Instruction Manual
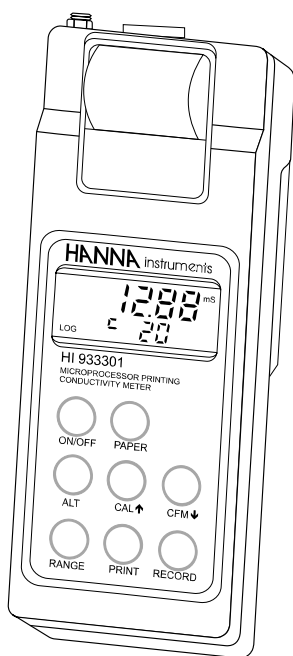
HI 933300
HI 933301

Portable Microprocessor Printing and Logging Multi-Range Conductivity Meters

HANNA
instruments

http://www.hannainst.com

CE

Dear Customer,

Thank you for choosing a Hanna Instruments Product.

Please read this instruction manual carefully before using the instrument.

This manual will provide you with all the necessary information for the correct use of the instrument, as well as a precise idea of its versatility in a wide range of applications.

These instruments are in compliance with CE directives EN 50081-1 and 50082-1.

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

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.

Each printing/logging conductivity meter is supplied complete with:
- **HI 76302W** Conductivity Probe with 1 m (3.3') screened cable
- AA size Alkaline Batteries (4 pcs)
- Paper roll (10 pcs)
- Rugged carrying case

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

GENERAL DESCRIPTION

The **HI933300** and **HI933301** are multirange conductivity meters equipped with printer and datalogger (**HI933300** only).

The measurement interval is user-selectable from 1 to 180 minutes, and the temperature coefficient β can vary from 0.0 to 3.0%/°C.

These microprocessor-based meters provide automatic calibration with 5 memorized values:

- 0 µS/cm (µmhoS/cm)
- 84 µS/cm (µmhoS/cm)
- 1413 µS/cm (µmhoS/cm)
- 12880 µS/cm (µmhoS/cm)
- 80000 µS/cm (µmhoS/cm).

This makes the calibration procedure extremely simple.

HI933300 can also log and directly print the conductivity and temperature measurements.

The stored data can be retrieved at a later time for printing or can be transferred to a computer through an optional **HI9200** infrared transmitter. The **HI 933300** will transfer the data in seconds through the infrared lights with no need for a cable between the transmitter and the meter.

The internal software allocates memory space to store up to 8,000 readings.

The meters provide automatic temperature compensation with the supplied **HI76302W** 4-ring probe with integrated temperature sensor. The sensors in the meter's probe utilize the latest technology in conductivity measurement.

The four-ring potentiometric method incorporated into the probe has been proven to provide higher accuracy than the more common amperometric method.

HI 933300 and **HI 933301** have a range of 0 to 199900 µS/cm and can be used in any sample from deionized water to brine.

The probe's stainless steel rings have a large surface for better response and ease of cleaning.

The meters are equipped with an automatic shut-off system and a 12VDC socket for maximum versatility in both laboratory and field use.
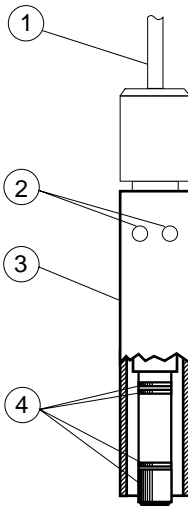
Other features include: on-board time and date, calibration factors stored in Eprom, automatic low battery alert system.
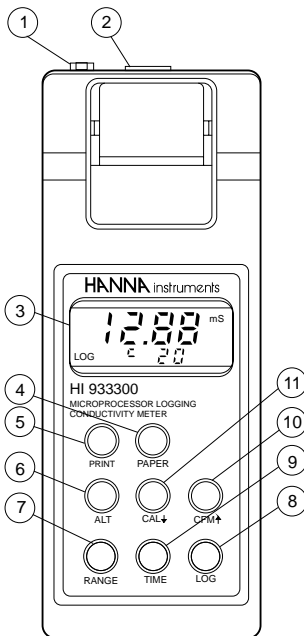
LCD DISPLAY FUNCTIONAL DESCRIPTION
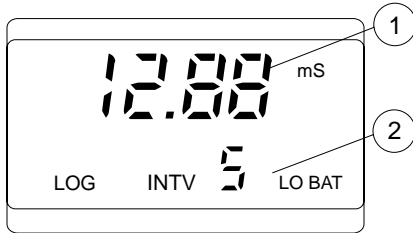
1. Primary Display
2. Secondary Display

FUNCTIONAL DESCRIPTION HI 76302W CONDUCTIVITY PROBE

1. Watertight Shielded Screened Cable
2. Air-Release Holes
3. PVC Protective Sleeve
4. 4 Stainless Steel Rings.

1. Power adapter plug
2. Conductivity probe socket
3. LCD display
4. **PAPER** key, to pull the paper and to reset the printer
5. **PRINT** key, to obtain a printout
6. **ALT** key, Alternate Function key
7. **RANGE** key, to display the conductivity or the temperature
8. **LOG** key, to enter the logging mode
9. **TIME** key, to display present time and printing interval
10. **CFM** key, to confirm calibration data
11. **CAL** key, to enter or exit the calibration mode.

FUNCTIONAL DESCRIPTION HI 933301
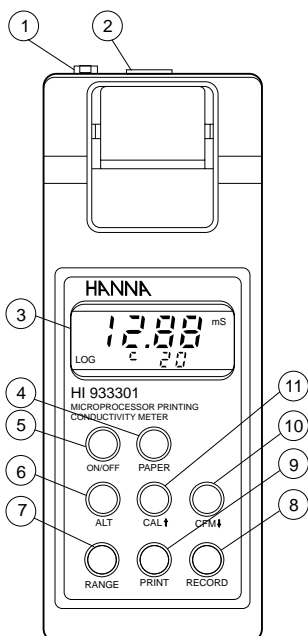
1. Power adapter plug
2. Conductivity probe socket
3. LCD display
4. **PAPER** key, to pull the paper and to reset the printer
5. **ON/OFF** key, to turn the meter on or off
6. **ALT** key, Alternate Function key
7. **RANGE** key, to display the conductivity or the temperature
8. **RECORD** key, to enter the recording mode
9. **PRINT** key, to obtain a printout
10. **CFM** key, to confirm calibration data
11. **CAL** key, to enter or exit the calibration mode.

