



# Your PDF Guides

You can read the recommendations in the user guide, the technical guide or the installation guide for HANNA INSTRUMENTS HI 96741. You'll find the answers to all your questions on the HANNA INSTRUMENTS HI 96741 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

## User manual HANNA INSTRUMENTS HI 96741 User guide HANNA INSTRUMENTS HI 96741 Operating instructions HANNA INSTRUMENTS HI 96741 Instructions for use HANNA INSTRUMENTS HI 96741 Instruction manual HANNA INSTRUMENTS HI 96741

### INSTRUCTION MANUAL

**HI 96741**

**Total Hardness  
and Iron LR  
ISM**

#### Dear Customer,

Thank you for choosing a Hanna product. This manual will provide you with the necessary information for the correct use of the instrument. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at [tech@hannaest.com](mailto:tech@hannaest.com).

#### Preliminary examination:

Please examine this product carefully. Make sure that the instrument is not damaged. If any damage occurred during shipment, please notify your dealer.

Each HI 96741 has Selective Meter is supplied complete with:

- Two Sample Cuvettes and Caps
- 9V Battery
- Instruction Manual

**Note:** Use all packing material until you are sure that the instrument works correctly. Any defective item must be returned in its original packing.

**!** For more details about spare parts and accessories see "Accessories".

#### Technical specifications:

Range	Mg Hardness: 0.00 to 2.00 mg/L Ca Hardness: 0.00 to 2.70 mg/L Total Hardness: 0.00 to 4.70 mg/L Iron LR: 0.00 to 1.60 mg/L
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Resolution	0.01 mg/L Total Hardness: 0.01 mg/L Iron LR
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Accuracy	Mg Hardness: ±0.11 mg/L = 5% of reading @ 25°C Ca Hardness: ±0.11 mg/L = 5% of reading @ 25°C Iron LR: ±0.01 mg/L = 9% of reading @ 25°C
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Typical EMC Dev.	±0.02 mg/L Mg Hardness ±0.02 mg/L Ca Hardness ±0.01 mg/L Iron LR
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Light Source	Tungsten lamp
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Light Detector	Silicon PhotoCell with narrow band interference filter @ 525 nm
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**Method for Total Hardness:** Adaptation of the Standard Methods for the Examination of Water and Wastewater (19<sup>th</sup> Ed.) - ion chromatometric method. The reaction between Mg<sup>2+</sup> and reagent creates a stable salt in the sample.

**For Iron LR:** Adaptation of the IPE method. The reaction between iron and the reagent creates a violet tint in the sample.

Environment	0 to 50°C (32 to 122°F), max 95% RH non-condensing
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Battery Type	1 x 9 volt
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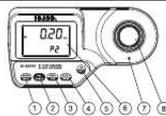
Auto-Shut-off	After 10' of non-use in measurement mode, with last reading reminder.
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Dimensions	192 x 104 x 69 mm (7.6 x 4.1 x 2.7")
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Weight	360 g (12.7 oz.)
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#### Functional description:



1. RANGE/CLP key: press to change the parameter, press and hold for three seconds to enter CLP mode. In **calibration mode** press to edit the date and time.
2. CAL CHECK key: press to perform the validation of the meter, or press and hold for three seconds to enter calibration mode.
3. ZERO/CFM key: press to zero the meter prior to measurement, to confirm added values, or to confirm factory calibration status.
4. READ/TIMER key: In measurement mode, press to make a measurement, or press and hold for three seconds to start a pre-programmed countdown prior to measurement. In **CLP mode** press to view the next screen.
5. ON/OFF key: to turn the meter on and off.
6. Liquid Crystal Display (LCD)
7. Cuvette alignment indicator
8. Cuvette holder

#### DISPLAY ELEMENTS DESCRIPTION:



1. The measuring screen (lamp, cuvette, detector), appears during different phases of zero or reading measurement.
2. Error messages and warnings.
3. The battery icon indicates the charge state of the battery.
4. The temperature appears when an internal check is in progress.
5. Status messages.
6. The chronometer appears when the reaction timer is counting.
7. The month, day and date icons appear when a date is displayed.
8. Four digit status display.
9. Measuring units.
10. Four digit secondary display.

#### Errors and warnings:

##### ON ZERO READING:

**Err**  
Light High: There is too much light to perform a measurement. Please check the preparation of the zero cuvette.

**Err**  
Light Low: There is not enough light to perform a measurement. Please check the preparation of the zero cuvette.

**Err**  
No Light: The instrument cannot adjust the light level. Please check that the sample does not contain any debris.

##### ON SAMPLE READING:

**Err**  
Inverted cuvettes: The sample and the zero cuvette are inverted.

**Err**  
Zero: A zero reading was not taken. Follow the instructions of the measurement procedure for zeroing the meter.

