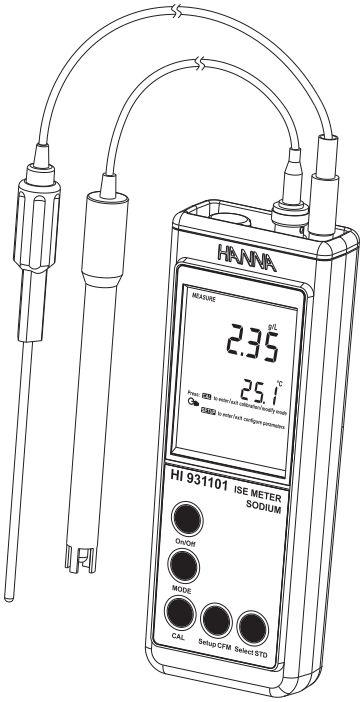
Instruction Manual

HI 931100 HI 931101 HI 931102

Accurate Sodium/Sodium Chloride and Temperature Meters



HANNA® instruments

www.hannainst.com

Dear Customer,

Thank you for choosing a Hanna Instruments product.

Please read this instruction manual carefully before using these instruments. This manual will provide you with the necessary information for correct use of these instruments, as well as a precise idea of their versatility.

If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com or view our worldwide contact list at www.hannainst.com.

WARRANTY

HI 931100, **HI 931101** and **HI 931102** are guaranteed for two years against defects in workmanship and materials when used for their intended purpose and maintained according to instructions. Electrodes and probes are guaranteed for six months. This warranty is limited to repair or replacement free of charge.

Damages due to accidents, misuse, tampering or lack of prescribed maintenance is 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 problem. 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 Technical Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packed for complete protection.

TABLE OF CONTENTS

PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully 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.

Each instrument is supplied with:

- Batteries (3 x 1.5V AAA)
- Instruction Manual
- Rugged Carrying Case

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

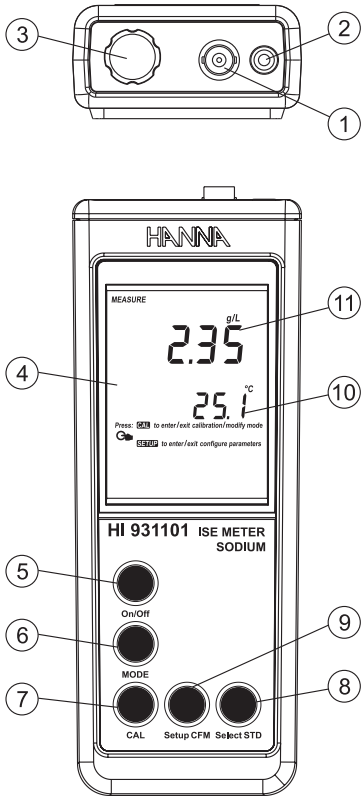
Hanna Instruments Sodium (**HI 931101**) / Sodium Chloride (**HI 931100**/ **HI 931102**) analyzers are state-of-the-art, hand held meters, designed to provide laboratory results and accuracy under harsh industrial conditions.

All meters come equipped with a large and easy-to-read LCD, which shows sodium/sodium chloride and temperature values simultaneously and guides the user through the calibration procedure with easy-to-follow graphic symbols.

In addition, **HI 931101** and **HI 931102** provide pNa or % NaCl readings respectively through the MODE key.

Automatic calibration, rundown batteries indicator and water-resistant housing are the features which make these meters easy to use and versatile both in the laboratory and in the field applications.

FUNCTIONAL DESCRIPTION



1) BNC electrode connector
2) Temperature probe socket
3) Battery holder cap
4) Liquid Crystal Display (LCD)
5) **On/Off** key, to turn the instrument ON and OFF.
6) **MODE** key, to select the range (**HI 931101**, **HI 931102** only)
7) **CAL** key, to enter/exit calibration mode.
8) **Select** key, to select setup item.
   STD key, to select calibration standard.
9) **Setup** key, to enter/exit SETUP mode.
   CFM key, to confirm calibration point.
10) Secondary LCD.
11) Primary LCD.

SPECIFICATIONS HI 931100

RANGE	0.150 to 1.500 g/L 1.50 to 15.00 g/L 15.0 to 150.0 g/L 150 to 300 g/L -20.0 to 120.0 °C (-4.0 to 248.0 °F)
RESOLUTION	0.001 g/L 0.01 g/L 0.1 g/L 1 g/L 0.1 °C (0.1 °F)
ACCURACY @ 20 °C / 68 °F	±5% of reading ±0.2 °C (±0.4 °F) excluding probe error
Calibration	Automatic, 1 or 2 point at 0.30 g/L (**HI 7085**) 3.00 g/L (**HI 7083**) 30.0 g/L (**HI 7081**)
Temperature compensation	fixed at 25 °C (77 °F)
Electrode	**FC300B** glass combination sodium-sensitive electrode (not included)
Temperature probe	**HI 7662** with 1 m (3.3') cable (not included)
Battery Type / Life	3 x 1.5V AAA batteries approx. 200 hours of continuous use
Dimensions	185 x 72 x 36 mm (7.3 x 2.8 x 1.4")
Weight (meter only)	300 g (10.6 oz.)
Environment	0 – 50 °C (32 – 122 °F) max. RH 100%
Warranty	2 years