SPECIFICATIONS

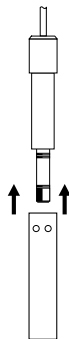|	HI 933300 & HI933301
Measurement Range µS/cm **µS/cm** **mS/cm** **mS/cm** **°C**	0.0 to 150.0 150 to 1500 1.50 to 15.00 15.0 to 199.9 0.0 to 60.0
Resolution	0.1 µS/cm, 1 µS/cm 0.01 mS/cm, 0.1 mS/cm, 0.1°C
Accuracy (@20°C/68°F)	±1% full scale; ±0.5°C excluding probe error
Typical EMC Deviation	±1% F.S ±0.5°C
Calibration	Automatic 1, 2, 3, 4 or 5 points at 0, 84, 1413, 12880, 80000 µS/cm
Temperature Compensation	Automatic from 0 to 60 °C (32 to 140°F) with variable ß from 0.0 to 3.0%
Probe	**HI 76302W** (**included**) detach-able with 4 stainless steel AISI 316 rings and incorporated tem-perature sensor. Probe length is 120mm (4.8"), diameter is 20mm (0.8"); screened cable length is 1 meter (3.3')
Printer	Low-power impact type-belt, 14 characters per line using 38 mm plain paper
Printing/Logging interval	Selectable from 1, 2, 5, 10, 15, 30, 60, 120, 180 minutes
Battery Type Life	4 x 1.5 volt AA size. 500 hours with 60' printing interval. Power socket for 12VDC adapter
Environment	0 to 50°C (32 to 122°F), 95%RH
Dimensions	196 x 80 x 57 mm (7.7 x 3.1x 2.2")
Weight	425 g (15 oz.) instrument only

OPERATIONAL GUIDE

INITIAL PREPARATION

Each meter is supplied complete with batteries. Remove the back cover, unwrap the batteries and install them while paying attention to their polarity.
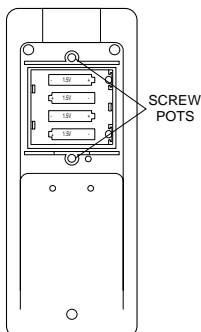
To prepare the instrument for use, connect the probe to the meter securely by aligning the pins with the socket located on the top of the instrument, pushing the plug in and tightening the threaded ring.

Make sure that the sleeve is properly inserted on the probe, with the holes towards the top of the probe (the end nearest to the cable).

To turn the **HI933300** on, press the RANGE key.

To turn the **HI933301** on, press the ON/OFF key.

The meter will display the clock time as 0:00 and a default sampling interval of 1 minute.

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To maximize battery life, the display is automatically switched off after 5 minutes of non-use.

The meter continues to monitor (if in the logging or recording mode) conductivity and temperature even when the display is off.
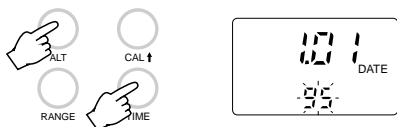

ON/OFF

To revive the display, press either the ON/OFF or the RANGE key.

RANGE

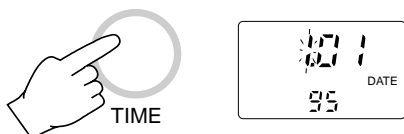### *SETTING DATE/TIME/PRINTING INTERVAL (for HI933300 only)*

Press the ALT and the TIME keys simultaneously. The display will show the date setting. At the bottom of the display the year will start blinking.

ALT   CAL↑
RANGE   TIME

DATE

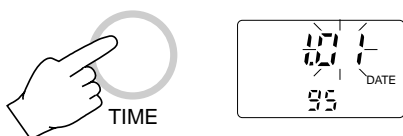Use the UP or DOWN arrow key to select the year.

or
CAL↑   CFM↓

When the correct year is selected, press the TIME key once. The month will start blinking.

TIME

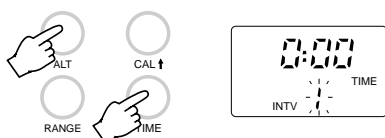DATE

8

Select the month by using the UP or DOWN arrow key.

or

CAL↑   CFM↓

Press the TIME key. The day will start blinking.

TIME

DATE

95

Use the UP or DOWN arrow key to select the correct day.

or

CAL↑   CFM↓

Press the ALT and the TIME keys simultaneously. The display will now show the time and the printing interval will start blinking.
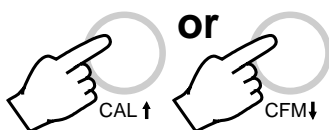
ALT   CAL↑

RANGE   TIME

TIME

INTV

The interval can be selected from 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes by using the UP and DOWN arrow keys.

or

CAL↑   CFM↓

Once the desired interval is selected press the TIME key once to set it. The hour will start blinking.
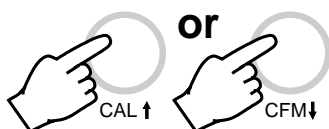

To select the hour press the UP or DOWN arrow key (24 hour clock).
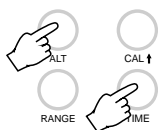

Press the TIME key once. The minutes will start blinking.

Use the UP or DOWN arrow key to select the minute.

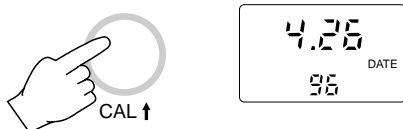Press the ALT and the TIME keys to leave this mode.

The meter's time, date and interval are now set and stored in the memory even when the display is switched off.

To view the time press the TIME key. This
also displays the selected interval time.

To view the date, press the UP arrow key
when the LCD is displaying the time.

To view the conductivity and temperature press
the RANGE key. Conductivity will be dis-
played on the primary display and tempera-
ture on the secondary (without decimal point).

To view the temperature press the RANGE
key again. The temperature will be displayed
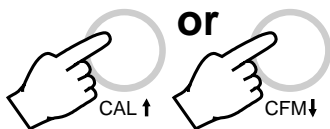on the primary display with a decimal point.

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SETTING DATE/TIME/PRINTING INTERVAL (for HI933301 only)

Press the ALT and the RANGE keys twice simultaneously. The display will show the date setting. At the bottom of the display the year will start blinking.
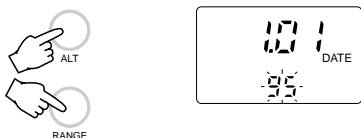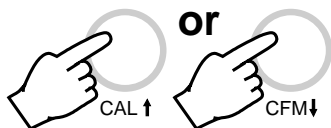
Use the UP or DOWN arrow key to select the year.

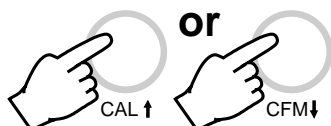When the correct year is selected, press the TIME key once. The month will start blinking.

Select the month by using the UP or DOWN arrow key.

Press the RANGE key. The day will start blinking.

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Use the UP or DOWN arrow key to select the correct day.

Press the ALT and the RANGE keys simultaneously. The display will now show the time and the printing interval will start blinking.
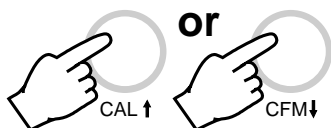

The interval can be selected from 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes by using the UP and DOWN arrow keys.

Once the desired interval is selected press the RANGE key once to set it. The hour will start blinking.

To select the hour press the UP or DOWN arrow key (24 hour clock).

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Press the RANGE key once. The minutes will start blinking.

Use the UP or DOWN arrow key to select the minute.
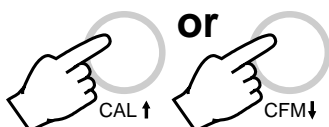
Press the ALT and the RANGE keys simultaneously to leave this mode.

