

Instruction Manual

HI 9033 - HI 9034
HI 9039 - HI 9130
HI 933100 - HI 9635
Portable Waterproof
Multi-Range
**Conductivity/TDS/
Fertilizer Meters**



 **HANNA**
instruments
Manufacturers since 1978

CE
These Instruments are in
Compliance with the CE Directives

Dear Customer,

Thank you for choosing a Hanna Product. Please read this instruction manual carefully before using the instrument. It will provide you with the necessary information for a correct use of the instrument, as well as a precise idea of its versatility. If you require further technical

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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 meter is supplied complete with:

- HI 76302W Conductivity Probe with 1 m (3.3') screened cable
- 9 V battery (except HI 933100 and HI 9635 which are supplied with 4 x 1.5V AA)
- Soft carrying case (HI 9130 only)
- Hard carrying case (except for HI 9130)

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

GENERAL DESCRIPTION

HI 9033, HI 9034, HI 9039, HI 9130, HI 933100 and HI 9635 are multirange conductivity/TDS meters with Automatic Temperature Compensation. These meters utilize the latest in four-ring potentiometric technology which has been proven to provide higher accuracy than the common amperometric method.

HI 9033, HI 9130, HI 933100 and HI 9635 have a range of 0 to 199900 $\mu\text{S}/\text{cm}$ ($\mu\text{mho}/\text{cm}$); HI 9034 has a range of 0 to 19990 mg/L (ppm). HI 9635 can also take TDS measurements in the 0 to 100,000 mg/L range, and temperature measurements in the 0.0 to 60.0°C range. Thanks to this wide measurement range, these meters can be used to analyze any sample from deionized water to brine.

In particular, HI 9130 with its white casing and easy operation has been specifically designed for the food industry.

HI 9039 can measure conductivity, temperature and two different types of fertilizer concentrations (F1 and F2) for applications in agriculture and horticulture. To measure the fertilizer content, simply standardize the two different fertilizer ranges. To monitor the quality of the water used with the fertilizer, the conductivity must be checked. This also helps in the selection of water to be mixed with the fertilizer. The temperature of all conductivity/TDS measurements is automati-

cally compensated for by the ATC circuitry of the meters. The stainless steel rings of the probe have a large surface for better response and easy cleaning. The detachable probe can be changed without returning the unit to the factory. The probe cable is screened and 1 m (3.3') long.

The meters are constructed with a waterproof, rugged housing to provide the versatility required for both laboratory and field use.

Another feature of the meters is the Battery Error Preventive System (BEPS) which prevents erroneous readings due to low battery voltage.

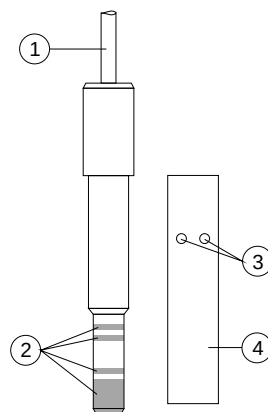
Moreover, HI 9039, HI 933100 and HI 9635 are equipped with a large LCD that helps the user through operation and calibration with large comprehensive symbols. Besides displaying the selected range, the LCD simultaneously displays the temperature. These meters are microprocessor-based and perform buffer recognition and calibration automatically.

For continuous monitoring HI 933100 and HI 9635 are supplied with built-in 12VDC sockets protected behind a waterproof cover.

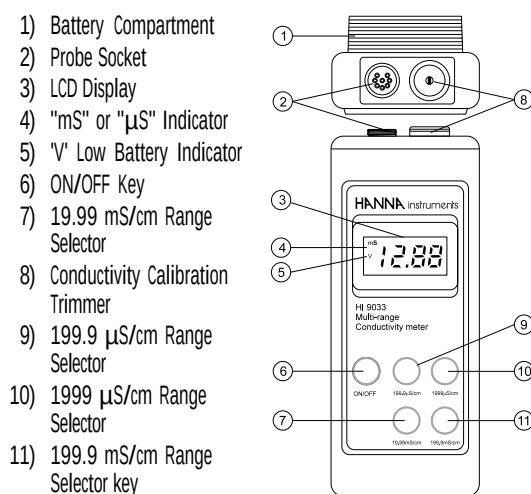
The temperature coefficient of HI 933100 and HI 9635 is user-selectable from 0.0 to 3.0%. The TDS/conductivity ratio (factor) of HI 9635 can be set to 0.7 (F1) or 0.5 (F2).

