3.3') cable
- HI 765W/10 Wire probe without handle for hard-to-reach places with 10 m (33') cable



- HI 762L/10 General purpose **liquid** probe, with 10 m (33') cable and **white** handle
- HI 762PBL **Penetration** probe with 1 m (3.3') cable and **blue** handle
- HI 762PBL/10 **Penetration** probe with 10 m (33') cable and **blue** handle
- HI 762PG **Penetration** probe with 1 m (3.3') cable and **green** handle
- HI 762PG/10 **Penetration** probe with 10 m (33') cable and **green** handle
- HI 762PR **Penetration** probe with 1 m (3.3') cable and **red** handle
- HI 762PR/10 **Penetration** probe with 10 m (33') cable and **red** handle
- HI 762PW **Penetration** probe with 1 m (3.3') cable and **white** handle
- HI 762PW/10 **Penetration** probe with 10 m (33') cable and **white** handle
- HI 762W **Wire** probe without handle for **hard-to-reach** places with 1 m (3.3') cable
- HI 762W/10 **Wire** probe, without handle for **hard-to-reach** places with 10 m (33') cable

FOR HI 93502 ONLY

- HI 762A/LUM **Air** probe, with 1 m (3.3') cable and **white** handle, Lumberg connector
- HI 762BP/T/LUM Frozen Food **between pack** probe, with 1 m (3.3') cable and **white** handle, Lumberg connector
- HI 762L/LUM General purpose **liquid** probe, with 1 m (3.3') cable and **white** handle, Lumberg connector
- HI 762PW/LUM **Penetration** probe, with 1 m (3.3') cable and **white** handle, Lumberg connector

FOR HI 93503 ONLY

- HI 765A **Air** probe, with 1 m (3.3') cable and **white** handle
- HI 765A/10 **Air** probe, with 10 m (33') cable and **white** handle
- HI 765BL General purpose **liquid** probe, with 1 m (3.3') cable and **black** handle
- HI 765BL/10 General purpose **liquid** probe, with 10 m (33') cable and **black** handle
- HI 765L General purpose **liquid** probe, with 1 m (3.3') cable and **white** handle

SPECIFICATIONS OF HI 93502

Main features:

- LUMBERG socket for temperature probes
- Interchangeable LUMBERG probes
- Range -20 to +120°C
- Display of temperature in Celsius
- Low battery detection
- Auto-off capability

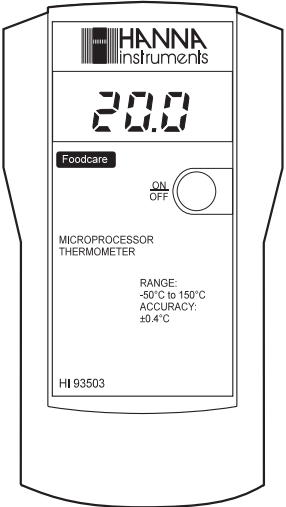


SPECIFICATIONS	
Range	-20.0 to 120.0°C
Resolution	0.1°C
Accuracy (@20°C/68°F)	±0.4°C (-20 to 80°C) ±0.4% of Full Scale (outside) for one year, excluding probe error
Typical EMC Deviation	±0.4°C with HI 762PW/LUM probe
Battery	9 Volt battery, 1000 hours of continuous use
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Dimensions	143 x 80 x 38mm (5.6 x 3.2 x 1.5")
Weight	320 g (11.3 oz.)

SPECIFICATIONS OF HI 93503

Main features:

- Interchangeable HI 765 probes
- Interchangeable HI 765 calibration test plugs
- Range -50 to +150°C
- Display of temperature in Celsius
- Low battery detection
- Auto-off capability



SPECIFICATIONS	
Range	-50.0 to 150.0°C
Resolution	0.1°C
Accuracy (@20°C/68°F)	±0.4°C (-20 to 80°C) ±0.3% of Full Scale (outside) for one year, excluding probe error
Typical EMC Deviation	±0.4°C with HI 765PW probe
Battery	9 Volt battery, 1000 hours of continuous use
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Dimensions	143 x 80 x 38mm (5.6 x 3.2 x 1.5")
Weight	320 g (11.3 oz.)