SPECIFICATIONS HI 931101

RANGE	0.00 to 3.00 15.0 to 150.0 mg/L (ppm) 0.150 to 1.500 g/L 1.50 to 15.00 g/L 15.0 to 60.0 g/L -20.0 to 120.0 °C (-4.0 to 248.0 °F)
RESOLUTION	0.01 0.1 mg/L 0.001 g/L 0.01 g/L 0.1 g/L 0.1 °C (0.1 °F)
ACCURACY @ 20 °C / 68 °F	±0.05 ±5% of reading ±0.2 °C (±0.4 °F) excluding probe error
Calibration	Automatic, 1 or 2 point at 0.23 g/L (**HI 7087/HI 8087**) 2.3 g/L (**HI 7080/HI 8080**) 23.0 g/L (**HI 7086/HI 8086**)
Temperature compensation	fixed at 25 °C (77 °F)
Electrode	**FC300B** glass combination sodium-sensitive electrode (not included)
Temperature probe	**HI 7662** with 1 m (3.3') cable (not included)
Battery Type / Life	3 x 1.5V AAA batteries approx. 200 hours of continuous use
Dimensions	185 x 72 x 36 mm (7.3 x 2.8 x 1.4")
Weight (meter only)	300 g (10.6 oz.)
Environment	0 – 50 °C (32 – 122 °F) max. RH 100%
Warranty	2 years

SPECIFICATIONS HI 931102

RANGE	0.150 to 1.500 g/L 1.50 to 15.00 g/L 15.0 to 150.0 g/L 150 to 300 g/L 0.00 to 30.00 -20.0 to 120.0 °C (-4.0 to 248.0 °F)
RESOLUTION	0.001 g/L 0.01 g/L 0.1 g/L 1 g/L 0.01 0.1 °C (0.1 °F)
ACCURACY @ 20 °C / 68 °F	±5% of reading ±5% of reading ±0.2 °C (±0.4 °F) excluding probe error
Calibration	Automatic, 1 or 2 point at 0.30 g/L (**HI 7085**) 3.00 g/L (**HI 7083**) 30.0 g/L (**HI 7081**)
Temperature compensation	fixed at 25 °C (77 °F)
Electrode	**FC300B** glass combination sodium-sensitive electrode (not included)
Temperature probe	**HI 7662** with 1 m (3.3') cable (not included)
Battery Type / Life	3 x 1.5V AAA batteries approx. 200 hours of continuous use
Dimensions	185 x 72 x 36 mm (7.3 x 2.8 x 1.4")
Weight (meter only)	300 g (10.6 oz.)
Environment	0 – 50 °C (32 – 122 °F) max. RH 100%
Warranty	2 years

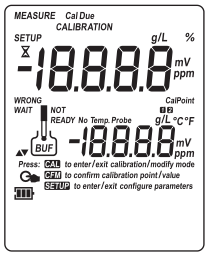
OPERATIONAL GUIDE

INITIAL PREPARATION

The instruments are supplied complete with batteries. For placing the batteries inside the meter, see page 14.

To prepare the instrument for use, connect the sodium sensitive electrode FC300B to the input socket on the top of the instrument. Connect the temperature probe to the temperature socket too. The temperature probe can be used independently to take temperature measurements. If the probe is disconnected, 25.0 °C (72.0 °F) is displayed with °C or °F symbol blinking.

Turn the instrument ON by pressing **On/Off**.



At start-up the display will show all the used segments for a few seconds (or while the button is held), followed by the percentage indication of the remaining battery life. The meter is now ready to operate.

After measurement switch the instrument off, and remove the electrodes. For a fast and accurate measurement, the electrode should be stored in a solution with a Na/NaCl concentration similar to the sample to be measured. Upper the rubber sleeve after use.

The auto-off feature turns the instrument off after a set period (default 20 min) to save battery life. To set another period or to disable this feature, see SETUP menu on page 11.

In order to take accurate measurements, make sure the instrument is calibrated before use (see page 11 for HI 931101 and page 13 for HI 931100 & HI 931102).

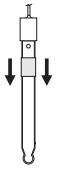
For greatest accuracy, calibration should be performed (or at least verified) every day for measurements taken in the same type of samples (e.g. cheese) or every time the sample type is changed (e.g. cheese, meat, sea water, etc.).

The best working temperature is around 20-25°C (68-77°F). For greater accuracy, perform the calibration of the meter with standard solution at a temperature as close as possible to the temperature of the sample (± 1°C/±2°F).

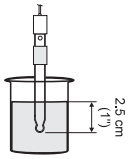
TAKING SODIUM MEASUREMENTS

Remove the protective cap of the **FC300B** sodium-sensitive electrode and, if possible, rinse it with some of the sample you are going to measure.

Lower the rubber sleeve to get the junction to work properly.