The meter's time, date and interval are now set and stored in memory even when the display is switched off.

VIEWING TIME / DATE / CONDUCTIVITY / TEMPERATURE (for HI 933301 only)

To view the time press the ALT and RANGE keys simultaneously. This also displays the selected interval time.

To view the date, press the UP arrow key when the LCD is displaying the time.


```
 4.26
         DATE
   96
```

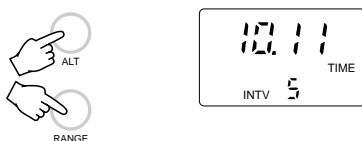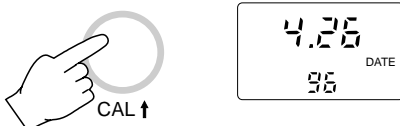To view the conductivity and temperature press the RANGE key. Conductivity will be displayed on the primary display and temperature on the secondary (without decimal point).


```
 12.88 mS
  c  20
```

To view the temperature press the RANGE key again. The temperature will be displayed on the primary display with a decimal point.


```
 °c  20.3
```
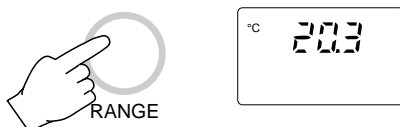
SETTING THE TEMPERATURE COEFFICIENT

Press the RANGE key until the display shows the temperature coefficient setting.


```
   2.0 %
```

This value is adjustable from 0.0 to 3.0%/°C.

15

Use the UP and the DOWN arrow key to change the setting.

TAKING CONDUCTIVITY MEASUREMENTS

Make sure that the meter has been calibrated before taking any measurements (see page 18).

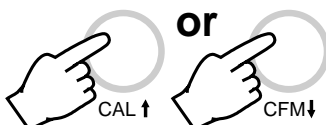To take a measurement, place the probe into the solution with the holes completely submerged. Tap and stir the probe to remove all air bubbles that may be trapped inside the PVC sleeve.

HI 933300 and **HI 933301** are auto-ranging conductivity meters, and the reading automatically switches from one resolution to the next, from pure water @ 0.1µS/cm up to 199900 µS/cm.

If the LCD displays four dashes, the meter is out of range.
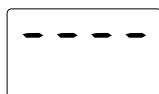
**HI76302W** conductivity probe has a built-in temperature sensor and automatically compensates for any temperature variation.

Wait for a few minutes for the temperature sensor to attain thermal equilibrium with the test solution before taking the measurement.

If the temperature of the conductivity probe and the solution is of considerable difference, a longer time should be allowed before taking readings.

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Once the reading stabilizes the measurement is complete.

If further measurements are desired, rinse the probe with tap water and test the next sample.

```
 12.88 ᵐˢ
  c  20
```
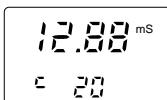
Note: The probe body and sleeve are made of PVC and are very susceptible to damage due to temperatures exceeding 50°C (122°F).

> If the probe is exposed to high temperature, the bond between the rings and the probe body may become impaired and the probe will not function properly, in which case it has to be replaced.

TAKING TEMPERATURE MEASUREMENTS

Taking temperature measurement with **HI 933300** and **HI 933301** is very easy.

Press the RANGE key until the display shows the °C mode.


```
 °C  20.3
```

RANGE
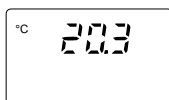
Simply immerse the probe into the sample and allow the reading to stabilize.

AFTER MEASUREMENTS

When all measurements are completed follow the probe maintenance procedure described at page 48.

CONDUCTIVITY CALIBRATION

It is recommended that **HI933300** and **HI933301** are calibrated frequently for greatest accuracy, especially when used often or in samples with widely differing conductivity values. For best results choose conductivity solutions that are closest in value to the sample to be measured.

For accurate calibration, use two beakers for each solution: the first one for rinsing the probe, the second one for

RINSE   CALIBRATION

calibration. In this way cross contamination is minimized.

If possible, to minimize any EMC interferences, use plastic beakers for the solutions.

These meters can also be calibrated in air at 0.0 µS/cm.

For example if your measurements are in the 2 to 20 mS/cm range you should use **HI7030** or **HI 8030** (12880 µS/cm = 12.88 mS/cm) conductivity calibration solution.
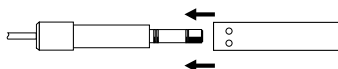
A complete list of all the Hanna Instruments calibration solution is given in the Accessories section (see page 50).

Press the RANGE key to select the conductivity measurement mode.
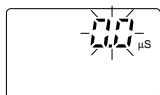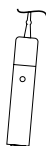

RANGE

Ensure that the probe is connected to the meter securely.

Insert the probe into the PVC sleeve with the holes towards the top (the end nearest to the cable) of the probe.
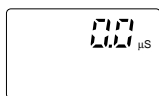

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PROCEDURE FOR OFFSET CALIBRATION (at 0.0 µS/cm)

• To perform the Offset calibration, dry the conductivity probe and leave it in air.

• Press the ALT and the CAL keys simultaneously. The primary LCD display will blink "0.0 µS" for about 10 seconds.

• When "0.0 µS" stops blinking, the calibration can be confirmed. Press the CFM key to confirm the offset value.

• If the input reading is out of the offset range, an error message will show on the secondary display "E0". Press the CAL key to re-calibrate the value.
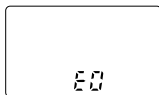
• If everything is satisfactory the LCD will blink "84.0 µS", expecting the first calibration solution.

• Press the CAL key to exit the calibration mode now.

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PROCEDURE FOR SINGLE POINT CALIBRATION WITH BUFFER SOLUTION
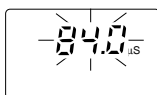
HI933300 and **HI933301** have auto-buffer recognition: you can simply place the probe into the type of buffer solution that you need to calibrate and perform the single point calibration very quickly as described below.
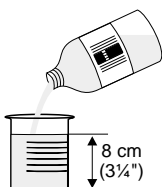
Choose one of the following calibration solutions:

84.0 µS/cm (cal. solution **HI7033/HI8033**)
1413 µS/cm (cal. solution **HI7031/HI8031**)
12.88 mS/cm (cal. solution **HI7030/HI8030**)
80.0 mS/cm (cal. solution **HI7034/HI8034**)

• Fill a beaker with conductivity calibration solution (e.g. **HI7030** or **HI8030**, 12.88 mS/cm).

8 cm
(3¼")

• Press the RANGE key to select the conductivity measurement mode.

RANGE

• Dip the probe into the sample. The level of solution must be higher than the holes on the PVC sleeve. Tap the probe repeatedly on the bottom of the beaker and stir it to ensure that no air bubbles are trapped inside the sleeve.

• Press the CAL key and the buffer value will be blinking on the display (e.g. 12.88 mS/cm).

CAL

_12.88_mS

20

• When the buffer value stops blinking, indicating that the probe has stabilized, press the CFM key to confirm the value.

$$12.88 \text{ mS}$$

CFM↓

• Press the CAL key to exit the calibration mode now.

