

To reenter Setup press Setup button again.

To select EC unit

To select the measurement unit when "EC UNIT" is displayed press the ON/OFF briefly to change between mS/cm, dS/m or μ S/cm.

To select the temperature unit (°C/°F)

To select the temperature unit when "TEMP" is displayed press the ON/OFF briefly to change between °C or °F.

To select the Auto-Off time

To select the AUTO OFF when "AOFF" is displayed press the ON/OFF briefly to change between 8 min, 60 min or --- (disabled).

To select the HOLD mode

To select the Hold mode when "HOLD" is displayed press the ON/OFF briefly to change between disabled "no", Hold mode "YES" or Stability mode "StAb".

To return to measurement mode

Press and hold the Setup button for 1 second to exit the menu (or press and hold ON/OFF button for 2 seconds after the last parameter was selected).

Measurement and Calibration

For better accuracy, frequent calibration of the meter is recommended. In addition, the instrument must be recalibrated whenever:

- When high accuracy is required.
- At least once a month.

Measurement

Press the ON/OFF button to turn the meter ON. Place the probe to the desired depth and saturate the soil if needed with deionized water. The conductivity value, automatically compensated for temperature, will be shown on the LCD.

The meter displays conductivity in the selected unit.

The temperature measured by the probe will be shown on the secondary LCD.

Note: Before taking any measurement make sure the meter has been calibrated.

Calibration procedure

- Enter calibration mode from measurement mode.
- The meter will enter the calibration mode, displaying "1.41 USE".

- Pour 3" of standard HI70031 into a beaker.
- Place the probe in calibration solution HI70031. The probe tip should be centered in the solution and submerged 2" (5 cm). The probe should be kept at least 1" from the walls and bottom of the beaker. The meter will automatically recognize the solution.
- If the solution is not recognized or is out of the accepted range "---- WRNG" is displayed.
- If the standard is recognized "REC" is displayed until the reading is stable and the calibration is accepted.
- After acceptance, the "Stor" message is displayed and meter returns to measurement mode.

Clear calibration

Place meter in calibration mode. Press and hold ON/OFF until "Clr" is displayed. The meter will now be at default calibration.

After restarting the meter the "Err CAL" message will appear (for 2 seconds) until a new calibration is performed.

Error Message

If the measured temperature is higher than 50.0 °C or lower than 0 °C, the 50.0 °C or 0.0 °C temperature value will blink on the LCD in measure mode. In both cases, the "Err TEMP" message will appear. If CAL or HOLD mode was entered by the user the meter will enter in measurement mode.

Maintenance:

- 1) Rinse probe with water after use and between samples. Dry off.
- 2) Store GroLine with the protection cover over conductivity probe.

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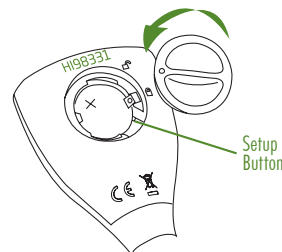
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Battery Replacement

Replace the battery when percentage indicator approaches 0%. To change the CR2032 Li-ion battery, turn the battery cover located on the back of the meter counterclockwise to unlock. Remove cover and replace with new battery + side facing up. Push the ON/OFF button to start the meter.



Note: Batteries should only be replaced in a safe area using the battery type specified in this instruction manual. Old batteries should be disposed in accordance with local regulations.

Accessories

HI7031M	1413 μ S/cm (1.41 mS/cm) calibration solution, 230 mL
HI7031L	1413 μ S/cm (1.41 mS/cm) calibration solution, 500 mL
HI70031P	1413 μ S/cm (1.41 mS/cm) calibration solution, 20 mL sachets (25 pcs.)