FUNCTIONAL DESCRIPTION OF HI 76302W CONDUCTIVITY PROBE

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

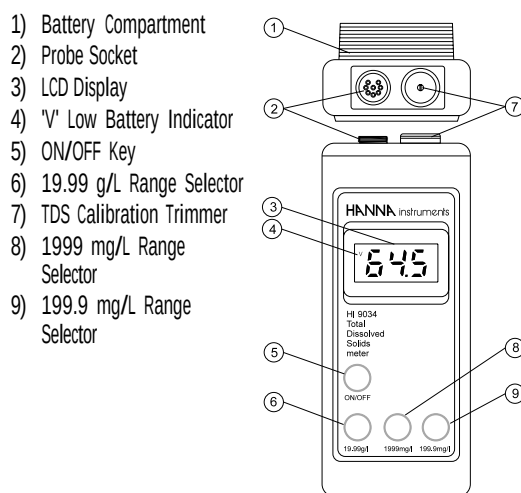


FUNCTIONAL DESCRIPTION & SPECIFICATIONS OF HI 9033



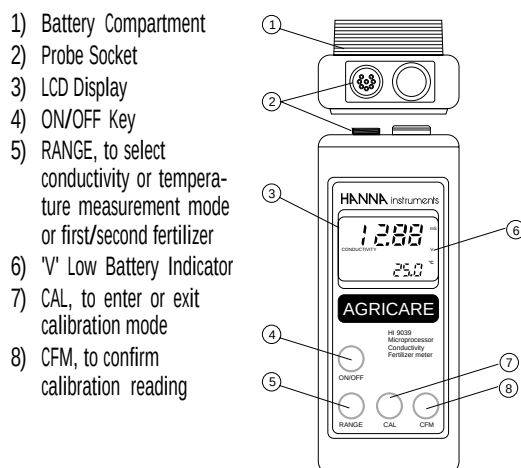
Range	0.0 to 199.9 μS/cm 0 to 1999 μS/cm 0.00 to 19.99 mS/cm 0.0 to 199.9 mS/cm
Resolution	0.1 μS/cm 1 μS/cm 0.01 mS/cm 0.1 mS/cm
Accuracy (@20°C/68°F)	± 1% Full Scale, excluding probe error
Typical EMC Deviation	± 1% Full Scale
Calibration	Manual single point through trimmer on the case
Temperature Compensation	Automatic from 10 to 40°C (50 to 104°F) with β of 2% °C
Probe	HI 76302W with 1 m (3.3') cable (included)
Battery Type/Life	1 x 9V; 100 hours of continuous use
Environment	0 to 50°C (32 to 122°F); 100% RH
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight	425 g (15 oz.); Kit: 1.4 kg (3.1 lb.)

FUNCTIONAL DESCRIPTION & SPECIFICATIONS OF HI 9034



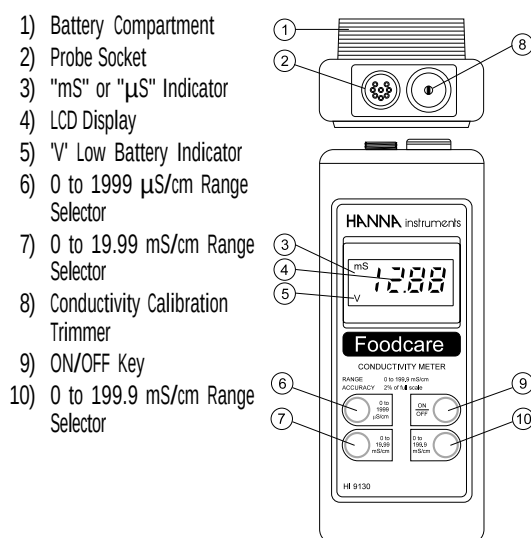
Range	0.0 to 199.9 mg/L 0 to 1999 mg/L 0.00 to 19.99 g/L
Resolution	0.1 mg/L 1 mg/L 0.01 g/L
Accuracy (@20°C/68°F)	± 1% Full Scale, excluding probe error
Typical EMC Deviation	± 1% Full Scale
Calibration	Manual single point through trimmer on the case
Temperature Compensation	Automatic from 10 to 50°C (50 to 122°F) with β of 2% °C
Probe	HI 76302W with 1 m (3.3') cable (included)
Battery Type/Life	1 x 9V; 100 hours of continuous use
Environment	0 to 50°C (32 to 122°F); 100% RH
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight	425 g (15 oz.); Kit: 1.4 kg (3.1 lb.)

FUNCTIONAL DESCRIPTION & SPECIFICATIONS OF HI 9039



Range	Conductivity	0 to 9999 $\mu\text{S/cm}$
	Temperature	0.0 to 50.0°C
	Fertilizer 1	0.00 to 9.99 g/L
	Fertilizer 2	0.00 to 9.99 g/L
Resolution		1 $\mu\text{S/cm}$; 0.1°C; 0.01 g/L
Accuracy (@20°C/68°F)		$\pm 1\%$ Full Scale, excluding probe error
Typical EMC Deviation		$\pm 1\%$ Full Scale
Calibration		Automatic, single point at 5000 $\mu\text{S/cm}$
Temperature Compensation		Automatic from 10 to 50°C (50 to 122°F) with β of 2% °C
Probe		HI 76302W with 1 m (3.3') cable (included)
Battery Type/Life		1 x 9V; 100 hours of continuous use
Environment		0 to 50°C (32 to 122°F); 100% RH
Dimensions		196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight		425 g (15 oz.); Kit: 1.4 kg (3.1 lb.)

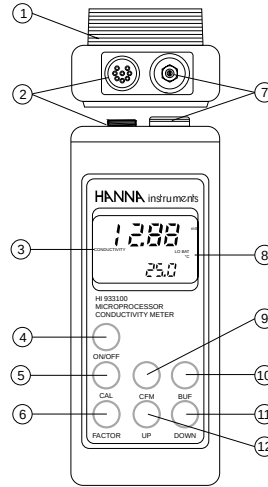
FUNCTIONAL DESCRIPTION & SPECIFICATIONS OF HI 9130



Range	0 to 1,999 μS/cm 0.00 to 19.99 mS/cm 0.0 to 199.9 mS/cm
Resolution	1 μS/cm 0.01 mS/cm 0.1 mS/cm
Accuracy (@20°C/68°F)	± 2% Full Scale, excluding probe error
Typical EMC Deviation	± 1% Full Scale
Calibration	Manual single point through trimmer on the case
Temperature Compensation	Automatic from 10 to 40°C (50 to 104°F) with β of 2%/°C
Probe	HI 76302W with 1 m (3.3') cable (included)
Battery Type/Life	1 x 9V; 100 hours of continuous use
Environment	0 to 50°C (32 to 122°F); 100% RH
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight	425 g (15 oz.); Kit: 1.4 kg (3.1 lb.)