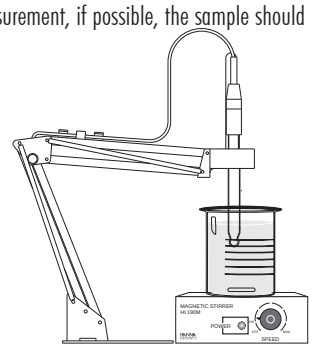


Immerse the tip of the **FC300B** electrode (2.5 cm/1" i.e. the electrode junction must be completely immersed) into the sample to be tested without touching the bottom of the beaker.



Wait for up to 10 to 15 minutes to allow for the electrode to adjust and stabilize, i.e. until there is no drifting for at least a couple of minutes.

During measurement, if possible, the sample should be gently stirred (100 rpm).

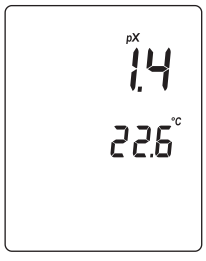


pNa (for HI931101) and NaCl% (for HI931102) measurements

Press the MODE key during measurement to convert the displayed value of **HI931101** to pNa.

$$pNa = -\log a_{Na}$$

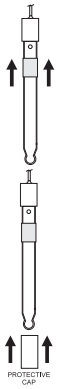
where a_{Na} is the activity of ion Na.



Press the MODE key during measurement to convert the displayed value of **HI 931102** to %.

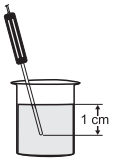
Press the same key to return to g/L measurements.

AFTER USE



Turn the meter off by pressing the ON/OFF key again.
For a faster and accurate measure, the electrode should be stored in a solution with a Na/NaCl concentration similar to the sample to be measured.
Upper the rubber sleeve after use.
For infrequent use (once a month or less) store the electrode dry. Before using it again, let it condition overnight in **HI7081/HI8081** (30.0 g/L NaCl) or **HI7086/HI8086** (23 g/L Na 1M).
To avoid very long response time, do not store or rinse the electrode with deionized water. Never rub or blot the electrode.

TEMPERATURE MEASUREMENT



The temperature can be measured independently.

- Immerse the temperature probe at least 1 cm (½") in the prepared sample.

- Wait for the reading to stabilize. The temperature of the solution will be shown on the lower part of the display.

Notes:
- If the temperature is out of range, the last range value will be displayed and the "°C" ("°F") tag will blink.
- If the temperature probe is not connected, the **25.0 °C** value will be displayed together with the blinking tags **"No Temp Probe"** and "°C" ("°F").

CALIBRATION

In order to obtain accurate measurements, frequent calibration is recommended.

For better results, calibrate at a temperature close to that of the solution to be tested (no more than ±3°C apart).

The instrument can be calibrated in 1 or 2 points. Two-point calibration is always recommended for better accuracy.

The user can select the calibration stability criteria in Setup menu in accordance with the application. "ACCU" - accurate is recommended.

Note: For best results, it is recommended to prepare two beakers for each calibration point: the first one to rinse the probes and the second one to calibrate.

Note: It is recommended to use clean plastic beakers.

Na CALIBRATION (HI 931101)

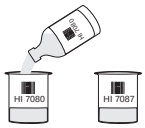
The calibration is performed by immersing the **FC300B** sodium-sensitive electrode in 2 different standard Na solutions to achieve accurate 2 point calibration.

It is also possible to calibrate just the offset (2.3 g/L Na) following the single point calibration procedure described below.

For best accuracy, a two-point calibration is recommended (see below).

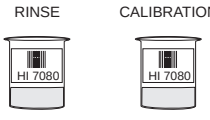
PREPARATION

- Pour small quantities of **HI7080** or **HI8080** (2.3 g/L Na) solution and **HI7087** or **HI8087** (0.23 g/L Na) or **HI7086** or **HI8086** (23 g/L Na) into two clean beakers.



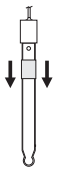
  To obtain accurate readings, use HI7080/HI8080 and HI7087/HI8087 if you are going to measure samples with low sodium content (below 2.3 g/L) or HI7080/HI8080 and HI7086/HI8086 if you are going to measure samples with high sodium content (over 2.3 g/L).

- For accurate calibration use two beakers for each buffer calibration, the first one for rinsing the electrode, the second one for calibration. This way, contamination of the buffer is minimized. Whenever possible use plastic beakers to minimize any EMC interferences.

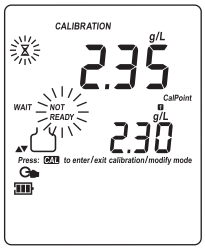


- Turn the meter on by pressing the **ON/OFF** key.

- Remove the protective cap of the electrode and rinse it with some of the buffer calibration solution you are going to use first.
- Lower the rubber sleeve to get the junction to work properly.

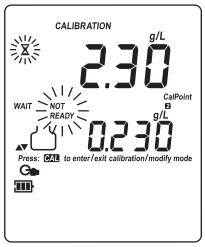


TWO-POINT CALIBRATION



- Press **CAL**. The instrument will display the measured concentration on the primary LCD, if a previous calibration exists, or "----" and the "**2.3**" standard on the secondary LCD, together with "**CAL**" and "**Cal Point 1**" tags.
- If necessary, press the **STD** key to select a different standard value.
- If the **STD** key is pressed, the instrument circles through all available calibration standards. Choose the point corresponding to the first calibration solution.
- The "⧖" tag will blink on the LCD until the reading is stable.
- When the reading is stable and close to the selected standard, "**CFM**" tag blinks.