CAL↑
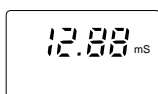
PROCEDURE FOR A COMPLETE CALIBRATION WITH 5 BUFFERS

HI933300 and **HI933301** have 5 memorized calibration values:

  0.0 µS/cm (probe in air)
 84.0 µS/cm (cal. solution **HI 7033/HI8033**)
 1413 µS/cm (cal. solution **HI 7031/HI8031**)
12.88 mS/cm (cal. solution **HI 7030/HI8030**)
 80.0 mS/cm (cal. solution **HI 7034/HI8034**)

These meters can be calibrated at all the above five points as described below.

• To perform the Offset calibration, dry the conductivity probe and leave it in air.
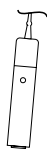
• Press the ALT and the CAL keys simultaneously. The primary LCD display will blink "0.0 µS" for about 10 seconds.

ALT   CAL↑ 0.0 µS

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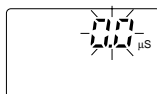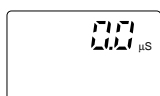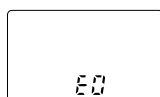• When "0.0 µS" stops blinking, the calibration can be confirmed. Press the CFM key to confirm the offset value.

• If the input reading is out of the offset range, "E0" as error message will appear on the secondary display . Press the CAL key to re-calibrate the value.

• If everything is satisfactory the LCD will blink "84.0 µS", expecting the next calibration solution (**HI7033 or HI8033**).
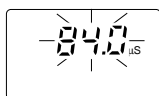
• Fill a beaker with **HI7033 or HI8033** conductivity calibration solution.

• Immerse the probe into the calibration solution.

The level of solution must be higher than the holes on the PVC sleeve. Tap the probe repeatedly on the bottom of the beaker and stir it to ensure that no air bubbles are trapped inside the sleeve.

• When the "84.0 µS" stops blinking, indicating that the measurement has stabilized, press the CFM key again to confirm the second point calibration.
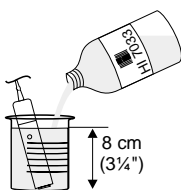

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- If the value is out of the slope range, an "E1" error message will appear on the secondary display. Press the CAL key to re-calibrate the value.
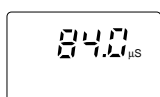
```
E1
```
CAL ↑

- If everything is satisfactory the LCD will blink "1413 µS", expecting the next calibration solution (**HI7031 or HI8031**).

```
-1413 µS
```

- Wait for 1 minute, then immerse the probe into the **HI7031/HI8031** calibration solution. The level of solution must be

8 cm (3¼")

higher than the holes on the PVC sleeve. Tap the probe repeatedly on the bottom of the beaker and stir it to ensure that no air bubbles are trapped inside the sleeve.

- When the "1413 µS" stops blinking, indicating that the measurement has stabilized, press the CFM key again to confirm the third calibration point.

```
1413 µS
```
CFM ↓

- If the value is out of the slope range, an "E2" error message will appear on the secondary display. Press the CAL key to re-calibrate the value.

```
E2
```
CAL ↑

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- If everything is satisfactory the LCD will blink "12.88 mS", expecting the next calibration solution (**HI7030 or HI8030**).

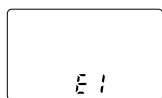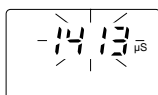- Wait for 1 minute, then immerse the probe into the **HI7030/HI8030** calibration solution. The level of solution must be

higher than the holes on the PVC sleeve. Tap the probe repeatedly on the bottom of the beaker and stir it to ensure that no air bubbles are trapped inside the sleeve.

- When the "12.88 mS" stops blinking, indicating that the measurement has stabilized, press the CFM key again to confirm the fourth calibration point.
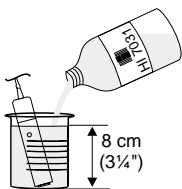

- If the value is out of the slope range, an "E3" error message will appear on the secondary display. Press the CAL key to re-calibrate the value.
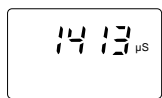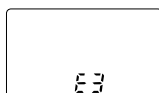

- If everything is satisfactory the LCD will blink "80.0 mS", expecting the next calibration solution (**HI7034 or HI8034**)
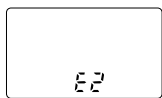

- Wait for 1 minute, then immerse the probe into the **HI7034/HI7034** calibration solution. The level of solution must be higher
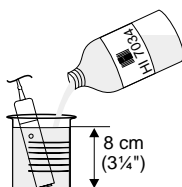
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than the holes on the PVC sleeve. Tap the probe repeatedly on the bottom of the beaker and stir it to ensure that no air bubbles are trapped inside the sleeve.

• When the "80.0 mS" stops blinking, indicating that the measurement has stabilized, press the CFM key again to confirm the fifth calibration point.
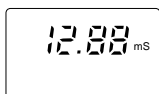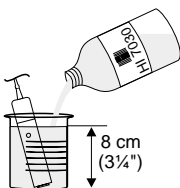
$$\boxed{80.0 \text{ mS}} \qquad \text{CFM}\downarrow$$
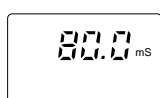
• If the value is out of the slope range, an "E4" error message will appear on the secondary display. Press the CAL key to re-calibrate the value.
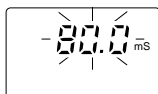
$$\boxed{E4} \qquad \text{CAL}\uparrow$$
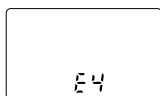
• If everything is satisfactory the calibration ends and the meter will return to the normal operational mode.

Note:

• If the instrument will not calibrate refer to the Probe Maintenance and Cleaning section (see page 48).

• It is always possible to quit the calibration mode by pressing the CAL key.

$$\text{CAL}\uparrow$$

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CONDUCTIVITY VERSUS TEMPERATURE CHART

As shown in the chart below, temperature has an effect on conductivity.

| °C	°F	HI7030 HI8030 (µS/cm)	HI7031 HI8031 (µS/cm)	HI7033 HI8033 (µS/cm)	HI7034 HI8034 (µS/cm)	HI7035 HI8035 (µS/cm)	HI7039 HI8039 (µS/cm)
0	32	7150	776	64	48300	65400	2760
5	41	8220	896	65	53500	74100	3180
10	50	9330	1020	67	59600	83200	3615
15	59	10480	1147	68	65400	92500	4063
16	60.8	10720	1173	70	67200	94400	4155
17	62.6	10950	1199	71	68500	96300	4245
18	64.4	11190	1225	73	69800	98200	4337
19	66.2	11430	1251	74	71300	100200	4429
20	68	11670	1278	76	72400	102100	4523
21	69.8	11910	1305	78	74000	104000	4617
22	71.6	12150	1332	79	75200	105900	4711
23	73.4	12390	1359	81	76500	107900	4805
24	75.2	12640	1386	82	78300	109800	4902
25	77	12880	1413	84	80000	111800	5000
26	78.8	13130	1440	86	81300	113800	5096
27	80.6	13370	1467	87	83000	115700	5190
28	82.4	13620	1494	89	84900	117700	5286
29	84.2	13870	1521	90	86300	119700	5383
30	86	14120	1548	92	88200	121800	5479
31	87.8	14370	1575	94	90000	123900	5575

HI933300 and **HI933301** will always display the value of the buffers at 25°C (77°F), e.g. "1413 µS" using **HI7031** or **HI8031** as calibration solution.