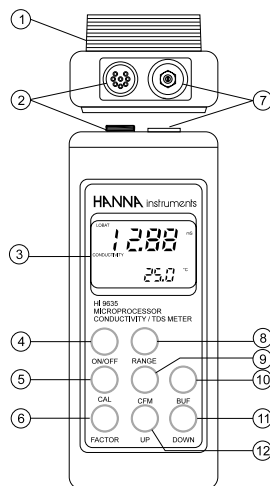
FUNCTIONAL DESCRIPTION & SPECIFICATIONS OF HI 933100

- 1) Battery Compartment
- 2) Probe Socket
- 3) Liquid Crystal Display
- 4) ON/OFF Key
- 5) CAL, to enter or exit calibration mode
- 6) FACTOR, to set the temperature coefficient or select the temperature mode
- 7) 12VDC Power Socket
- 8) 'LOBAT' Low Battery
- 9) CFM, to confirm the calibration reading
- 10) BUF, to select the calibration buffer value
- 11) DOWN, to set the temperature coefficient or for manual temperature compensation setting
- 12) UP, to set the temperature coefficient or for manual temperature compensation setting



Range	Conductivity	0.0 to 150.0 $\mu\text{S/cm}$ 150 to 1500 $\mu\text{S/cm}$ 1.50 to 15.00 mS/cm 15.0 to 199.9 mS/cm
	Temperature	0.0 to 60.0°C
Resolution		0.1 $\mu\text{S/cm}$; 1 $\mu\text{S/cm}$; 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% Full Scale ± 0.2 °C
Calibration		Automatic, two points at 0 and 1413 or 12880 $\mu\text{S/cm}$
Temperature Compensation		Automatic or manual from 10 to 60°C (50 to 140°F) with β from 0 to 3%/°C
Probe		HI 76302W with 1 m (3.3') cable (included)
Battery Type/Life		4 x 1.5V AA; 150 hours of continuous use. Power socket for 12VDC
Environment		0 to 50°C (32 to 122°F); 100% RH
Dimensions		196 x 80 x 60 mm (7.7 x 3.1 x 2.2")
Weight		425 g (15 oz.); Kit: 1.4 kg (3.1 lb.)

FUNCTIONAL DESCRIPTION & SPECIFICATIONS OF HI 9635



- 1) Battery Compartment
- 2) Probe Socket
- 3) Liquid Crystal Display
- 4) ON/OFF Key
- 5) CAL, to enter or exit calibration mode
- 6) FACTOR, to show temperature, %TC or TDS factor on the secondary display
- 7) 12VDC Power Socket
- 8) RANGE, to select the measurement mode
- 9) CFM, to confirm the calibration reading
- 10) BUF, to select the calibration buffer value
- 11) DOWN, to set the temperature coefficient or for manual temperature compensation setting
- 12) UP, to set the temperature coefficient or for manual temperature compensation setting

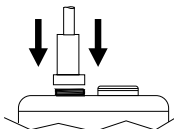
RANGE	Conductivity	0.0 to 150.0 $\mu\text{S/cm}$ 150 to 1500 $\mu\text{S/cm}$ 1.50 to 15.00 mS/cm 15.0 to 199.9 mS/cm
	TDS	0.0 to 150.0 mg/L (ppm) 150 to 1500 mg/L (ppm) 1.50 to 15.00 g/L (ppt) 15.0 to 100.0 g/L (ppt)
	Temperature	0.0 to 60.0°C
Resolution	Cond.	0.1 $\mu\text{S/cm}$ / 1 $\mu\text{S/cm}$ 0.01 mS/cm / 0.1 mS/cm
	TDS	0.1 mg/L (ppm) / 1 mg/L (ppm) 0.01 g/L (ppt) / 0.1 g/L (ppt)
	Temperature	0.1°C
Accuracy (@20°C/68°F)	Cond.	± 2% Full Scale
	TDS	± 2% Full Scale
	Temperature	± 0.5°C excluding probe error
Typical EMC Deviation	Cond.	± 2% Full Scale
	TDS	± 2% Full Scale
	Temperature	± 0.5°C
Calibration		Automatic 1, 2 or 3 point calibration at 84, 1413 or 12880 $\mu\text{S/cm}$
Temperature Compensation		Automatic or manual from 0 to 60°C (32 to 140°F) with adjustable β from 0.0 to 3.0% /°C and TDS factor at 0.70 or 0.50. Compensation referenced to 25°C (77°F)
Probe		HI 76302W with 1 m (3.3') cable (included)
Battery Type/Life		4x1.5V AA/150 hours of continuous use Auto-shut off after 10' of non use 12VDC power socket
Environment		0 to 50°C (32 to 122°F); 100% RH
Dimensions		196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight		425 g (15 oz.); Kit: 1.4 kg (3.1 lb.)

OPERATIONAL GUIDE

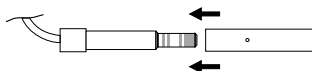
INITIAL PREPARATION

Each meter is supplied complete with battery(ies). Remove the back cover, unwrap the battery(ies) and install it (them) while paying attention to polarity its (their) (see page 31).

Connect the probe to the meter securely by aligning the pins with the socket, 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).



Make sure that the meter has been calibrated before taking any measurements (see page 15).

TAKING CONDUCTIVITY/TDS MEASUREMENTS

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



Turn the instrument on by first pressing the ON/OFF key and then selecting the desired range (not HI 933100 and HI 9635).



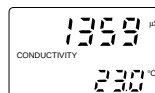
With HI 9039, press RANGE to choose the range. "F1" and "F2" will appear to show the first or the second fertilizer range.



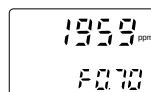
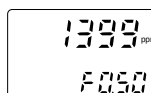
With HI 9635, press RANGE to select the desired mode, which can be one of the following:



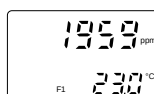
- Conductivity mode



- TDS1 mode: TDS with 0.7 factor (shown on the secondary display)
- TDS2 mode: TDS with 0.5 factor (shown on the secondary display)

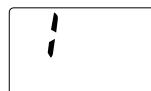



In the TDS mode, by pressing FACTOR the secondary display shows the temperature of the solution .