- Press **CFM** to confirm calibration.
- The calibrated value is then displayed on the primary LCD and the secondary LCD will display the second expected standard value, together with "**CAL**" and "**Cal Point 2**" tags.



- After the first calibration point is confirmed, submerse the electrode approximately 3 cm (1¼") into the second standard solution and stir gently.
- If necessary, press the **STD** key to select the appropriate buffer value.
- The "⧖" tag will blink on the LCD until the reading is stable.
- When the reading is stable and close to the selected buffer, "**CFM**" tag blinks.
- Press **CFM** to confirm calibration.
- The instrument stores the calibration values and returns to normal measurement mode.

ONE-POINT CALIBRATION

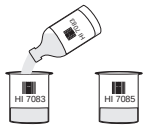
- Proceed as described in TWO-POINT CALIBRATION section.
- Press **CAL** after the first calibration point was confirmed. The instruments will memorize the one-point calibration data and will return to measurement mode.

NaCl CALIBRATION (HI 931100 / HI 931102)

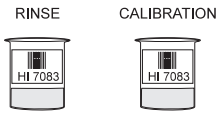
The calibration is performed by immersing the **FC300B** sodium-sensitive electrode in 2 different standard NaCl solutions to achieve accurate 2 point calibration.
It is also possible to calibrate just the offset (3.00 g/L NaCl) following the single point calibration procedure described below.
For best accuracy, a two-point calibration is recommended (see below).

PREPARATION

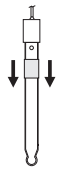
- Pour small quantities of **HI 7083** or **HI 8083** (3.00 g/L NaCl) solution and **HI 7085** or **HI 8085** (0.30 g/L) or **HI 7081** or **HI 8081** (30 g/L) into two clean beakers.
  To get accurate readings use HI 7083/HI 8083 and HI 7085/ HI8085 if you are going to measure samples with low sodium chloride content (below 3 g/L) or HI 7083/HI 8083 and HI 7081/ HI 8081 if you are going to measure samples with high sodium chloride content (over 3 g/L).



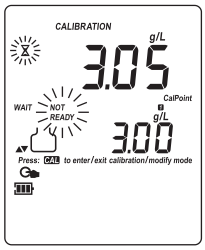
- For accurate calibration, use two beakers for each buffer calibration, the first one for rinsing the electrode, the second one for calibration. This way, contamination of the buffer is minimized. Whenever possible use plastic beakers to minimize any EMC interferences.



- Turn the meter on by pressing the ON/OFF key.
- Remove the protective cap of the electrode and rinse it with some of the buffer calibration solution you are going to use first.
- Lower the rubber sleeve to get the junction to work properly.

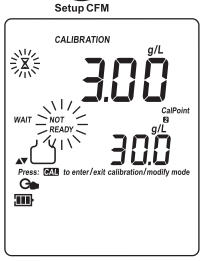


TWO-POINT CALIBRATION



- Press **CAL**. The instrument will display the measured concentration on the primary LCD, if a previous calibration exists, or "----", and the "**3.00 g/L**" standard on the secondary LCD, together with "**CAL**" and "**Cal Point 1**" tags.
- If necessary, press the **STD** key to select a different standard value.
- If the **STD** key is pressed, the instrument circles through all available calibration standards. Choose the point corresponding to the first calibration solution.
- The "⧖" tag will blink on the LCD until the reading is stable.
- When the reading is stable and close to the selected standard, "**CFM**" tag blinks.

- Press **CFM** to confirm calibration.
- The calibrated value is then displayed on the primary LCD and the secondary LCD will display the second expected standard value, together with "**CAL**" and "**Cal Point 2**" tags.



- After the first calibration point is confirmed, submerse the electrode approximately 3 cm (1¼") into the second standard solution and stir gently.
- If necessary, press the **STD** key to select the appropriate buffer value.
- The "⧖" tag will blink on the LCD until the reading is stable.
- When the reading is stable and close to the selected buffer, "**CFM**" tag blinks.

- Press **CFM** to confirm calibration.
- The instrument stores the calibration values and returns to normal measurement mode.

ONE-POINT CALIBRATION

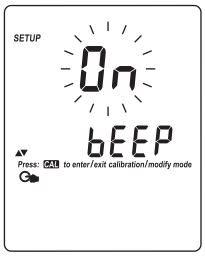
- Proceed as described in TWO-POINT CALIBRATION section.
- Press **CAL** after the first calibration point was confirmed. The instruments will memorize the one-point calibration data and will return to measurement mode.

Notes:
- For best results, wait for a couple of minutes before pressing the CFM key.
- Press and hold **Setup** then **Select** before **"CFM"** tag appears, to toggle between standard and temperature display on secondary LCD line reading during calibration.
- If the value measured by the instrument is not close to the selected standard, "**WRONG**" "ر ـ" and "**WRONG**" "☝" tags will blink alternately. In this case check if the correct standard has been selected or used, or regenerate the electrode and the reference by following the Cleaning Procedure (see page 16). If necessary, change the standard, the electrode, or the reference.
- Press **CFM**, then **CAL** before **"CFM"** tag appears in order to clear previous calibration and set the default values. The **"CLR ALL"** message is displayed on both LCD lines and the instrument returns to measurement mode.