**Err**  
Under range: A flashing "0.00" indicates that the sample absorbs less light than the zero reference. Check the preparation and make sure you use the same cuvette for reference (zero) and measurement.

**Err**  
Over Range: A flashing value of the maximum concentration indicates an over range condition. The concentration of the sample is beyond the programmed range: dilute the sample and re-run the test.

##### BUFFER CALIBRATION PROCEDURE:

**Err**  
Standard Low: The standard reading is less than expected.

**Err**  
Standard High: The standard reading is higher than expected.

##### OTHER ERRORS AND WARNINGS:

**Err**  
Cap error: Appears when external light enters in the analysis cell. Assure that the cuvette cap is present.

**Err**  
Cooling lamp: The instrument waits for the lamp to cool down.

**Err**  
Battery low: The battery must be replaced soon.

**Err**  
Dead battery: This indicates that the battery is dead and must be replaced. Once this indication is displayed, normal operation of the instrument will be interrupted. Change the battery and restart the meter.

#### Measurement procedure:

**Measurement 1:** Turn the meter on by pressing ON/OFF.

**2:** When the lamp starts briefly and the LCD displays "0.00", the meter is ready. The code that appears on the secondary display is the one of the last selected parameter. If necessary, press RANGE/CLP to change parameter. The battery "CHRG" indicates that the instrument needs to be recharged.

**3:** For Total Hardness: Fill a graduated reading cup up to the 100 mL mark with the sample. Add 0.5 mL of HI 93719B & Black solution for Calcium and Magnesium and mix. Fill three cuvettes with 10 mL of sample each. Add 1 drop of HI 93719C & EDTA solution to one cuvette, replace the cap and seal the cuvette. This is the ZERO sample. Add 1 drop of HI 93719C & EDTA solution to the second cuvette, replace the cap and seal the cuvette. This is the READ sample.

**4:** Fill a cuvette with 10 mL of the blank up to the neck and seal the cap.

**5:** Place the cuvette into the holder and ensure that the notch in the cap is positioned accurately into the groove.

**6:** Press ZERO/CFM and the lamp, cuvette and detector icons will appear on the display, depending on the measurement phase.

**7:** For Total Hardness: Place the ZERO sample into the holder and ensure that the notch on the top is positioned accurately into the groove. Press ZERO/CFM and the lamp, cuvette and detector icons will appear on the display, depending on the measurement phase. After a few seconds the display will show "0.00". Remove the ZERO sample and insert the READ sample into the holder. Press and hold READ/TIMER for three seconds. The display will show the reading prior to measurement. It begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds. The lamp, cuvette and detector icons will appear on the display, depending on the measurement phase. After the instrument will display the level of Magnesium hardness in mg/L (Ca<sup>2+</sup> equivalent).

**8:** After a few seconds the display will show "0.00". The meter is now zeroed and ready for measurement.

**9:** Remove the cuvette.

**10:** Add the sample and repeat for each parameter. **Iron LR:** The first cuvette (holding a solid) must be filled up to the graduated reading cup up to the 10 mL mark with the sample.

**11:** Add 10 drops of a pre-diluted 0.04 M KMnO<sub>4</sub> solution, close the cuvette and shake well for 30 seconds. Fill a cuvette with 10 mL of the treated sample up to the neck and replace the cap.

**12:** Replace the cap and seal the cuvette.

**13:** Repeat the sample into the holder and ensure that the notch on the cap is positioned accurately into the groove.

**14:** Press and hold READ/TIMER for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**15:** The display will show the level of Iron LR in mg/L (Ca<sup>2+</sup> equivalent).

**16:** Remove the cuvette.

**17:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**18:** The display will show the level of Total Hardness in mg/L (Ca<sup>2+</sup> equivalent).

**19:** Remove the cuvette.

**20:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**21:** The display will show the level of Iron LR in mg/L (Ca<sup>2+</sup> equivalent).

**22:** Remove the cuvette.

**23:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**24:** The display will show the level of Total Hardness in mg/L (Ca<sup>2+</sup> equivalent).

**25:** Remove the cuvette.

**26:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**27:** The display will show the level of Iron LR in mg/L (Ca<sup>2+</sup> equivalent).

**28:** Remove the cuvette.

**29:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**30:** The display will show the level of Total Hardness in mg/L (Ca<sup>2+</sup> equivalent).

**31:** Remove the cuvette.

**32:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**33:** The display will show the level of Iron LR in mg/L (Ca<sup>2+</sup> equivalent).

**34:** Remove the cuvette.

**35:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**36:** The display will show the level of Total Hardness in mg/L (Ca<sup>2+</sup> equivalent).

**37:** Remove the cuvette.

**38:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**39:** The display will show the level of Iron LR in mg/L (Ca<sup>2+</sup> equivalent).

**40:** Remove the cuvette.

**41:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**42:** The display will show the level of Total Hardness in mg/L (Ca<sup>2+</sup> equivalent).