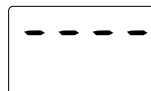



HI 933100 and HI 9635 are auto-ranging conductivity meters, and the reading automatically switches from one resolution to the next.

With HI 9033, HI 9034 and HI 9130, if the LCD displays a "1" on the far left hand side, the meter is out of range and the solution measured exceeds the selected range. In this case, the next (higher) range should be selected.



With HI 9039, HI 933100 and HI 9635 the out of range prompt is given by four hyphens.



TEMPERATURE EFFECT

HI 76302W conductivity probe has a built-in temperature sensor and automatically compensates for any temperature differences. 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 drastically different, a longer time should be allowed before taking readings.

Once the reading stabilizes, the measurement is complete. If further measurements are desired, rinse the probe with tap water and test the next sample.

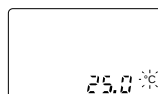
MANUAL TEMPERATURE COMPENSATION (FOR HI 933100 AND HI 9635)

To perform manual temperature compensation, use HI 933100 and HI 9635 with HI 76301W conductivity probe instead of the supplied HI 76302W.

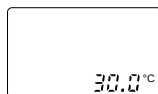
Connect HI 76301W to the meter.

Select the temperature (°C) mode by pressing FACTOR once.

The secondary LCD figure will display a default temperature of 25°C or the last recorded temperature reading with a blinking "°C" symbol. Change the reading by pressing the UP or DOWN keys. Hold down the UP or DOWN keys to force the reading to change in 0.5°C steps (HI 933100) or 1°C (HI 9635) instead of 0.1°C.

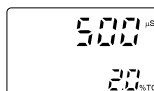


Note: If HI 76302W is connected to HI 933100 or HI 9635 and the °C mode is selected, the secondary LCD will continue to display the measured temperature, and the "°C" symbol will not blink. Pressing UP or DOWN will also not alter the temperature readings.



TEMPERATURE COEFFICIENT SELECTION (FOR HI 933100 AND HI 9635)

Press FACTOR again to select the TC (Temperature Coefficient). The secondary LCD will display the temperature coefficient (e.g. 2.0% per °C).



This value is adjustable from 0.0 to 3.0%/°C by pressing UP or DOWN.



AFTER MEASUREMENTS

When all measurements are completed the meter should be turned OFF and the probe cleaned (see page 30).



Note: The probe body and sleeve are made of PVC and are susceptible to damage due to temperatures exceeding 60°C (140°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.

CONDUCTIVITY/TDS CALIBRATION

For best results in calibrating your meter, choose a conductivity/TDS solution that is closest in value to the sample to be measured.

For example if your measurements are in the 2 to 20 mS/cm range, ideally use the HI 7030 or HI 8030 ($12880 \mu\text{S}/\text{cm} = 12.88 \text{ mS}/\text{cm}$) conductivity calibration solution.

For accurate calibration, use two beakers for each solution: the first one for rinsing the probe and the second one for calibration. In this way, contamination of the calibration solutions is minimized.

RINSE



CALIBRATION

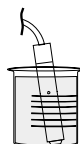
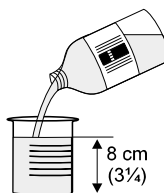


In order to minimize any EMC interference, use plastic beakers for the solutions, wherever possible.

A complete list of the Hanna calibration solutions is given in the Accessories section (page 32).

PROCEDURE FOR HI 9033 AND HI 9

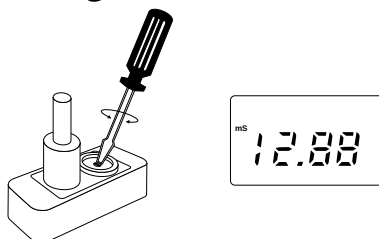
- Fill a beaker with 8 cm ($3\frac{1}{4}$ ") of conductivity calibration solution (if possible fill two beakers and use one as rinse and the other for calibration).
- Make sure that the probe is connected to the meter securely by aligning the pins with the socket, pushing the plug in and tightening the threaded ring.
- Immerse the probe into the beaker. The level of solution must be higher than the holes on the PVC sleeve.
- Turn the instrument on by pressing the ON/OFF key and select the appropriate range (e.g. 19.99 mS/cm).



- Tap the probe repeatedly on the bottom of the beaker and stir it to ensure that no air bubbles are trapped inside the sleeve.
- If the temperature of the probe is close to that of the solution, the display will stabilize quickly and provide you with temperature compensated conductivity measurements. However, allow a few

minutes if there is a temperature difference of 5°C (9°F) or more for the ATC circuitry to compensate completely.

- When the reading stabilizes, turn the calibration trimmer until the display reads the proper conductivity value @25°C. For example with HI 7030/HI 8030 turn the trimmer to read 12.88 mS/cm @ 25°C.



Note: It is also possible to standardize the calibration to have readings compensated to 20°C (68°F) rather than 25°C (77°F). During the calibration, as explained above, simply adjust the trimmer to the calibration buffer reading at 20°C (68°F). For example, for HI 7030 / HI 8030 this value is 11.67 mS/cm and can be found on the conductivity vs. temperature chart on page 22.

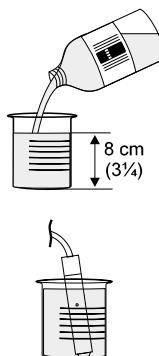
The calibration is now complete and the instrument is ready for use. All subsequent measurements will now be compensated to 25°C (77°F).

If the instrument cannot be calibrated refer to the Probe Maintenance section (page 30).

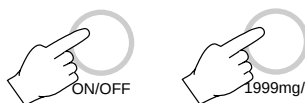
You can calibrate the instrument using any other Hanna calibration solution in exactly the same way. For example with HI 7031 / HI 8031 turn the trimmer to obtain 1413 µS/cm @25°C.