FOR HI 93503 ONLY

- HI 765-18C Calibration key, -18.0°C ±0.4°C
- HI 765000C Calibration key, 0.0°C ±0.4°C
- HI 765070C Calibration key, +70.0°C ±0.4°C



TEMPERATURE PROBES

Hanna offers a wide range of probes to meet your needs with air, liquid, penetration and surface measurements.

These probes use highly sensitive thermistor sensors which provide greater accuracy, faster response and wider temperature range than conventional probes.

All Hanna temperature probes are supplied pre-calibrated from the factory and are ready to be used with your meter. The probes are easily connected to your meter with a standard connector.

Completely interchangeable, these probes make it possible for you to switch from one probe to another without wasting time and money by going through tedious calibration procedures.

The Hanna probes are also available in different handle colors to avoid cross contamination during testing:

FOR HI 93501 AND HI 93510 ONLY

- HI 762A Air probe, with 1 m (3.3') cable and **white** handle
- HI 762A/10 Air probe, with 10 m (33') cable and **white** handle
- HI 762BL General purpose **liquid** probe, with 1 m (3.3') cable and **black** handle
- HI 762BL/10 General purpose **liquid** probe, with 10 m (33') cable and black handle
- HI 762L General purpose **liquid** probe, with 1 m (3.3') cable and **white** handle
- HI 762L/2 General purpose **liquid** probe, with 2 m (6.6') cable and **white** handle

DISPLAY CODE GUIDE

The following error messages, low battery detection warning and self-explanatory symbols are displayed to help the user:

DISPLAY	DESCRIPTION
Er	The probe is not connected to the instrument; the probe cable might be damaged: change the probe; the reading is out of range.
Eb	Weak battery: replace the battery.
HI 93510 only:	
°C	The readings are in Centigrade.
°F	The readings are in Fahrenheit.
M	Hold function is activated. press HOLD to return to current measurement
HI	Highest temperature is being displayed
LO	Lowest temperature is being displayed

CALIBRATION

All Hanna thermometers have been accurately pre-calibrated at the factory. It is generally recommended to have all thermometers recalibrated at least once a year. For an accurate recalibration, contact your nearest Hanna Customer Service Center.

FOR HI 93501, HI 93503 AND HI 93510 ONLY

Hanna Test Plugs provide a quick and easy way to check the meter's accuracy by simply connecting these Test Plugs to the probe connector of the meter. If the reading differs by more than $\pm 0.4^{\circ}\text{C}$ ($\pm 0.8^{\circ}\text{F}$) from the Test Plug value, the unit is due for recalibration.

Choose the right Test Plug to suit your needs:

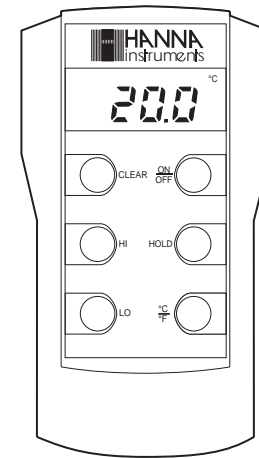
FOR HI 93501 AND HI 93510 ONLY

HI 762-18C	Calibration key, $-18.0^{\circ}\text{C} \pm 0.4^{\circ}\text{C}$
HI 762000C	Calibration key, $0.0^{\circ}\text{C} \pm 0.4^{\circ}\text{C}$
HI 762070C	Calibration key, $+70.0^{\circ}\text{C} \pm 0.4^{\circ}\text{C}$
HI 762-004F	Calibration key, $-0.4^{\circ}\text{F} \pm 0.8^{\circ}\text{F}$
HI 762032F	Calibration key, $+32.0^{\circ}\text{F} \pm 0.8^{\circ}\text{F}$
HI 762158F	Calibration key, $+158.0^{\circ}\text{F} \pm 0.8^{\circ}\text{F}$

SPECIFICATIONS OF HI 93510

Main features:

- Interchangeable HI 762 probes
- Interchangeable HI 762 calibration test plugs
- Range -50 to $+150^{\circ}\text{C}$ or -58 to 302°F
- Display of temperature in Celsius and Fahrenheit
- Hold function
- HI and LO (Max and Min) memory recall function
- Low battery detection
- Auto-off capability



SPECIFICATIONS

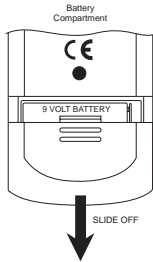
Range	-50.0 to 150.0°C -58.0 to $199^{\circ}\text{F}/200$ to 302°F
Resolution	$0.1^{\circ}\text{C} / 0.1^{\circ}\text{F} / 1^{\circ}\text{F}$
Accuracy (@ $20^{\circ}\text{C}/68^{\circ}\text{F}$)	$\pm 0.4^{\circ}\text{C}$ (-20 to 80°C) $\pm 0.8^{\circ}\text{F}$ (-4 to 176°F) $\pm 0.7\%$ of Full Scale (outside) for one year, excluding probe error
Typical EMC Deviation	$\pm 0.5^{\circ}\text{C} / \pm 1^{\circ}\text{F}$ with HI 762BL probe
Battery	9 Volt battery, 500 hours of continuous use
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Dimensions	$143 \times 80 \times 38\text{mm}$ ($5.6 \times 3.2 \times 1.5''$)
Weight	320 g (11.3 oz.)

OPERATIONAL GUIDE

INITIAL PREPARATION

Remove the battery cover located on the rear of your thermometer as shown here.

Remove the 9V battery. Unwrap the battery and connect it to the battery clips. Replace the battery and the cover.

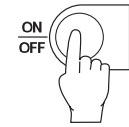


To switch on, press the ON/OFF key.

Your thermometer will carry out a self diagnostic test routine and the LCD will light up all segments.

The thermometer will then revert to the measurement mode.

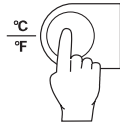
If a temperature probe is plugged in, the unit will display the temperature. If a probe is not plugged in, the display will show "Er".



To switch your thermometer off, press the ON/OFF key again.

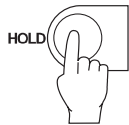
°C / °F SWITCH (HI 93510 ONLY)

Measurements can be performed in either Centigrade or Fahrenheit. To change the scale, press °C/°F. When the meter is turned on, it automatically defaults to the °C scale.



HOLD FUNCTION (HI 93510 ONLY)

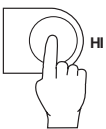
The hold function is activated by the HOLD key. The measured temperature is frozen on the display until as HOLD is pressed again. The blinking symbol "M" will appear on the display when the HOLD is in function to alert the user.



HI AND LO MEMORY (HI 93510 ONLY)

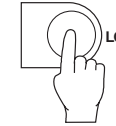
HI and LO memory recall keys make it possible to check and recall the maximum and minimum temperature measured since the meter was last switched on or CLEAR was pressed.

Once the HI key is pressed, the instrument will automatically display the highest temperature reached during the measurement together with the "HI" symbol.



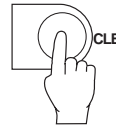
Release the key and the meter will return to normal operational mode.

Press and hold the LO key and the instrument will display the lowest temperature reached together with the "LO" symbol.



CLEAR HI AND LO MEMORY (HI 93510 ONLY)

HI and LO stored values can be erased by pressing the CLEAR key. The meter will restart memorizing the maximum and minimum values automatically.



LOW BATTERY DETECTION AND BATTERY REPLACEMENT

When the battery is low the user is warned by the symbol "Eb" on the display.



Battery replacement must only take place in a non-hazardous area using an alkaline 9V battery.

Remove the battery compartment cover and replace the 9V battery with a new one. Make sure the battery is properly connected before replacing the cover.

AUTO SHUT-OFF

To save battery life, you can have your thermometer switch itself off after 7 minutes. A switch is located in the battery compartment for this feature. Remove the battery cover and slide the switch across to the right to disable the thermometer's auto-off feature. If the switch is moved to the left, the meter will shut off automatically after 7 minutes of non-use.