SETUP

Setup mode allows viewing and configuring the following parameters:

- Beep Status (bEEP)
- Auto power off timer (AOFF)
- Temperature Unit
- Calibration Stability Criteria



To enter SETUP mode, press **Setup** while the instrument is in measurement mode.

Select the desired setup parameter using the **STD** key.

Press **CAL** if you want to change the item value. The selected item starts blinking for about 8 seconds.

Press the **Select** key to change the displayed value.

Wait until item stops blinking to complete selection or press **CAL** to escape.

Press the **STD** key to select the next parameter.

Press **Setup** to exit SETUP menu at any time.

The following table lists the SETUP parameters, their valid values range and the factory settings (default).

SETUP PARAMETERS			
Abbreviation	What it does	Valid Values	Default
bEEP	Beep tone used to signal errors and confirming change.	On/Off	OFF
AOFF	Auto off timer: Permits unit to turn off after preset time to save battery power.	Off, 5, 10, 20 or 60 minutes	20 minutes
	Temperature unit displayed.	°C or °F	°C
StAb	Select calibration stability criteria.	IntEr, ACCU or FASt	ACCU

The Stability Criteria offers the posibility to select the appropriate time before confirmation in accordance with the application.

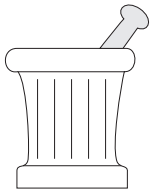
ACCU - about 3-4 minutes / calibration point
IntEr - about 2 minutes / calibration point
FASt - about 1 minute / calibration point

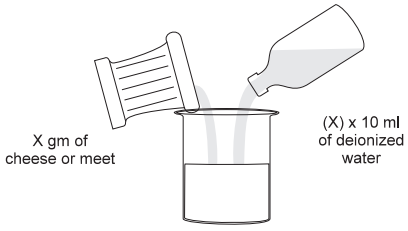
Note: ACCU criteria is recommended.

SPECIAL APPLICATIONS & ADDITIONAL INFORMATION

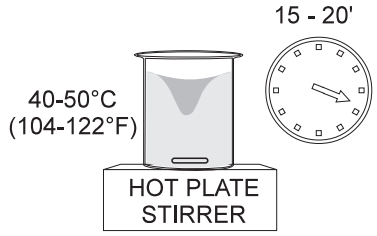
HOW TO MEASURE SODIUM CHLORIDE IN CHEESE AND MEAT (HI 931100 & HI 931102)

1. Take a sample of cheese or meat to be analyzed.
2. Grind the sample.
3. Pour a quantity of X g in a glass beaker. Add (X) x 10mL of deionized water (**note**: ignoring water content in cheese and meat).

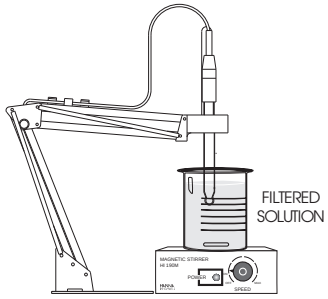




4. Cover the beaker to prevent any spilling during stirring, place the beaker on the top of a hot plate stirrer and agitate the sample at 40-50°C (104-122°F) for 15-20 minutes.



5. Let the sample cool to the ambient temperature, then filter it.
6. Dip the sodium electrode **FC300B** into the filtered sample. The tip of the electrode should be immersed for approximately 2.5 cm/1" (i.e. the electrode junction must be completely immersed) without touching the bottom of the beaker. During measurement, the sample should be gently stirred (100 rpm).



7. Wait for the reading to stabilize, i.e. no drift for at least a couple of minutes.
   Take note of the measured value.
8. Since the dilution rate is 1/10, the reading in the g/L range has to be divided by 100 to get the actual reading of NaCl (per gram of cheese or meat) or it can be considered the value directly expressed in % of NaCl.

Note: 10 to 15 minutes as response time, in the first measurement taken in samples of cheese or meat, is the right amount of time needed by the electrode to stabilize. The next measurements in cheese or meat samples will have a shorter response time (less than 2 minutes). Do not rinse the sodium electrode between measurements since contamination is negligible.

IONIC STRENGTH ADJUSTER (ISA)

It is recommend the use of **HI 7090** ISA solution when the NaCl concentration of the sample is lower than 5 g/L. In such case, the calibration of the meters should be performed with standard solution containing 2% of ISA.
ISA (Ionic Strength Adjuster) = 50% of NH_4 Cl 4M + 50% of NH_4 OH 4M (use 2mL of ISA every 100 mL of sample).

TEMPERATURE

The best working temperature is around 20-25°C (68-77°F).
For greatest accuracy, we suggest to perform the calibration of the meter with standard solution at a temperature as close as possible to the temperature of the sample (± 1°C/±2°F).