PROCEDURE FOR HI 9034

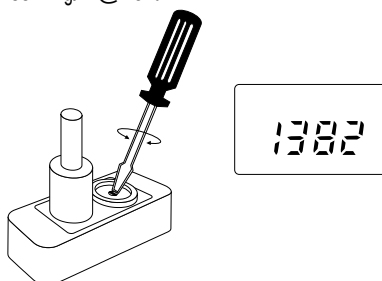
- Fill a beaker with 8 cm (3¼") of TDS calibration solution (if possible fill two beakers and use one as rinse and the other for calibration).
- Make sure that the probe is connected to the meter securely by aligning the pins with the socket, pushing the plug in and tightening the threaded ring.
- Immerse the probe into the beaker. The level of solution must be higher than the holes on the PVC sleeve.



- Turn the instrument on by pressing ON/OFF and select the appropriate range (e.g. 1999 mg/L).



- Tap the probe repeatedly on the bottom of the beaker and stir it to ensure that no air bubbles are trapped inside the sleeve.
- If the temperature of the probe is close to that of the solution, the display will stabilize quickly and provide you with temperature compensated TDS measurements. However, allow a few minutes if there is a temperature difference of 5°C (9°F) or more for the ATC circuitry to compensate completely.
- When the reading stabilizes, turn the calibration trimmer until the display reads the proper TDS value @25°C.
For example, when calibrating with HI 7032 turn the trimmer to read 1382 mg/L @25°C.



Note: It is also possible to standardize the calibration to have readings compensated to 20°C (68°F) rather than 25°C (77°F). Simply adjust the trimmer to the calibration buffer reading at 20°C (68°F). For example, for HI 7032 this value is 1251 mg/L and can be found on the TDS vs. temperature chart on page 23.

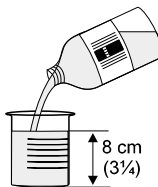
The calibration is now complete and the instrument is ready for use. All subsequent measurements will now be compensated to 25°C (77°F).

If the instrument cannot be calibrated, refer to the Probe Maintenance section (page 30).

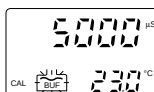
You can calibrate the instrument using any other Hanna calibration solution in exactly the same way. For example with HI 7038 turn the trimmer to obtain 6.44 g/L @25°C.

PROCEDURE FOR HI 9039

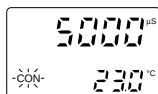
- Fill a beaker with 8 cm (3¼") of HI 7039 or HI 8039 conductivity calibration solution at 5000 µS/cm @25°C (if possible fill two beakers and use one as rinse and the other for calibration).
- Make sure that the probe is connected to the meter securely by aligning the pins with the socket, pushing the plug in and tightening the threaded ring.
- Immerse the probe into the beaker. The level of solution must be higher than the holes on the PVC sleeve.
- Turn the instrument on by pressing ON/OFF and select the conductivity measurement mode by pressing RANGE.



- 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 CAL to display "5000 µS" together with the "CAL" symbol and an intermittent "BUF" indicator.



- If the reading is within 15% of the theoretical value, the meter automatically recognizes the standard solution and the "BUF" symbol will stop flashing.
- "—" will disappear from the display when the reading is stable and the "CON" symbol will start blinking.
- Press CFM to confirm the calibration reading.

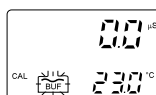
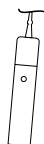


Calibration is now complete and the instrument is ready for use. All subsequent measurements will now be compensated to 25°C (77°F). If the instrument cannot be calibrated refer to the Probe Maintenance section (page 30). Press CAL to quit the calibration mode.

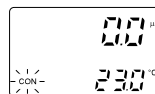


PROCEDURE FOR HI 933100

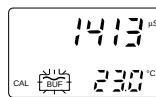
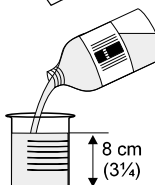
- Make sure that the conductivity probe is connected to the meter securely by aligning the pins with the socket, pushing the plug in and tightening the threaded ring.
- Dry the probe and leave it in the air.
- Turn the instrument on by pressing ON/OFF.
- Press CAL to display "0.0 μS " together with the "CAL" symbol and an intermittent "BUF" indicator.



- "—" will disappear from the display when the reading is stable and the "CON" symbol will start blinking.
- Press CFM to confirm the calibration value and exit the calibration mode.



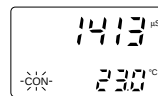
- Fill a beaker with 8 cm (3¼") of HI 7031/HI 8031, at 1413 $\mu\text{S}/\text{cm}$ @25°C, or HI 7030/HI 8030, at 12880 $\mu\text{S}/\text{cm}$ @25°C (if possible fill two beakers and use one as rinse and the other for calibration).
- Immerse the probe into the beaker. The level of solution must be higher than the holes on the PVC sleeve.
- Tap the probe gently on the bottom of the beaker and stir it to ensure that no air bubbles are trapped inside the sleeve.
- Press CAL to display "1413 μS " together with the "CAL" symbol and an intermittent "BUF" indicator.



- Press BUF if you are calibrating with HI 7030/HI 8030 to display "12.88mS" instead of "1413 μS ".

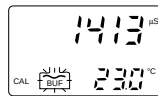
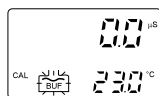


- If the reading is within 15% of the theoretical value, the meter automatically recognizes the buffer and the "BUF" symbol will stop flashing.
- "—" will disappear from the display when the reading is stable and "CON" symbol will start blinking.
- Press CFM to confirm the calibration value and quit the calibration mode.



The calibration is now complete and the instrument is ready for use. All subsequent measurements will now be compensated to 25°C (77°F). If the instrument cannot be calibrated refer to the Probe Maintenance section (page 30).

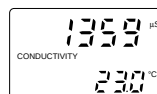
Note: In order to calibrate with a first calibration value other than 0 µS/cm, press BUF to select 1413 µS/cm or 12.88 mS/cm.