Warranty

The GroLine is warranted for a period of one year against defects in workmanship and materials when used for its intended purpose and maintained according to instructions. This warranty is limited to repair or replacement free of charge. Damage due to accidents, misuse, tampering or lack of prescribed maintenance is not covered. If service is required, contact your local Hanna Instruments Office. If under warranty, report the model number, date of purchase, serial number and the nature of the problem. If the repair is not covered by the warranty, you will be notified of the charge incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization (RGA) number from the Technical Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

IST98331 08/16

INSTRUCTION MANUAL

GroLine

HI98331

Direct Soil Conductivity & Temperature Meter with built-in Stainless Steel Conductivity Probe



HANNA
instruments

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Preliminary Examination

Remove the meter from the packing material and examine it carefully to make sure that no damage has occurred during shipment. If noticeable damage is evident, contact your local Hanna Instruments Office.

Each meter is supplied with:

- CR2032 battery (1 pc.)
- Storage / Protection sleeve
- Instruction manual
- Quality Certificate

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

General Description

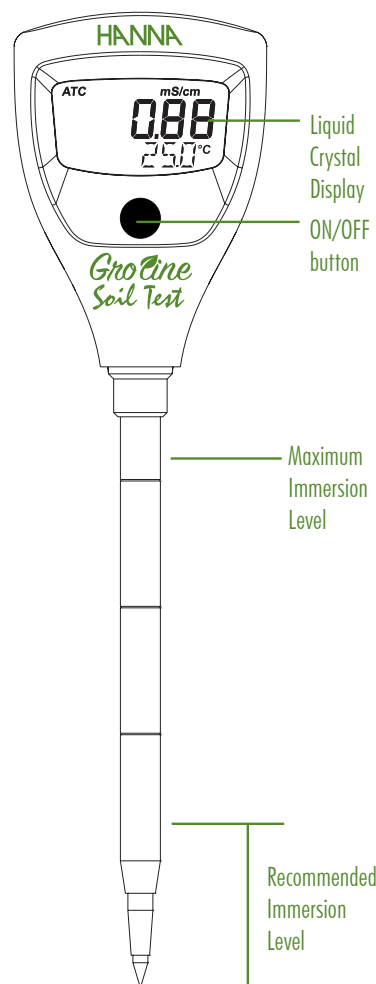
The Hanna Instruments GroLine is a special pocket conductivity meter expressly designed to directly measure soil conductivity. The meter also measures temperature.

Soil conductivity is a simple measurement that indicates if salts are present in the sample soil. Conductivity can be measured in units of $\mu\text{S}/\text{cm}$, mS/cm , or dS/m .

The conductivity is calibrated at one point, in liquid conductivity standard.

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

Operation



Recommendations for Users

Before using Hanna Instruments products, make sure that they are entirely suitable for your specific application and for the environment in which they are used. Operation of these instruments may cause unacceptable interferences to other electronic equipment. Take all necessary steps to correct such interferences. Avoid touching the probe at all times. Any variation introduced by the user to the supplied equipment may degrade the instrument's EMC performance. Do not put the instrument in a microwave oven to avoid burns or damage to equipment. Do not use or store the instrument in hazardous environments.

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Specifications

Range	0 to 4000 $\mu\text{S}/\text{cm}$ 0.00 to 4.00 mS/cm (dS/m) 0.0 to 50.0 $^{\circ}\text{C}$ (32.0 to 122.0 $^{\circ}\text{F}$)
Resolution	1 $\mu\text{S}/\text{cm}$ 0.01 mS/cm (dS/m) 0.1 $^{\circ}\text{C}$ (0.1 $^{\circ}\text{F}$)
Accuracy (@25 $^{\circ}\text{C}/77^{\circ}\text{F}$)	$\pm 50 \mu\text{S}/\text{cm}$ (0 to 2000 $\mu\text{S}/\text{cm}$) $\pm 300 \mu\text{S}/\text{cm}$ (2000 to 4000 $\mu\text{S}/\text{cm}$) $\pm 0.05 \text{ mS}/\text{cm}$ (0.00 to 2.00 mS/cm) $\pm 0.30 \text{ mS}/\text{cm}$ (2.00 to 4.00 mS/cm) $\pm 1.0^{\circ}\text{C}$ ($\pm 1.5^{\circ}\text{F}$)
Temperature Compensation	automatic, with temperature coefficient (β) fixed @ 2%/ $^{\circ}\text{C}$
Calibration	single point, 1.41 mS/cm
Battery Type	CR2032 Li-ion
Battery Life	approximately 100 hours of continuous use
Probe	114 mm (4.5") Stainless steel penetration
Environment	0 to 50 $^{\circ}\text{C}$ (32 to 122 $^{\circ}\text{F}$); RH 95% max
Dimensions	50 x 196 x 21 mm (2.0 x 7.7 x 0.9")
Weight	74 g (2.4 oz.)

