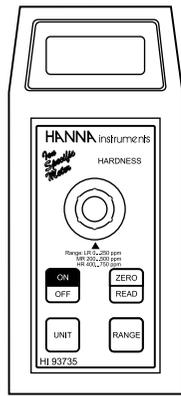


Instruction Manual

HI 93735 Hardness ISM



Dear Customer,

Thank you for choosing a Hanna product. This manual will provide you with the necessary information for the correct operation of the meter. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com.

This instrument is in compliance with CE directives EN 50081-1 and EN 50082-1.

PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipment. If there is any damage, notify your Dealer.

Each Ion Specific Meter is supplied complete with

- 9V Battery
- Two Sample Cuvets and Caps
- One Transport Cap
- Instruction Manual

Note: Conserve all packing material until the instrument has been observed to function correctly. Any defective item must be returned in its original packing.

GENERAL DESCRIPTION

The HI 93735 meter measures the total hardness in drinking, surface and wastewater.

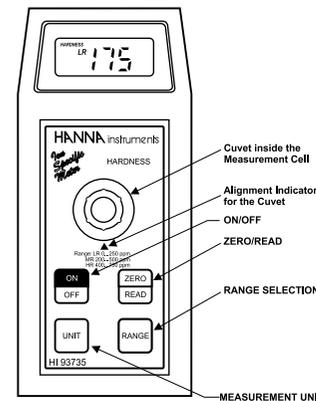
The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same place every time it is placed into the measurement cell.

The reagents are in liquid and powder form and are supplied in bottles and in packets. The amount of reagent is precisely dosed to ensure maximum repeatability.

Display codes aid the user in routine operations.

The meters have an auto-shut off feature that will turn the instrument off after 10 minutes of non-use.

SPECIFICATIONS



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Range	LR 0 to 250 ppm
	MR 200 to 500 ppm
	HR 400 to 750 ppm
Resolution	1 ppm from 0 to 100 ppm
	5 ppm from 100 to 750 ppm
Accuracy	LR ± 5 ppm or $\pm 4\%$ of reading, whichever is greater
	MR ± 7 ppm or $\pm 3\%$ of reading, whichever is greater
	HR ± 10 ppm or $\pm 2\%$ of reading, whichever is greater
Typical EMC Deviation	± 5 ppm
Light Source	Light Emitting Diode @ 470 nm
Method	Adaptation of the EPA recommended method 130.1. The reaction between calcium, magnesium and the reagents causes a red-violet tint in the sample
Light Detector	Silicon Photocell
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Battery Type/Life	1 x 9 volt/40 hours
Auto-Shut off	After 10' of non-use
Dimensions	180 x 83 x 46 mm (7.1 x 3.3 x 1.8")
Weight	290 g (10 oz.).

REQUIRED REAGENTS:

Code	Description	Quantity
HI 93735A-LR	Hardness Indicator reagent LR	9.5mL/test
HI 93735A-MR	Hardness Indicator reagent MR	9.5mL/test
HI 93735A-HR	Hardness Indicator reagent HR	9.5mL/test
HI93735B	Hardness Buffer reagent	2 drops
HI93735C	Fixing Reagent	1 packet

REAGENT SETS

- HI 93735LR Reagents for 100 tests LR (0 to 250 ppm)
- HI 93735MR Reagents for 100 tests MR (200 to 500 ppm)
- HI 93735HR Reagents for 100 tests HR (400 to 750 ppm)
- HI 93735-0 Reagents for 100 tests (0 to 750 ppm)

DISPLAY CODE GUIDE

50L This indicates that the meter is in a ready state and zeroing can be performed.

5IP Sampling in Progress. This prompt appears each time the meter is performing a measurement.

-0- This indicates that the meter is in a zeroed state and measurement can be performed.

200 Under range. A flashing value lower than the minimum concentration readable (see specifications) indicates that the sample absorbs less light than the zero reference. Check the procedure and make sure you use the same cuvet for reference (zero) and measurement.

500 Over range. A flashing value higher than the maximum concentration readable (see specifications) indicates that the sample absorbs too much light, meaning that the concentration is too high. Dilute the sample.

CAP Light over range. The cuvet is not inserted correctly and an excess ambient light is reaching the detector. If the cover is properly installed, then contact your dealer or the nearest Hanna Customer Service Center.

LO Light under range. The zero sample is too dark for proper zeroing. If this is not the case, contact your dealer or the nearest Hanna Customer Service Center.

2.50 The "LOW BATTERY" indicates that the battery voltage is getting low and the battery needs to be replaced.



WARRANTY

HI 93735 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions.

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. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization Number from the Customer Service department and then send it with shipment costs prepaid. 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.

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

OPERATIONAL GUIDE

MEASUREMENT PROCEDURE

- Turn the meter on by pressing ON/OFF.



- When the LCD displays "SCL", it is ready.