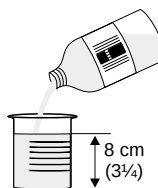
PROCEDURE FOR HI 9635

Before proceeding with the conductivity calibration, set the temperature coefficient to 2% (see page 25).

- Press RANGE to select the conductivity measurement mode.



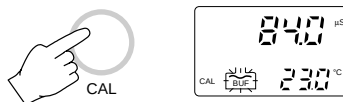
- Fill a beaker with 8 cm (3¼") of HI 7033/HI 8033 conductivity calibration solution at 84.0 µS/cm @25°C/77°F (if possible fill two beakers and use one as rinse and the other for calibration).



- Immerse the probe into the beaker. 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.



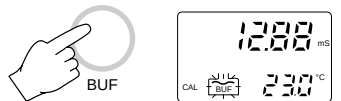
- Press CAL to display "84.0 μ S" together with the "CAL" symbol and an intermittent "BUF" indicator.



- If the reading is within 15% of the theoretical value, then the meter automatically recognizes the value.
- "—" will disappear from the display when the reading is stable and "CON" will start blinking.
- Press CFM to confirm the calibration value and the display will show "1413 μ S" expecting the 2nd calibration solution.



- Repeat the same procedure using HI 7031/HI 8031 conductivity calibration solution at 1413 μ S/cm @25°C/77°F.
- After confirmation of the 2nd calibration value the display will show "1.41mS" expecting the 3rd calibration solution.
- Press BUF to select the 12.88 mS/cm calibration value.



- Repeat the same procedure using HI 7030/HI 8030 conductivity calibration solution at 12.88 mS/cm @25°C/77°F.
- After confirmation of the 3rd calibration solution, if everything is satisfactory, the calibration ends and the meter returns to the normal operational mode.

Three-point calibration is now complete and the instrument is ready for use. All subsequent measurements will now be compensated to 25°C (77°F).

Notes:

- To perform the calibration with a different first calibration value than 84 μ S/cm, press BUF to select one of the other standard solutions.
- To quit after 1 or 2 point calibration, press CAL.
- If the instrument will not calibrate refer to the Probe Maintenance and Cleaning section (page 30).

CONDUCTIVITY VERSUS TEMPERATURE CHART

The conductivity of an aqueous solution is the measure of its ability to carry an electrical current by means of ionic motion.

The conductivity invariably increases with increasing temperature.

It is affected by the type and number of ions in the solution and by the viscosity of the solution itself. Both parameters are temperature dependent. The dependency of conductivity on temperature is expressed as a relative change per degree Celsius at a particular temperature, commonly as percent per °C.

°C	°F	HI 7030 HI 8030 (µS/cm)	HI 7031 HI 8031 (µS/cm)	HI 7033 HI 8033 (µS/cm)	HI 7034 HI 8034 (µS/cm)	HI 7035 HI 8035 (µS/cm)	HI 7039 HI 8039 (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

TDS VERSUS TEMPERATURE CHART

The TDS value in aqueous solutions is directly proportional to conductivity. The ratio between the two parameters depends on the solution and usually it is set to a factor of 0.5 (corresponding to a solution of CaCO_3). This means that 1 $\mu\text{S/cm}$ is equal to 0.5 mg/L (ppm) of TDS. With HI 9635, the TDS factor can be set to 0.5 or 0.7 depending on the solution to be measured (see page 26). For accurate TDS measurements, make sure that HI 9635 has been calibrated in a conductivity standard solution and the temperature coefficient is properly set.

$^{\circ}\text{C}$	$^{\circ}\text{F}$	HI 7032 mg/L (ppm)	HI 7036 g/L (ppt)
0	32	758	6.82
5	41	876	7.88
10	50	999	8.99
15	59	1122	10.10
16	60.8	1148	10.33
17	62.6	1173	10.56
18	64.4	1200	10.78
19	66.2	1224	11.01
20	68	1251	11.24
21	69.8	1277	11.47
22	71.6	1303	11.71
23	73.4	1329	11.94
24	75.2	1358	12.18
25	77	1382	12.41
26	78.8	1408	12.65
27	80.6	1438	12.89
28	82.4	1461	13.13
29	84.2	1476	13.37
30	86	1515	13.61
31	87.8	1541	13.85

FERTILIZER CALIBRATION (HI 9039 only)

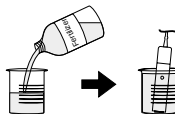
- Turn the HI 9039 on by pressing ON/OFF.



- Select the first fertilizer range (F1) by pressing RANGE. "F1" symbol will appear on the secondary display



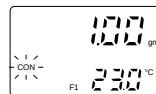
- Dissolve 1 gram of your fertilizer in 1 liter of distilled water and immerse the probe into the solution (1.00 g/L @25°C). The level of solution must be higher than the holes on the PVC sleeve.



- 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 CAL to display "1.00 g" together with the "CAL" and "BUF" symbols.



- If the buffer is within the theoretical range, then the meter automatically recognizes the buffer and the "BUF" symbol stops flashing.
- "—" will disappear from the display when the reading is stable and "CON" symbol will start blinking.
- Press CFM to confirm the calibration value.



The calibration is now complete and the instrument is ready to measure fertilizer content.



If the instrument cannot be calibrated refer to the Probe Maintenance section (page 30).

To quit the calibration mode, press CAL at any time.



Repeat the same procedure for the second fertilizer, i.e. F2, by pressing RANGE.

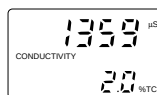
TEMPERATURE COEFFICIENT (HI 933100 and HI 9635 only)

SETTING THE TEMPERATURE COEFFICIENT

- Switch the meter on by pressing ON/OFF.



- Press FACTOR until the temperature coefficient is displayed.



- Change this value by pressing UP or DOWN. This value is adjustable from 0.0 to 3.0% per degree Celsius.



This feature is particularly helpful with acids, alkalis and concentrated salt solutions which typically have lower values, around 1.5%/°C.