Na CONCENTRATION WITH HI 931100 AND HI 931102

It is always possible to determine the Na concentration by using the formula:

$$X_{Na} = X_{NaCl} \bullet (23 / 58.4)$$

where

X_{Na} = Na concentration

and

X_{NaCl} = NaCl concentration

TEMPERATURE CALIBRATION (for technical personnel only)

All the instruments are factory calibrated for temperature.
Hanna's temperature probes are interchangeable and no temperature calibration is needed when they are replaced.
If the temperature measurements are inaccurate, temperature recalibration should be performed.
For an accurate recalibration, contact your dealer or the nearest Hanna Customer Service Center, or follow the instructions below.

- Prepare a vessel containing ice and water and another one containing hot water (at approximately 50 °C or 122 °F). Place insulation material around the vessels to minimize temperature changes.
- Use a calibrated thermometer with a resolution of 0.1 °C as a reference thermometer. Connect the **HI 7662** temperature probe to the appropriate socket.
- With the instrument off, press and hold down the **CAL** & **Setup** keys, then power on the instrument. The "**CAL**" tag will appear and the secondary LCD will show "**0.0 °C**". The primary LCD will display the measured temperature or the "----" message, if the measured temperature is out of range.

- Submerse the temperature probe into the vessel with ice and water as close as possible to the reference thermometer. Allow a few seconds for the probe to stabilize.
- Use the **Select** key to set the reading on the secondary LCD to that of ice and water, measured by the reference thermometer. The value can be changed in a circling way in the ±2.0 °C interval, around the selected point. When the reading is stable and close to the selected calibration point, "**CFM**" tag will blink.

- Press **CFM** to confirm. The secondary LCD will display "**50.0 °C**".

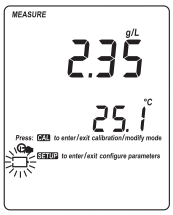
- Submerse the temperature probe into the second vessel as close as possible to the reference thermometer. Allow a few seconds for the probe to stabilize.
- Use the **Select** key to set the reading on the secondary LCD to that of the hot water. The value can be changed in a circling way in the ±2.0 °C interval, around the selected point.

- When the reading is stable and close to the selected calibration point, "**CFM**" tag will blink.
- Press **CFM** to confirm. The instrument returns to measurement mode.

Note: If the reading is not close to the selected point, "**WRONG**" tag will blink. Change the temperature probe and restart calibration.

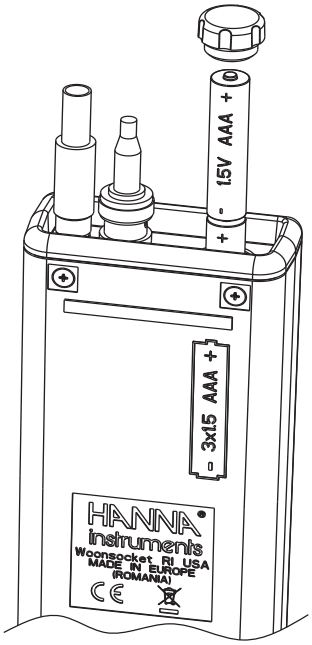
BATTERIES REPLACEMENT

If the batteries become weak, the display will flash the battery symbol to advise the user that approx. 1 hour of working time is left.
It is recommended to replace the batteries soon.



To replace the batteries, follow the next steps:

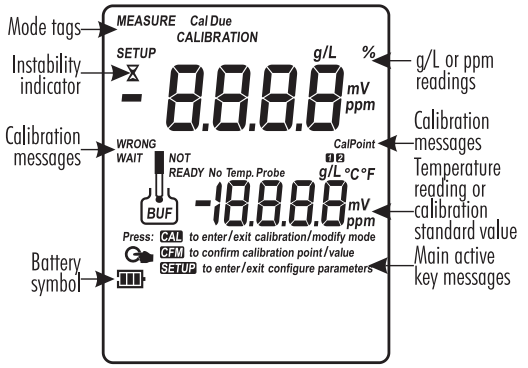
- Turn the instrument OFF.
- Open the battery compartment cap (located on the top of the instrument).
- Remove old batteries.
- Insert three new 1.5V AAA batteries in the battery compartment, following the instructions on the rear of the instrument.
- Reattach the battery compartment cap.



The instrument is provided with the BEPS (Battery Error Prevention System) feature, which automatically turns the instrument off when the batteries level is too low to ensure reliable readings. At start up the display will show "**0 bAtt**" message for a few seconds, then the instrument automatically turns off.

LCD MESSAGE GUIDE

TAGS & SYMBOLS



- **Mode tags** light up for indicating the corresponding active mode, and blink for warning the user.

  MEASURE on: Instrument in measurement mode.

  SETUP on: SETUP menu mode has been entered.

  CALIBRATION on: calibration mode has been entered.

- Indication of **temperature compensation mode**:

  ATC for automatic compensation, **"ATC"** blink for compensation at 25 °C.

- ⧖ **blinking (while in calibration)**: reading unstable.

- **Main active key messages** light up for indicating the corresponding active key.

  CAL on: CAL key available.

  CFM blinking: ask confirmation of calibration.

  SETUP on: SETUP key available.

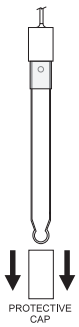
- **Battery symbol blinking**: low battery condition.