Operational Guide

The meter is shipped with the battery inside.

To turn the meter ON and check the battery status

Press the ON/OFF button to turn the meter on. At start-up, all the LCD segments are displayed for 1 second, "Err CAL" is displayed when no calibration is available, then the percent indication of the remaining battery life is displayed for another second. The meter then enters the normal measuring mode.

Note: Keeping the ON button pressed while turning the meter on will display all LCD segments as long as the button is pressed, after 10 seconds the firmware version and model will be displayed. Pressing the button 3 times will display the serial number (SN-1, SN-2, SN-3). To enter measurement mode press the ON/OFF button briefly.

To enter calibration mode

Press and hold down the ON/OFF button until "OFF" is replaced by "CAL." Release the button.

To enter setup mode

While in measurement mode, remove the battery cap and hold the Setup button for 1 second. The meter will enter in setup mode.

Advanced Functions

HOLD mode

The HOLD mode can be selected only if in setup the HOLD parameter is set to "YES". While in measurement mode, press the ON/OFF button until briefly "HOLD" appears on the secondary display and the reading will be frozen on the LCD. The HOLD will toggle with the temperature value until the ON/OFF button is pressed briefly again. The "MEAS" message appears and the meter returns to measure mode.

Hold on STABILITY mode

The STAB mode can be selected only if in setup the HOLD parameter is set to "StAb".

By pressing the ON/OFF button briefly and the "WAIT" message appears on screen. The parameters are hold on screen after stabilization only; before stabilization done the stability indicator is present on the LCD.

Press the ON/OFF button briefly to exit the STAB mode and return to measure mode. The "MEAS" message appears and the meter returns to measure mode.

Taking another stable measurement is possible by pressing the ON/OFF button briefly.

(If the "HOLD" message appears, then measured stable values (EC and temp) are already retained and hold on the display.)

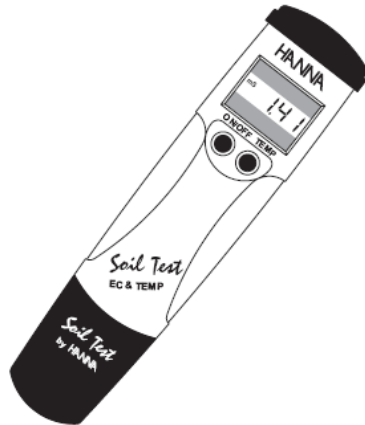
Meter Setup

While in measurement mode, remove the battery cover. Press Setup button located on the side of the battery in the battery compartment. The meter will enter in setup mode.

Press and hold the ON/OFF button to move through setup parameters. Change option by pressing ON/OFF button briefly. The default settings are: "EC UNIT" - mS/cm , "TEMP" measure unit - $^{\circ}\text{C}$, "AOFF" - 8 min, "HOLD" functionality - disabled "no". After Hold, the meter returns to measurement mode.

**Manual de Instrucciones
HI 98331**

**Conductímetro de Suelo Directo y
Medidor de Temperatura**



GARANTIA

HI 98331 está garantizado por un año por defectos de fabricación y materiales cuando es usado para los fines que fue desarrollado y mantenido de acuerdo a las instrucciones.

La muestra está garantizada por un periodo de seis meses. Esta garantía está limitada a reparaciones o reemplazos libres de cargo.

Daños debido a accidentes, mal uso, interferidos o faltos de mantención prescrita no son cubiertos.