All readings the readings are standardized at 25°C.

The default temperature coefficient is 1.9%. The coefficient can be set from 0.0% (without compensation) to 3.0% per degree Celsius. The meter retains this coefficient even when switched off.

DETERMINATION OF THE TEMPERATURE COEFFICIENT OF A SOLUTION

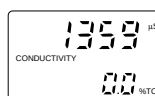
- Immerse the probe into the solution and press RANGE if necessary to select conductivity measurements.



- Press FACTOR to display the temperature coefficient.



- Set the temperature coefficient to "0.0%" (i.e. no compensation) by pressing DOWN.



- Measure the conductivity of the sample at 25°C and denote it as "C25".

- Measure the sample at a different temperature "t°C" which should be between 5°C to 10°C different from 25°C and note the conductivity reading as "Ct".
- The temperature coefficient "β" of the solution can be calculated with the following formula:

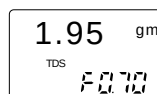
$$\beta = 100 \times \frac{(Ct - C25)}{(t^{\circ}\text{C} - 25) \times C25}$$

TDS FACTOR (HI 9635 only)

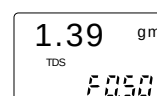
Some solutions, especially in horticulture, use 0.7 as the conversion rate between conductivity and TDS instead of the common 0.5 CaCO₃ TDS factor.

The TDS factor of HI 9635 can be selected as 0.7 (F1) or 0.5 (F2).

- Press RANGE to enter TDS1 mode, that is Total Dissolved Solids with a TDS factor of 0.7 (F0.70 is shown on the secondary display).



- Press RANGE again to change to TDS2 mode, that is Total Dissolved Solids with a TDS factor of 0.5 (F0.50 is shown on the secondary display).

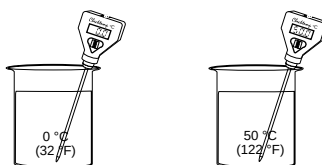


TEMPERATURE CALIBRATION (HI 9039, HI 933100 and HI 9635 only)

INITIAL PREPARATION

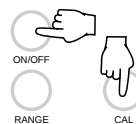
Prepare a container of ice and water and another container with hot water at a temperature of 50°C. Place insulation material around the containers to minimize temperature changes.

Use a CHECKTEMPC or a calibrated thermometer with a resolution of 0.1 as reference thermometer.



Note: After temperature calibration, recalibrate the instrument (for conductivity or fertilizer content).

- Press CAL and ON/OFF simultaneously.



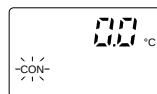
- Immerse the conductivity probe into the 0°C (32°F) bath.



- When the reading stabilizes, press CAL. "0.0°C", "CAL" symbol and an intermittent "BUF" indicator will be displayed. "—" symbol will blink for a few seconds.



- "—" symbol will disappear from the display when the reading is stable and "CON" will start blinking.



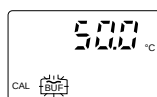
- Press CFM to confirm the calibration value.



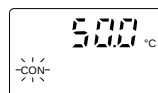
- Immerse the conductivity probe into the 50°C (122°F) bath and wait for a couple of minutes for thermal equilibrium.



- Press CAL to display the "50.0°C", "CAL" symbol and an intermittent "BUF" indicator. "—" will symbol blink for a few seconds.



- "—" will disappear from the display when the reading is stable and "CON" will start blinking.



- Press CFM to confirm the calibration value.



The calibration is now complete and the instrument returns to normal operation.

Note: You can quit the calibration mode at any time by pressing ON/OFF.



LCD SYMBOLS GUIDE

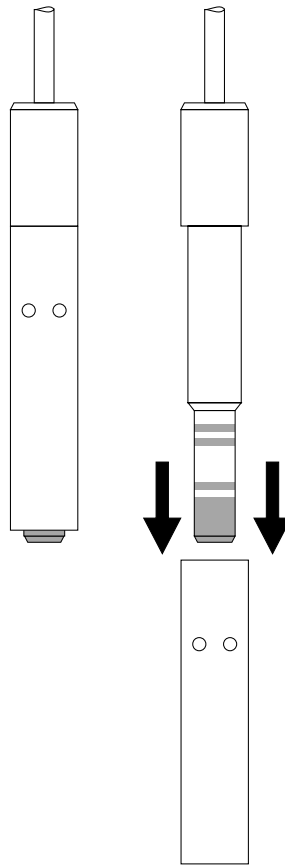
μS	Measurement in μS/cm (except HI 9034)
mS	Measurement in mS/cm (except HI 9034)
<i>For HI 9033, HI 9034 and HI 9130 only</i>	
1	Out of range
V	Low battery voltage
<i>For HI 9039, HI 933100 and HI 9635 only</i>	
---	Out of range
LOBAT	Low battery voltage
CAL	Calibration mode
CON	Ready for confirmation
~ (blinking)	Input reading not stable
BUF	Calibration buffer valid
BUF (blinking)	Calibration buffer not valid or not yet recognized
CONDUCTIVITY	Conductivity measurement
°C	Automatic temperature compensation mode
<i>For HI 9039 only</i>	
FERTILIZER	Fertilizer measurement
F1	1 st fertilizer concentration
F2	2 nd fertilizer concentration
°C (blinking)	Temperature out of range
<i>For HI 933100 and HI 9635 only</i>	
%TC	Temperature coefficient mode
°C (blinking)	Manual temperature compensation mode
<i>For HI 9635 only</i>	
TDS	TDS measurement
ppm	TDS Measurement in mg/L (ppm)
gm	TDS Measurement in g/L (ppt)
F0.70 or F1	0.7 as TDS factor
F0.50 or F2	0.5 as TDS factor

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, recalibrate the instrument.