INITIAL PREPARATION

Prepare a container of ice and water and another container with hot water (at a temperature of at least 50°C/122°F). Place insulation material around the containers to minimize temperature changes.

Use a ChecktempC or a calibrated thermometer with a resolution of 0.1° as reference thermometer.
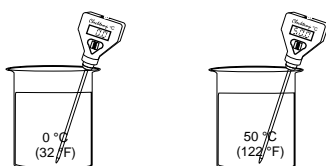
Note: After performing the following calibration, conductivity must be recalibrated.

PROCEDURE

• Press the RANGE key to select the temperature measurement mode (just temperature measurement on the primary display).
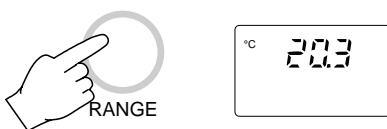
• Ensure that the probe is connected to the meter securely by aligning the pins with the socket, pushing the plug in and tightening the threaded ring. Insert the probe

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into the PVC sleeve with the holes towards the top (the end nearest to the cable) of the probe.

• Place the probe into the container with ice and water (0.0°C/32°F).

• Press the CAL key. The secondary (lower) display will blink "0" for about 30 seconds.
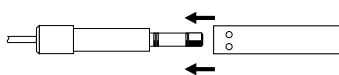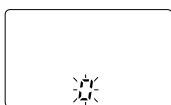

• When "0" stops blinking, the calibration can be confirmed. Press the CFM key to confirm the first value.

• If the value is out of the offset range, an error message will show on the secondary display "E1". Press the CAL key to re-calibrate the value.

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- If everything is satisfactory the LCD will blink "50" expecting the second buffer (50°C/122°F).

  Note: if a single point calibration is required, press the CAL key to leave the calibration mode now.

- Place the probe into the second container with hot water (50°C/122°F).
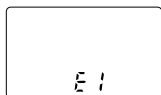
- When "50" stops blinking, press the CFM key again to confirm the second calibration point.

- If the value is out of the slope range, an error message will show on the secondary display "E2". Press the CAL key to re-calibrate the value.

- If everything is satisfactory the temperature calibration is complete and the meter will return to the normal operational mode.
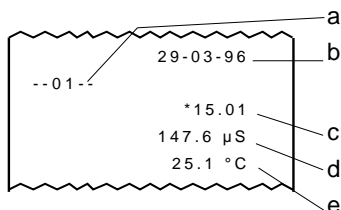
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PRINTING/RECORDING WITH HI933301

To print the measured values press the PRINT key.

The printout provides the following information:

a - Running log number

b - Date (DD-MM-YY)

c - Time (HH-MM)

d - Conductivity value in µS/cm or mS/cm

e - Temperature in degrees Centigrade.

RECORDING MODE (PROGRAMMED PRINTOUTS)

Set the appropriate printing interval (see Operational Guide section on page 12).

Press the ALT and the RECORD keys simultaneously to enter the recording mode.
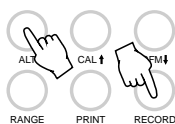
The log number will appear for a few seconds on the display to indicate the correct operational mode.

The meter will print the measurement taken at that moment and will continue to print according to the set interval until the recording function is stopped (see below).

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Each printout provides the following information:

a - Running log number.
b - Running sample number in that particular log.
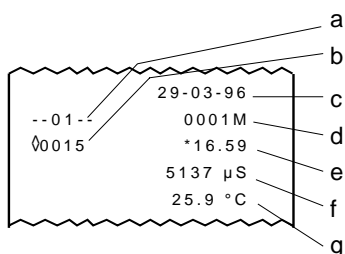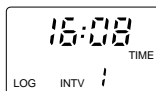c - Date (DD-MM-YY)
d - Printing interval indicator in minutes
e - Time (HH-MM)
f - Conductivity value in μS/cm or mS/cm
g - Temperature in degrees Centigrade.

When the meter is in the recording mode "LOG" is displayed on the bottom left corner of the LCD.

If no keys are pressed, the meter goes to standby mode to prolong the battery life. To reactivate the display press any key.

Notes:

• It is recommended to use the voltage adapter (**HI710005** or **HI710006**) during recording, especially when many printouts are going to be taken.

• Before starting to record, make sure that there is enough paper for your measurements.
  When the paper is finished the meter will not advise the operator and the printouts could be lost.

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- It is possible to insert a new paper roll during the recording mode (see page 46).

- Once in the logging mode, the interval cannot be changed.

  Exit the logging mode (pressing the ALT and the RECORD keys simultaneously) before setting the new interval (see page 12).
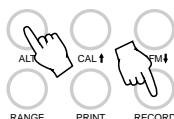
- If the PRINT key is pressed while still in recording mode, an additional printout is produced without affecting the running sample number.

SAMPLE NUMBER

During recording it is possible to know the running sample number. Press the RECORD key and the display will show the number of values that have been printed until now.
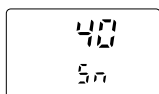
TO STOP RECORDING

In order to quit the recording mode, press the ALT and the RECORD keys simultaneously. This will generate a recording exit status printout.

```
                     29-03-96
 --01--             0001M
◊0055      *17.39
```
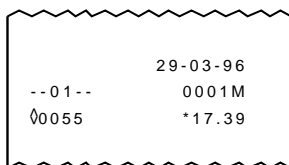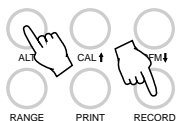
The running log number can be reset by simply removing the batteries.

To print the measured values shown on display, press the PRINT key once.

PRINT

This function can be activated in normal operation mode as well as during logging and scanning data on display (see below).

When in measurement mode, the printout provides the following information:

a - Running log number

b - Date (DD-MM-YY)

c - Time (HH-MM)

d - Conductivity value in µS/cm or mS/cm

e - Temperature in degrees Centigrade.
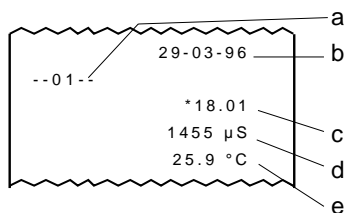
```
                                   a
            29-03-96               b
  --01-
                 *18.01
            1455 µS               c
            25.9 °C               d
                                   e
```

LOGGING MODE

This function is suggested when remote measurements have to be taken automatically without the necessity of an operator and for a long period of time. In this mode data will be stored directly into memory.

Set the appropriate logging interval (see Operational Guide section on page 8).