- **Calibration messages**:

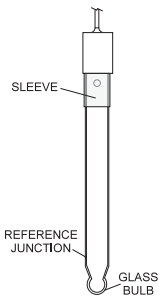
  WRONG 👍 **and WRONG** 🌡 **blinking** alternatively: wrong buffer, value not recognized.

FC300B CONDITIONING & MAINTENANCE

PREPARATION

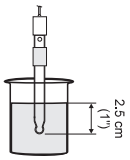


Remove the protective cap.
DO NOT BE ALARMED IF ANY SALT DEPOSITS ARE PRESENT.
This is normal with sodium electrodes and they will disappear when rinsed with water.
During transport tiny bubbles of air may have formed inside the glass bulb. The electrode cannot function properly under these conditions. These bubbles can be removed by "shaking down" the electrode as you would do with a glass thermometer.

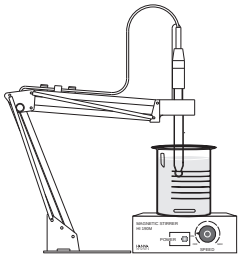


If the bulb and/or junction are dry, soak the electrode overnight in **HI 7081** NaCl 30.0 g/L solution before using with the **HI 931100** or **HI 931102** sodium meter. Soak it overnight in **HI 7086** or **HI 8086** Na 23 g/L solution before using with the **HI 931101** sodium meter.
If the fill solution (electrolyte) is more than 1cm (½") below the fill hole, add **HI8093 1M KCl+AgCl Electrolyte Solution.**
Lower the rubber sleeve during measurements and calibration.

SODIUM MEASUREMENT



Rinse the sodium electrode tip with some of the sample to be tested to remove any contamination.
Immerse the tip (2.5 cm /1") in the sample and stir gently.
The sensitive bulb should not touch the bottom of the beaker.
The Hanna **HI 76405** electrode holder can be used for this purpose (see page 35).
During measurement, the sample should be gently stirred (approx. 100 rpm). The Hanna **HI 190M** stirrer can be used for this purpose (see page 34).



STORAGE

When used frequently, the electrode should be stored in a solution with a Na or NaCl concentration similar to the sample to be measured. For longer periods of storage, the electrode should be capped with a few drops of appropriate solution.

For frequent use in different samples (1 or 2 times per week), store the electrode in **HI 7081** or **HI 8081** (30.0 g/L NaCl) if used for NaCl measurements (in conjunction with **HI 931100** or **HI 931102**).

Store the electrode in **HI 7080** or **HI 8080** (2.3 g/L Na) if used for Na measurements (in conjunction with **HI 931101**).

For occasional use (once a month or less) store the electrode dry and let it conditioning overnight in **HI 7081** or **HI 8081** (30.0 g/L NaCl) or **HI 7086** or **HI 8086** (23 g/L Na) before use.

Note: NEVER STORE OR RINSE THE ELECTRODE IN DISTILLED OR DEIONIZED WATER.

PERIODIC MAINTENANCE

Inspect the electrode and the cable. The cable used for connection to the meter must be intact and there must be no points of broken insulation on the cable or cracks on the electrode stem or bulb. Connectors must be perfectly clean and dry.

If any scratches or cracks are present, replace the electrode.

Rinse off any salt deposits with water.

Refill the electrode with fresh electrolyte **(HI 8093)** and let it stand upright for 1 hour.

Follow the Storage Procedure above.

CLEANING PROCEDURE

General	Soak in Hanna **HI 7061 or HI 8061 General Cleaning Solution** for approximately 1 hour.

Removal of films, dirt or deposits on the membrane/junction:

- Protein	Soak in Hanna **HI 7073** or **HI 8073 Protein Cleaning Solution** for 15 minutes.
- Inorganic	Soak in Hanna **HI 7074** or **HI 8074 Inorganic Cleaning Solution** for 15 minutes.
- Oil/grease	Rinse with Hanna **HI 7077** or **HI 8077 Oil and Fat Cleaning Solution**.

IMPORTANT: After performing any of the cleaning procedures rinse the electrode thoroughly with a solution containing 2% ISA (see page 22), refill (if necessary) the reference chamber with fresh electrolyte (HI8093) and soak the electrode in a solution very close to the next sample to be measured for at least 1 hour before taking measurements.

NEVER RUB OR BLOT DRY THE ELECTRODE.

TROUBLESHOOTING GUIDE

SYMPTOMS	PROBLEM	SOLUTION
Reading fluctuates up and down (noise).	Dirty or blocked electrode junction.	Clean the electrode.
Display shows blinking full scale value.	Reading out of range.	Check that sample is within measurable range; Check electrolyte level and general electrode status.
Display shows blinking "°C" or "°F".	Out of order or missing temperature probe.	Replace temperature probe or check the connection. Replace electrode.
Display shows blinking battery symbol.	Low charge level on battery.	Replace batteries.
Meter does not work with temperature probe.	Broken temperature probe.	Replace temperature probe.
Meter fails to calibrate or gives faulty readings.	Broken ISE electrode.	Replace electrode.
"**WRONG** ⏁" "**WRONG electrode**" is displayed during calibration procedure.	Wrong or contaminated standard.	Check that standard solution is correct and fresh. Use the **STD** key to select the appropiate buffer.
Meter shuts off.	Dead battery; Auto-off feature is enabled: in this case, meter shuts off after selected period of non-use.	Replace batteries. Press **ON/OFF**.
"**Erxx**" message at start up.	Internal error.	Contact your dealer or any Hanna Service Center.
The instrument does not start or not stop when pressing **ON/OFF**.	Initialization error.	Press and hold down **ON/OFF** for about 25 seconds for a hardware reset. If the error persist contact your dealer or any Hanna Service Center.
"**Cal Due**" "**Prod**" messages at startup.	Instrument not factory calibrated.	Contact Hanna Technical Support for factory calibration.