The probe body is PVC. For this reason it must never come into close contact with a heat source. If the probe is exposed to high temperatures, the rings might become loose or detached, resulting in a serious impairment of the probe functioning. In such cases, the probe has to be replaced.



BATTERY REPLACEMENT

The meters are supplied with the advanced "BEPS" technology. BEPS, or Battery Error Preventive System, will detect a low power condition in the battery and display "V" (HI 9033, HI 9034 and HI 9130) or "LO BAT" (HI 9039, HI 933100 and HI 9635) on the LCD.

This is to alert the user that the display will shut-off after approximately 5 more hours of use if batteries are not replaced.

BEPS shuts off the display completely to prevent erroneous measurements being taken.

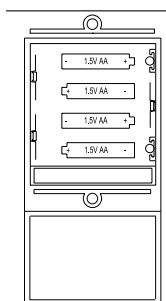
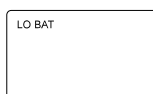
Battery replacement must only take place in a non-hazardous area using the battery types specified in this instruction manual.

In order to replace rundown batteries, simply remove the two screws on the rear cover of the instrument and replace the four 1.5V AA batteries (HI 933100 and HI 9635) or the 9V Alkaline battery (HI 9033, HI 9034, HI 9039, HI 9130) with new ones, paying attention to the correct polarity.

When the meter is turned on, BEPS will detect the new battery and ensure that it functions properly.

The meter should be recalibrated after every battery change.

HI 933100 and HI 9635 can also be connected to a 12VDC car battery or external power supply by means of an adapter. In addition both meters are equipped with auto shut-off circuitry that will switch the meter off after approximately 10 minutes of non-use.



ACCESSORIES

CONDUCTIVITY & TDS CALIBRATION SOLUTIONS

HI 7030L	12880 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 7030M	12880 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 230 mL
HI 7031L	1413 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 7031M	1413 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 230 mL
HI 7033L	84 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 7033M	84 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 230 mL
HI 7034L	80000 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 7034M	80000 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 230 mL
HI 7035L	111800 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 7035M	111800 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 230 mL
HI 7039L	5000 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 7039M	5000 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 230 mL
HI 7032L	1382 ppm (mg/L), 460 mL
HI 7032M	1382 ppm (mg/L), 230 mL
HI 7036L	12.41 ppt (g/L), 460 mL
HI 7036M	12.41 ppt (g/L), 230 mL

CONDUCTIVITY & TDS CALIBRATION SOLUTIONS IN FDA APPROVED BOTTLES

HI 8030L	12880 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 8031L	1413 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 8033L	84 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 8034L	80000 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 8035L	111800 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL
HI 8039L	5000 $\mu\text{S/cm}$ ($\mu\text{mho/cm}$), 460 mL

OTHER ACCESSORIES

HI 721310	9V battery for HI 9033, HI 9034, HI 9039 and HI 9130 (10 pcs)
HI 721308	1.5V AA size alkaline battery for HI 933100 and HI 9635 (10 pcs)
CHECKTEMPC	Electronic thermometer (range -50.0 to 150°C)
HI 710005	Power adapter from 115VAC to 12VDC (for HI 933100 and HI 9635)
HI 710006	Power adapter from 230VAC to 12VDC (for HI 933100 and HI 9635)

HI 731326	Small screwdrivers, length 90 mm, for calibration purposes (20 pcs) (for HI 9033, HI 9034 and HI 9130 only)
HI 76301W	4-ring probe without temperature sensor, for Manual Temperature Compensation measurements with HI 933100 and HI 9635
HI 76302W	4-ring probe with temperature sensor, for Automatic Temperature Compensation measurements
HI 710031	Hard carrying case
MANCONWPR2	Instruction Manual

WARRANTY

All Hanna Instruments meters are warranted for two years against defects in workmanship and materials when used for their intended purpose and maintained according to instructions. The electrodes and the probes are warranted for a period of six months. This warranty is limited to repair or replacement free of charge.

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

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization number from the Customer Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

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

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

Recommendations for Users

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

Operation of these instruments in residential areas could cause unacceptable interferences to radio and TV equipment.

The metal band at the end of the probe is sensitive to electrostatic discharges. Avoid touching this metal band at all times.

During calibration of instruments, ESD wrist straps should be worn to avoid possible damage to the probe by electrostatic discharge.

To maintain the EMC performance of this equipment the recommended cables noted in the user's manual must be used.

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.

In particular cases the meters could turn off. In such cases they can be turned on by pressing the ON/OFF key.

In particular cases the meters, except HI 9635, could change the measurement range. In such cases they can be reverted to the desired range by pressing the proper key.

OTHER PRODUCTS FROM HANNA

- CALIBRATION AND MAINTENANCE SOLUTIONS
- CHEMICAL TEST KITS
- CHLORINE METERS
- DISSOLVED OXYGEN METERS
- HYGROMETERS
- ION SPECIFIC METERS (Colorimeters)
- MAGNETIC STIRRERS
- Na/NaCl METERS
- pH/ORP/Na ELECTRODES
- pH/ORP METERS
- PROBES (DO, $\mu\text{S}/\text{cm}$, RH, T, TDS)
- PUMPS
- REAGENTS
- SOFTWARE
- THERMOMETERS
- TITRATORS
- TRANSMITTERS
- TURBIDITY METERS
- Wide Range of Accessories

Most Hanna meters are available in the following formats:

- BENCH-TOP METERS
- POCKET-SIZED METERS
- PORTABLE METERS
- PRINTING/LOGGING METERS
- PROCESS METERS (Panel and Wall-mounted)
- WATERPROOF METERS
- METERS FOR FOOD INDUSTRY

HANNA LITERATURE

Hanna publishes a wide range of catalogs and handbooks for an equally wide range of applications.

The reference literature currently covers areas such as:

- Water Treatment
- Process
- Swimming Pools
- Agriculture
- Food
- Laboratory
- Thermometry

and many others. New reference material is constantly being added to the library.



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