Press the ALT and the LOG keys simultaneously to enter the logging mode. The log number and page number will appear for a few seconds on the display to indicate the correct operational mode. The printer will print a complete set of data and the "LOG" sym

bol will appear on the bottom left corner of the LCD.

```
         29-03-96
--01--     0001M
◊0001      *18.05
         1455 µS
         25.9 °C
```
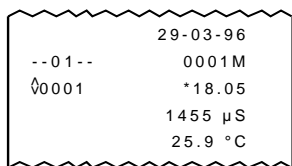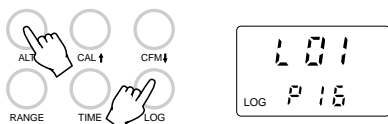
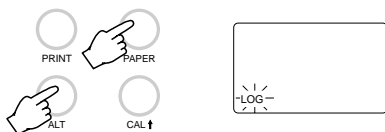Press the ALT and the PAPER keys at the same time and the "LOG" symbol on the display will start to blink.
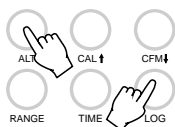
After approximately 5 minutes the display will switch off but the logging function remains active.

To reactivate the display press any key except the ALT key.

Notes:

• Once in the logging mode, the interval cannot be changed. Exit the logging mode (pressing the ALT and the LOG keys simultaneously) before setting the new interval (see page 8).

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- If the PRINT key is pressed while in logging mode, a printout is produced without affecting the running sample number.
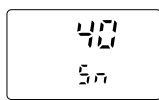

PRINT

SAMPLE NUMBER

During logging it is possible to know the running sample number.

Reactivate the display if the meter is in standby mode by pressing any key (except the ALT key).

Press the LOG key twice and the display will show the number of values that have been taken until now in the current log.

LOG

```
  40
  5n
```

LOGGING MODE WITH PRINTING

This function is suggested when an immediate report of the measurement is required in addition to the recording of data into memory.

Press the ALT and the LOG key simultaneously to enter the logging mode. The log number and page number will appear for a few seconds on the display to indicate the correct operational mode.

The meter will print a complete set of data and the "LOG" symbol will appear on the bottom left corner of the display.

ALT   CAL↑   CFM↓
RANGE   TIME   LOG

```
  L 01
LOG  P 15
```

```
              29-03-96
--01--        0001M
◊0001         *16.07
              5897 µS
              25.9 °C
```
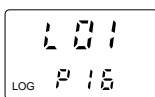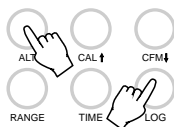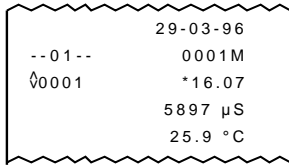
During logging with print-ing, the display shows the time, interval and the "LOG" symbol.

```
 15:08
        TIME
LOG  INTV  1
```

To display the conductivity value, press the RANGE key.


```
 5897 µS
 c  25
```
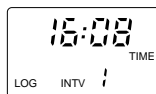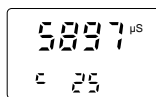
If no key is pressed, the display goes blank after about 5 minutes. To reactivate the dis-play press any key except the ALT key.

Each printout provides the following informa-tion:

a - Running log number.
b - Running sample number in that particular log
c - Date (DD-MM-YY)
d - Logging interval indicator in minutes
e - Time (HH-MM)
f - Conductivity value in µS/cm or mS/cm
g - Temperature in degrees Centigrade.

```
                            a
              29-03-96      b
--01--        0001M
◊0004         *16.10        c
              5815 µS       d
              25.6 °C       e
                            f
              29-03-96      g
--01--        0001M
◊0005         *16.11
              5829 µS
              25.6 °C
```

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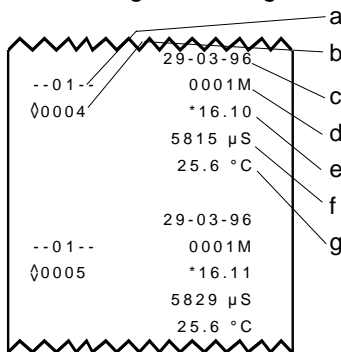
It is always possible to switch from the logging with printing function to the logging function only. Press the ALT and the PAPER keys at the same time and the "LOG" symbol will start to blink, indicating that the data are only stored in memory and not printed.
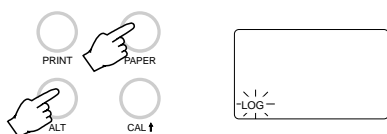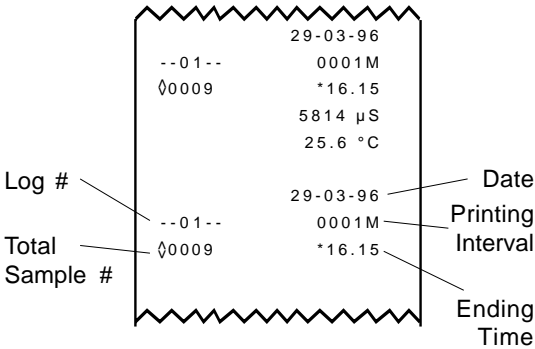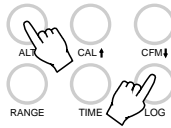

Notes:

- It is recommended to use the voltage adapter (**HI710005** or **HI710006**) during logging with printing mode, especially when many printouts are going to be performed.

- Before proceeding with logging with printing, make sure there is enough paper for your measurements. When the paper is finished the meter will not advise the operator and the printouts could be lost. If this happens, data will continue to be stored into memory, and it is always possible to print it at different time (see below).

- It is possible to insert a new paper roll during logging session (see page 46).

- Once in the logging mode, the interval cannot be changed. Exit the logging mode first (pressing the ALT and the LOG keys simultaneously) before setting the new interval (see page 8).

- If the PRINT key is pressed while in logging mode, a printout is produced without affecting the running sample number.


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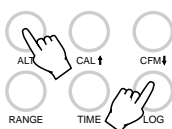
TO STOP LOGGING

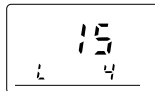Press the ALT and the LOG keys simultaneously, this will generate a log exit status print out.


```
        29-03-96
--01--     0001M
◊0009      *16.15
        5814 µS
        25.6 °C


        29-03-96
--01--     0001M
◊0009      *16.15
```

Log # — (pointing to --01--)
Total Sample # — (pointing to ◊0009)
Date — (pointing to 29-03-96)
Printing Interval — (pointing to 0001M)
Ending Time — (pointing to *16.15)

TO SCAN STORED DATA ON DISPLAY
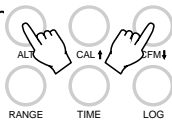
Press the LOG key. The display will show the log number and the page number of the next log.
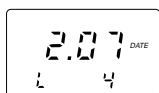


```
L  06
P  11
```
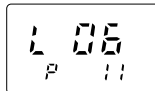
While pressing the ALT key, press the CFM key until the desired log number appears on the secondary display. The primary display will show the number of samples in that particular log.
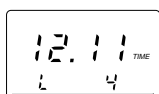
Press the DOWN arrow key to reverse the sequer


```
    15
L    4
```

38

Press the ALT and the RANGE keys simulta-
neously. This now shows the date in which
logging has commenced.

$$2.07 \,_{DATE}$$
$$L \quad 4$$

Press the UP arrow key and the time will be
displayed.

$$12.11 \,_{TIME}$$
$$L \quad 4$$

Press the UP arrow key and the temperature
will be displayed.

$$°C \quad 20.3$$
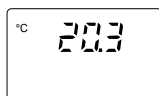
Press the UP arrow key and the conductivity
value will be displayed.

$$12.88 \,^{mS}$$
$$c \quad 20$$
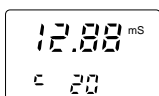
Continue pressing the UP
arrow key to display one by
one all the memorized data
of the same log in the above
sequence, i.e. time, tem-
perature, conductivity value.