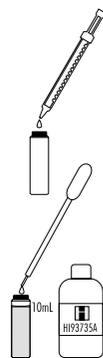
- The meter automatically defaults to Hardness Low Range (LR) measurement mode, with the "HARDNESS" and "LR" indications appearing on the LCD. Press the "RANGE" key to select the Medium Range (MR) or the High Range (HR) if needed. If the "RANGE" key is pressed while in HR mode, the meter returns to LR range.



- Using the syringe, add exactly 0.5mL of unreacted sample to the cuvet.

Note: for accurate results, fill the syringe with the sample up to the 1.0mL mark, then transfer 0.5mL to the cuvet.

- With the plastic dropper fill the cuvet up to the 10 mL mark adding the HI93735A indicator reagent appropriate to the selected range (e.g. HI93735A-LR if the range selected is LR).



Note: the liquid in the cuvet forms a convexity on the top; the bottom of this convexity must be at the same level of the 10mL mark.

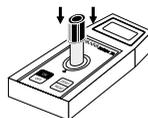
- Add 2 drops of HI93735B buffer reagent.



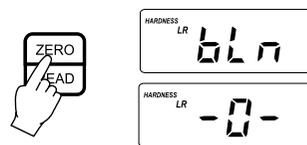
- Replace the cap and shake gently to mix.



- Place the cuvet into the holder and ensure that the notch on the cap is positioned securely into the groove.



- Press "ZERO/READ". The display will show a countdown prior to measurement. During measurement the "bLn" indication will be shown, then "-0-" will appear.

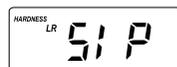


- Remove the cuvet and add the content of 1 packet of HI93735C fixing reagent.

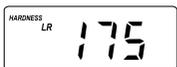
- Replace the cap and shake gently to mix.

- Reinsert the cuvet into the holder and ensure that the notch on the cap is positioned securely into the groove.

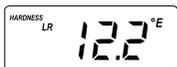
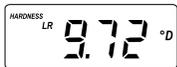
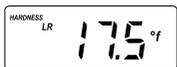
- Press "ZERO/READ". The display will show a countdown prior to measurement. During measurement the "SIP" indication will be displayed.



- The instrument directly displays the hardness in ppm of CaCO₃ on the Liquid Crystal Display.



- Press the "UNIT" key repeatedly to have the reading converted in °f, °D and °E respectively.



The conversion factors are as follows:

$$1 \text{ ppm} = 0.1 \text{ } ^\circ\text{f} = 0.05556 \text{ } ^\circ\text{D} = 0.07 \text{ } ^\circ\text{E}$$

- Press the "RANGE" key to have the meter ready for the next measurement.

INTERFERENCES

Interference may be caused by:
Excessive amounts of heavy metals

Note: if the sample is very acidic, some extra drops of HI93735B buffer reagent may be added.

TIPS FOR AN ACCURATE MEASUREMENT

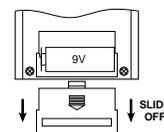
The instruction listed below should be carefully followed during testing to ensure best accuracy.

- Do not touch the cuvet walls with hands.
- In order to maintain the same conditions during the zeroing and the measuring phases, it is necessary to close the cuvet to prevent any contamination.
- Do not let the test sample stand too long after reagent is added or accuracy will be lost.
- Whenever the cuvet is placed into the measurement cell, it must be completely free of fingerprints, oil or dirt. Wipe it thoroughly with HI 731318 or a lint-free cloth prior to insertion.
- It is important that the sample does not contain any debris. This would corrupt the readings.
- It is possible to take multiple readings in a row, but a zero reading must be taken for each sample and it is recommended that the same cuvet is used for zeroing and measurement.
- It is important to discard the sample immediately after the reading is taken because the glass might become permanently stained.
- Shaking the cuvet can generate bubbles in the sample, causing higher readings. To obtain accurate measurements, remove such bubbles by swirling or by gently tapping the vial.

BATTERY REPLACEMENT

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

Simply slide off the battery cover on the back of the meter. Detach the battery from the terminals and attach a fresh 9V battery while paying attention to the correct polarity. Replace the battery and the cover.



ACCESSORIES

REAGENT SETS

- HI 93735LR Reagents for 100 tests LR (0 to 250 ppm)
- HI 93735MR Reagents for 100 tests MR (200 to 500 ppm)
- HI 93735HR Reagents for 100 tests HR (400 to 750 ppm)
- HI 93735-0 Reagents for 100 tests (0 to 750 ppm)

OTHER ACCESSORIES

- HI 710009 Blue rubber boot
- HI 710010 Orange rubber boot
- HI 721310 9V battery (10 pcs)
- HI 731318 Tissue for wiping cuvetts (4 pcs)
- HI 731321 Glass cuvetts (4 pcs)
- HI 731325 Caps for cuvetts (4 pcs)
- HI 93703-50 Cuvets cleaning solution (230 mL).

CE DECLARATION OF CONFORMITY



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