ACCESSORIES

Na CALIBRATION (& STORAGE) SOLUTIONS FOR HI 931101:

HI 7080M	2.3 g/L Na solution, 230 mL
HI 7080L	2.3 g/L Na solution, 460 mL
HI 7086M	23 g/L Na solution, 230 mL
HI 7086L	23 g/L Na solution, 460 mL
HI 7087M	0.230 g/L Na solution, 230 mL
HI 7087L	0.230 g/L Na solution, 460 mL

Na CALIBRATION (& STORAGE) SOLUTIONS IN FDA APPROVED BOTTLES FOR HI 931101:

HI 8080M	2.3 g/L Na solution, 230 mL
HI 8080L	2.3 g/L Na solution, 460 mL
HI 8086M	23 g/L Na solution, 230 mL
HI 8086L	23 g/L Na solution, 460 mL
HI 8087M	0.230 g/L Na solution, 230 mL
HI 8087L	0.230 g/L Na solution, 460 mL

NaCl CALIBRATION (& STORAGE) SOLUTIONS FOR HI 931100 & HI 931102:

HI 7081M	30 g/L NaCl solution, 230 mL
HI 7081L	30 g/L NaCl solution, 460 mL
HI 7083M	3.0 g/L NaCl solution, 230 mL
HI 7083L	3.0 g/L NaCl solution, 460 mL
HI 7085M	0.3 g/L NaCl solution, 230 mL
HI 7085L	0.3 g/L NaCl solution, 460 mL
HI 7090M	ISA solution, 230 mL
HI 7090L	ISA solution, 460 mL

NaCl CALIBRATION (& STORAGE) SOLUTIONS IN FDA APPROVED BOTTLES FOR HI 931100 & HI 931102:

HI 8081M	30 g/L NaCl solution, 230 mL
HI 8081L	30 g/L NaCl solution, 460 mL
HI 8083M	3.0 g/L NaCl solution, 230 mL
HI 8083L	3.0 g/L NaCl solution, 460 mL
HI 8085M	0.3 g/L NaCl solution, 230 mL
HI 8085L	0.3 g/L NaCl solution, 460 mL
HI 8090M	ISA solution, 230 mL
HI 8090L	ISA solution, 460 mL

ELECTRODE CLEANING SOLUTIONS:

HI 7061M	General Cleaning Sol., 230 mL
HI 7061L	General Cleaning Sol., 460 mL
HI 7073M	Protein Cleaning Sol., 230 mL
HI 7073L	Protein Cleaning Sol., 460 mL
HI 7074M	Inorganic Cleaning Sol., 230 mL
HI 7074L	Inorganic Cleaning Sol., 460 mL
HI 7077M	Oil & Fat Cleaning Sol., 230 mL
HI 7077L	Oil & Fat Cleaning Sol., 460 mL

ELECTRODE CLEANING SOLUTIONS IN FDA APPROVED BOTTLES:

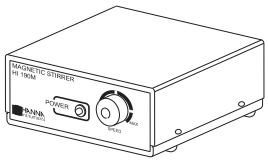
HI 8061M	General Cleaning Solution, 230 mL
HI 8061L	General Cleaning Solution, 460 mL
HI 8073M	Protein Cleaning Solution, 230 mL
HI 8073L	Protein Cleaning Solution, 230 mL
HI 8077M	Oil & Fat Cleaning Solution, 230mL
HI 8077L	Oil & Fat Cleaning Solution, 460mL

REFILLING ELECTROLYTE SOLUTION IN FDA APPROVED BOTTLE:

HI 8093	1M KCl + AgCl Electrolyte, 4x50mL

OTHER ACCESSORIES:

ChecktempC	Pocket-size thermometer with penetration probe and 0.1°C resolution (range -50.0 to 150.0°C)
FC 300B	Sodium electrode, glass body, single junction, refillable, with 1 meter (3.3') cable
HI 190M-2	Mini-stirrer 220V (max. stirring capacity 1 liter, speed range min.100 max. 1000 rpm)
HI 190M-1	Mini-stirrer 115V (max. stirring capacity 1 liter, speed range min.100 max. 1000 rpm)



HI 710031	Rugged carrying case
HI 721308	1.5V AA alkaline battery (10 pcs)
HI 7662	Temperature probe with 1 m (3.3') cable
HI 76405	Electrode holder

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 60VDC.

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

Hanna Instruments Inc.
Highland Industrial Park
584 Park East Drive
Woonsocket, RI 02895 USA

Technical Support for Customers
Tel. (800) 426 6287
Fax (401) 765 7575
E-mail tech@hannainst.com
www.hannainst.com

Local Sales and Customer Service Office

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