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To exit from the recall mode press the LOG key.

Note: this mode will not alter data in memory.
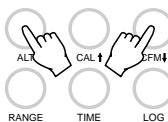
TO PRINT STORED DATA

Having selected a log number by using ALT and CFM keys, as detailed in the chapter "TO SCAN STORED DATA ON DISPLAY" you can print all or part of that log section by using the ALT and PRINT keys.

The printer will then start to print the logged section beginning with the selected sample number without altering the content of the memory.

Note: It is always possible to print only the sample shown on the display by pressing the PRINT key.

For example if 10 samples are stored in a particular log, use the DOWN arrow key to display sample No. 5.

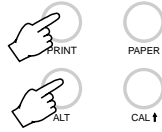Sample 5 can be printed on its own using the PRINT key.

Samples 5, 6, 7, 8, 9 and 10 can be printed by pressing ALT and PRINT keys.

If you wish to stop the printer during the download session press "ALT" and

40

"PAPER" simultaneously and the printer will immediately stop.

Note: Before proceeding with printing, make sure there is enough paper for the data to be printed.
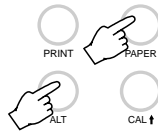
When the paper is finished the meter will not advise the operator and the printouts could be lost.

If this happens, stop the printer by pressing ALT and PAPER key simultaneously. Data will be kept in memory.

Insert a new paper roll and repeat the above instructions starting from the last printed sample number (see chapter "PRINTER MAINTENANCE" on page 46 for changing paper roll).

41
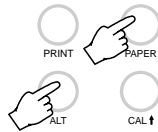
DATA TRANSFER TO PC

HI 933300 contains infrared emitting circuitry.

Set the meter to TIME mode and simply place your datalogger on a **HI 9200** Infrared Transmitter (ensuring that the two infrared LEDs are placed on top of each other) and the contents of the memory can then be downloaded to your PC through the **HI 9200**'s RS 232 port.
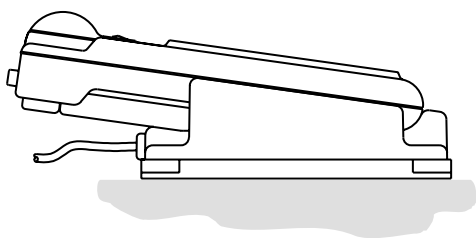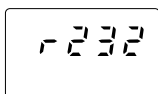

TIME

During the data transfer the instrument displays the message "r 232".

r 232

Using the **HI 9200** Infrared Transmitter, all recorded data can be fed to your Personal Computer for easy reproduction, storage or elaboration without the interference of cables or cords between the meter and the transmitter.

Data transmission from the instrument to the PC is now much easier with new **HI 92000** Windows® compatible application software offered by Hanna Instruments.

Windows® is registered Trademark of "Microsoft Co."

HI 92000 allows you to use the powerful means of the most widely used spread sheet programs available (e.g.Excel©, Lotus 1-2-3©).

Simply open your file downloaded by **HI 92000** from your spread sheet program and then it is possible to make any elaboration available with your software (e.g. graphics, statistic analysis).

User friendly, **HI 92000** offers a variety of features and has on line help to support you throughout any situation.
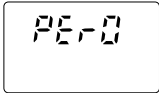
To install **HI 92000** you need a 3.5" drive and a few minutes to follow the instructions conveniently printed on the disk label.
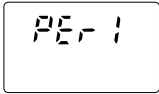
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FAULT FUNCTIONS

HI 933300 and **HI 933301** are factory pro-
grammed to automatically diagnose a fault.
This is displayed with error codes on the
LCD.

Error codes:
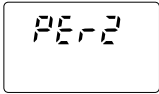
PEr 0, PEr 1, PEr 2 = Short
    circuit on the system,
    the meter should be
    returned for repair
    (see Warranty sec-
    tion).

PErO

PEr 1

PEr2

PEr 3 = Printer mechanism
    fault - repair needed
    (see Warranty sec-
    tion).

PEr3

PEr 4 = Printer   clutch
    jammed - reset the
    printer (see page 47).

PEr4

PEr 9 = Printer jammed - re-
    set the printer (see
    page 47).

PEr9

MEMORY ORGANIZATION (HI933300)

Capacity: 8000 data samples which are divided into 16 pages.

Each time a new logging period starts, it automatically starts from a new page.
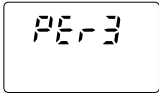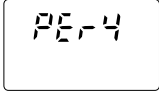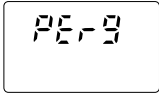
If the logging function is still on, and the available page is 0 the meter will overwrite the first lot of data in the existing memory. During logging the meter automatically returns to the oldest page in memory and if it contains data, it will overwrite. In this case the first log will not correspond to the oldest set of data

It is recommended to periodically "clean" the memory. Save data with PC if you need to keep a record and then disconnect the batteries for about 1 minute. If you do this, remember to set the date and time, once the batteries have been reconnected.

ATTENTION:

Data is stored into memory until the batteries are removed.

If battery replacement is required and data is not to be lost, plug the adapter in and proceed with battery replacement (see page 49). Only once the batteries have been replaced it is possible to unplug the adapter without loosing the stored data.

TO CHANGE THE INK CARTRIDGE

When printouts become faint, it might be necessary to change the ink cartridge. Contact your Hanna authorized center.

TO INSERT THE PAPER ROLL

The **HI933300** and **HI933301** use plain paper rolls 38 mm width. To insert a new roll is very easy.

Open the paper cover pulling it gently.
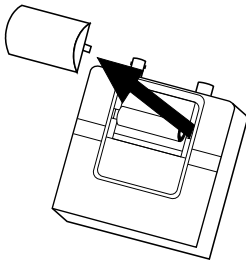
Take the carton cylinder away.
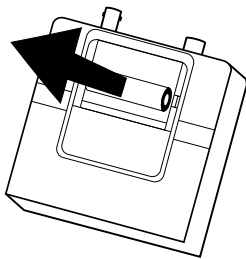
Insert the paper edge in the printer slot and feed the printer by pressing the PAPER key.

PAPER

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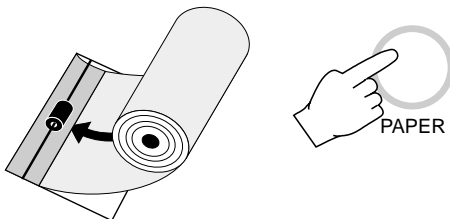
Allow about 5 cm (2") to exit from the printer and replace the paper cover.