Si requiere servicio técnico, contáctese con el vendedor quien realizó la venta de este instrumento. Si está bajo garantía, reporte el número del modelo, fecha de compra, número serial y el motivo de la falla. Si la reparación no es cubierta por la garantía, será notificado de los costos incurridos. Si el instrumento es devuelto a Hanna Instruments, obtenga primero el número de autorización de instrumentos en devolución desde el departamento de Servicio Técnico y entonces le enviaremos su instrumento con los costos de envío

prepagados. Cuando envíe cualquier instrumento, cerciórese que está apropiadamente embalado para su completa protección.

EXAMEN PRELIMINAR

Remueva el embalaje del instrumento y examínelo cuidadosamente. Si existe daño causado por el envío, notifíquelo inmediatamente a su vendedor de Hanna Instruments.

Cada medidor contiene:

- HI 73331 Sonda para penetración de conductividad
- 4 baterías de 1.5V
- Destornillador de calibración

Nota: Conserve todo el material de embalaje hasta que haya probado el instrumento y funcione correctamente.

Cualquier elemento defectuoso debe ser devuelto en su empaque original.

US DESIGN PATENT
D462,024

DESCRIPCION GENERAL

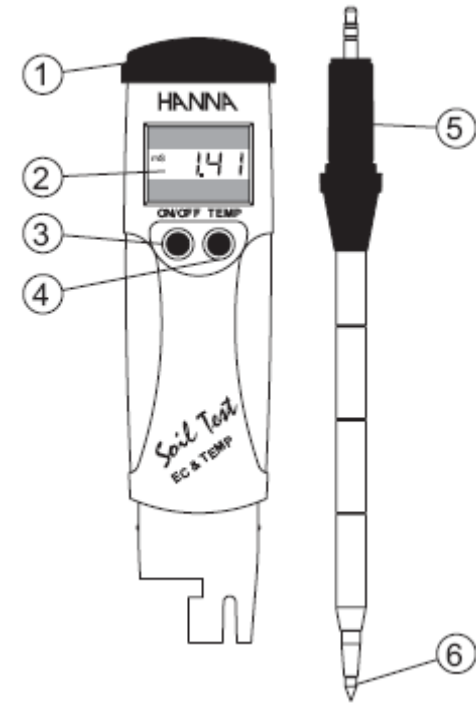
HI 98331 es un medidor especial de bolsillo diseñado especialmente para medir directamente la conductividad de suelos. El medidor también mide la temperatura y las lecturas de la conductividad son compensadas por la temperatura con un sensor incorporado en la sonda para penetración de conductividad HI 73331.

La sonda es intercambiable y puede ser rápidamente reemplazada por el usuario.

El rango de conductividad puede ser calibrado en un punto y el medidor ha sido diseñado para ser calibrado en líquido.

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DESCRIPCION DE FUNCIONES



1. Compartimiento de Baterías
2. Display de Cristal Líquido (LCD)
3. Botón ON/OFF
4. Botón TEMP
5. HI 73331 Conductímetro de Suelo Directo y Medidor de Temperatura
6. Sensor incorporado de temperatura en la punta de la sonda



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ESPECIFICACIONES

Rango	Conductividad:	0.00 a 4.00 mS/cm (dS/m)*
	Temperatura:	0.0 to 50.0 °C
Resolución	Conductividad:	0.01 mS/cm
	Temperatura:	0.1 °C
Precisión (a 20 °C)	Conductividad:	±0.05mS/cm (0.00 a 2.00mS/cm) ±0.30mS/cm (2.00 a 4.00mS/cm)
	Temperatura:	±1 °C
Compensación de Temperatura	Automática, coeficiente de temperatura (β) fijada a 2%/°C	
Calibración	manual de 1 punto	
Tipo de Batería	4 x 1.5V de tipo botón	
Sonda (incluida)	HI 73331 penetración de 122 mm (4.5")	
Ambiente	0.0 to 50.0 °C	
Dimensiones	163 x 40 x 26mm (6.4 x 1.6 x 1.0") 150 mm para la sonda	
Peso	100 g (3.5 oz.)	