TO RESET PRINTER

Investigate the cause of the printer jam (e.g. the paper caught under the cover that has prevented printer from advancing paper feed).

Press the PAPER key to reset the printer.

PAPER

PROBE MAINTENANCE

Rinse the probe with tap water after every series of measurements. If a more thorough cleaning is required, remove the PVC sleeve and clean the probe with a cloth or a nonabrasive detergent. When reinserting the sleeve onto the probe, be sure that the sleeve is in the right direction with the four holes towards the cable end.
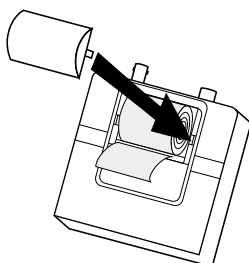
After cleaning the probe, re-calibrate the instrument.

The probe body is in PVC and for this reason must never come into close contact with sources of heat. If the probe is exposed to high temperatures, detachment of the rings might occur, resulting in a serious impairment of probe function. In such cases, the probe has to be replaced.
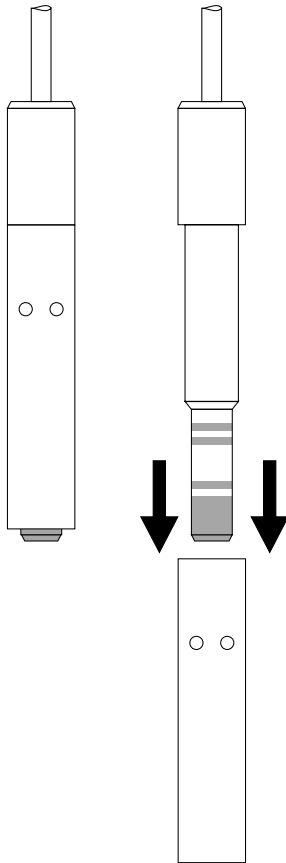
BATTERY REPLACEMENT

When the batteries are run down "LOBAT" is displayed on the Liquid Crystal Display to warn the user.

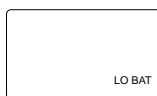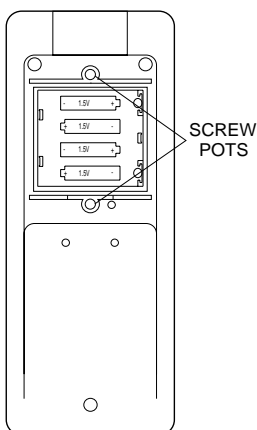Battery replacement must only take place in a non hazardous area using 1.5V alkaline AA type batteries.

In order to replace run down batteries, simply remove the two screws on the rear cover of the instrument and replace the four 1.5V AA batteries with new ones, paying attention to the correct polarity.

A 12VDC power source can also be used to power the unit (see the Accessories section page 51).

Note: The instrument uses the following configuration.
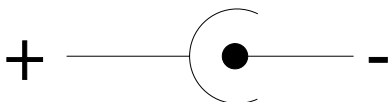
It is recommendable to purchase the Hanna **HI 710005** and **HI 710006** voltage adapters that use the proper polarity configuration. Anyway, **HI 933300** and **HI 9333001** can be used with other adapters. In this case, remember to check the correct polarity of your adapter before connecting it to the meter.

CONDUCTIVITY CALIBRATION SOLUTIONS

|	
HI 7030L	12880 µS/cm (µmho/cm), 460 mL
HI 7030M	12880 µS/cm (µmho/cm), 230 mL
HI 7031L	1413 µS/cm (µmho/cm), 460 mL
HI 7031M	1413 µS/cm (µmho/cm), 230 mL
HI 7033L	84 µS/cm (µmho/cm), 460 mL
HI 7033M	84 µS/cm (µmho/cm), 230 mL
HI 7034L	80000 µS/cm (µmho/cm), 460 mL
HI 7034M	80000 µS/cm (µmho/cm), 230 mL
HI 7035L	111800 µS/cm (µmho/cm), 460 mL
HI 7035M	111800 µS/cm (µmho/cm), 230 mL
HI 7039L	5000 µS/cm (µmho/cm), 460 mL
HI 7039M	5000 µS/cm (µmho/cm), 230 mL

CONDUCTIVITY CALIBRATION SOLUTIONS IN FDA APPROVED BOTTLES

HI 8030L	12880 µS/cm (µmho/cm), 460 mL
HI 8031L	1413 µS/cm (µmho/cm), 460 mL
HI 8033L	84 µS/cm (µmho/cm), 460 mL
HI 8034L	80000 µS/cm (µmho/cm), 460 mL
HI 8035L	111800 µS/cm (µmho/cm), 460 mL
HI 8039L	5000 µS/cm (µmho/cm), 460 mL

POWER UNITS

HI710005   Voltage adapter from 115 VAC to 12 VDC

HI710006   Voltage adapter from 230 VAC to 12 VDC
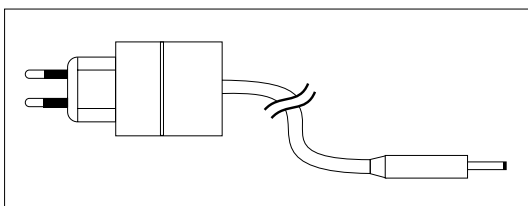
OTHER ACCESSORIES

CHECKTEMPC Electronic thermometer (range -50.0 to 150.0°C)

HI710031   Hard carrying case

HI710034   Plain Paper Spare Rolls (10 pcs)

HI710035   Spare Ink Cartridge (1pc)

HI721308   1.5V AA alkaline battery (10 pcs)

HI76302W   4-ring probe with temperature sensor with 1 meter (3.3') cable

HI9200   Infrared Transmitter (for **HI933300** only)

HI92000/16 Windows® 3.11 software for data transfer to PC (for **HI933300** only)

HI92000/32 Windows® 95 software for data transfer to PC (for **HI933300** only)

MANCNPRNR1 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 the instructions.

The probes are warranted for a period of six months.

Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered. This warranty is limited to repair or replacement free of charge.

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 charge for repair or replacement. If the instrument is to be returned to Hanna Instruments, obtain a Return Goods Authorization from the Customer Service Department first and then send it with shipment cost 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.

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

CE DECLARATION OF CONFORMITY

HANNA instruments

$C\,\epsilon$

DECLARATION OF CONFORMITY

We

Hanna Instruments Srl
V.le delle industrie 12
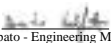35010 Ronchi di Villafranca (PD)
ITALY

herewith certify that the conductivity meters

HI 933300   HI 933301

have been tested and found to be in compliance with the following regulations:

IEC 801-2	Electrostatic Discharge
IEC 801-3	RF Radiated
IEC 801-4	Fast Transient
EN 55022	Radiated, Class B

Date of Issue: 15-03-1996

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 60VDC.

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

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HANNA
instruments

http://www.hannainst.com