GUIA DE OPERACIONES

Tomando mediciones

Conecte la sonda HI 73331. El medidor requiere la sonda para realizar cualquier tipo de medida. Presione el botón ON/OFF para encender el medidor. Ponga la sonda a la profundidad deseada y sature la tierra si es necesario. El valor de conductividad, automáticamente compensado por la temperatura, será mostrada por la pantalla LCD.

El medidor despliega la conductividad en mS/cm, lo cual es equivalente a dS/m.

Presionando el botón TEMP, la temperatura medida por la sonda será mostrada mientras el botón se mantiene presionado.

Nota: Antes de tomar cualquier medición asegúrese que el medidor ha sido calibrado.

MANTENCION DE LA SONDA

La sonda HI 73331 es muy sencilla de usar. La única precaución a ser tomada es limpiar el área que rodea el

conector antes de remover la sonda, para así evitar ensuciar el conector.

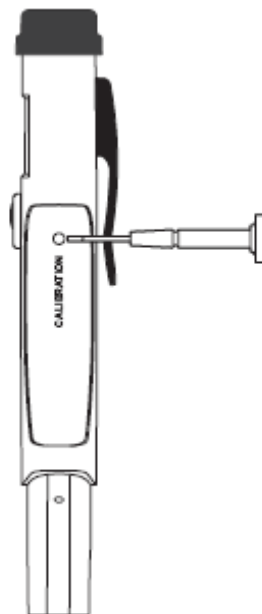
CALIBRACION

Para mantener una buena precisión, se recomienda una frecuente calibración del instrumento. Se recomienda calibrar el instrumento:

- Cuando la sonda de conductividad es reemplazada.
- Cuando se requiere una alta precisión.
- Al menos una vez al mes.

Procedimiento de Calibración

Sumerja la punta de la sonda en un vaso graduado con la solución HI 70031P de 1413 µS/cm. La punta de la sonda debe estar bajo 2" en el líquido. La sonda debe mantenerse separada al menos 1" de los bordes y del fondo del vaso graduado. Ajuste el trimmer para leer 1.41 en el LCD.



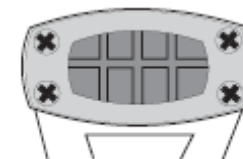
PROBLEMAS

- Las baterías deben ser cambiadas cuando las lecturas estén erróneas, el panel LCD esté difuso o el medidor pierda la calibración.

- El medidor no pueda medir la conductividad ni la temperatura sin la sonda HI 73331.

REEMPLAZO DE LA BATERIA

Para cambiar las baterías, remueva los 4 tornillos localizados en la parte de arriba del medidor.



Una vez que la tapa es removida, cuidadosamente reemplace las 4 baterías localizadas en el compartimiento mientras pone atención a su polaridad.



LADO DEL LCD

Reemplace la parte de arriba asegurándose que el sello está puesto en su lugar y ponga los tornillos bien apretados para asegurar que no entre agua.

ACCESORIOS

HI 73331 Conductímetro de Suelo Directo y Medidor de Temperatura

HI 7031M Solución de calibración 1413 µS/cm (1.4 mS/cm) a 25°C, botella de 230 mL

HI 7031L Solución de calibración 1413 µS/cm (1.4 mS/cm) a 25°C, botella de 460 mL

HI 731326 Destornillador de Calibración, 20 piezas

Recomendaciones para los Usuarios

Antes de usar este producto, asegúrese que éste esté completamente apto para el ambiente en el cual será usado. La operación de este instrumento en áreas residenciales puede crear interferencias inaceptables en equipos como radios y TV.

Evite tocar las sondas en todo momento.

Cualquier variación introducida por el usuario al equipo puede degradar el desempeño del EMC del instrumento.

Para prevenir los shocks eléctricos, no use el instrumento cuando los voltajes de la superficie medida superen los 24 VAC o 60 VDC. Para prevenir los daños o quemar el instrumento, no realice ninguna medición en hornos microondas.

* El medidor da lecturas indicativas con baja precisión entre 4mS/cm y 10 mS/cm.



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