**43:** Remove the cuvette.

**44:** Press and hold ON/OFF for three seconds. The display will show the count down time to measurement. This begins a flashing a lamp at the end of reaction period. Alternatively, wait for 30 seconds.

**45:** The display will show the level of Iron LR in mg/L (Ca<sup>2+</sup> equivalent).

### Manual abstract:

This manual will provide you with the necessary information for the correct use of the instrument. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at [tech@hannainst.com](mailto:tech@hannainst.com). Functional description: Errors and warnings: ON ZERO READING:

Light High: There is too much light to perform a measurement. Please check the preparation of the zero cuvette. Light Low: There is not enough light to perform a measurement. Please check the preparation of the zero cuvette. No Light: The instrument cannot adjust the light level. Please check that the sample does not contain any debris.

Measurement procedure: Measurement 2 Preliminary examination: Please examine this product carefully. Make sure that the instrument is not damaged. If any damage occurred during shipment, please notify your Dealer. Each HI 96741 Ion Selective Meter is supplied complete with: · Two Sample Cuvettes and Caps · 9V Battery · Instruction Manual Note: save all packing material until you are sure that the instrument works correctly. Any defective item must be returned in its original packing.

For more details about spare parts and accessories see "Accessories". 3 Technical specifications: Mg Hardness 0.00 to 2.00 mg/L Ca Hardness 0.00 to 2.70 mg/L Total Hardness 0.00 to 4.70 mg/L Iron LR 0.00 to 1.60 mg/L Resolution 0.01 mg/L Total Hardness 0.01 mg/L Iron LR Range Accuracy Mg Hardness  $\pm 0.11$  mg/L  $\pm 5\%$  of reading @ 25°C Ca Hardness  $\pm 0.11$  mg/L  $\pm 5\%$  of reading @ 25°C Iron LR  $\pm 0.01$  mg/L  $\pm 8\%$  of reading @ 25°C Typical EMC Dev.

$\pm 0.02$  mg/L Mg Hardness  $\pm 0.02$  mg/L Ca Hardness  $\pm 0.01$  mg/L Iron LR Light Source Tungsten lamp Light Detector Silicon Photocell with narrow band interference filter @ 525 nm 1. RANGE/GLP/ key: press to change the parameter, press and hold for three seconds to enter GLP mode. In calibration mode press to edit the date and time. 2. CAL CHECK key: press to perform the validation of the meter, or press and hold for three seconds to enter calibration mode. 3. ZERO/CFM key: press to zero the meter prior to measurement, to confirm edited values or to confirm factory calibration restore.

4. @ @ In GLP mode press to view the next screen. 5. ON/OFF key: to turn the meter on and off. 6.

Liquid Crystal Display (LCD) 7. Cuvette alignment indicator 8. @ @ Zero: A zero reading was not taken. @ @ @ @ Check the procedure and make sure you use the same cuvette for reference (zero) and measurement. Over Range: A flashing value of the maximum concentration indicates an over range condition.

The concentration of the sample is beyond the programmed range: dilute the sample and re-run the test. DURING CALIBRATION PROCEDURE: Standard Low: The standard reading is less than expected. Standard High: The standard reading is higher than expected. 8-9 #1 #2 #3 #1 #2 4 DISPLAY ELEMENTS DESCRIPTION: 5-6 5-6 Method For Total Hardness: Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18 th Edition, colorimetric method. The reaction between Mg/Ca and reagents causes a violet tint in the sample. For Iron LR: Adaptation of the TPTZ method. The reaction

between iron and the reagent causes a violet tint in the sample. Environment Battery Type Auto-Shut off 0 to 50°C (32 to 122°F); max 95% RH non-condensing 1 x 9 volt After 10' of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder. 192 x 104 x 69 mm (7.6 x 4.

1 x 2.7") 360 g (12.7 oz.). 1. The measuring scheme (lamp, cuvette, detector), appears during different phases of zero or reading measurement 2. Error messages and warnings 3. The battery icon indicates the charge state of the battery 4. The hourglass appears when an internal check is in progress 5. Status messages 6.

The chronometer appears when the reaction timer is running 7. The month, day and date icons appear when a date is displayed 8. Four digit main display 9. Measuring units 10. Four digit secondary display OTHER ERRORS AND WARNINGS: Cap error: Appears when external light enters in the analysis cell.

Assure that the cuvette cap is present. Cooling lamp: The instrument waits for the lamp to cool down. Battery low: The battery must be replaced soon. Dead battery: This indicates that the battery is dead and must be replaced. Once this indication is displayed, normal operation of the instrument will be interrupted.

Change the battery and restart the meter. 10 11 Dimensions Weight [www.hannainst.com](http://www.hannainst.com) or 1· Turn the meter on by pressing ON/OFF. 2· When the beeper sounds briefly and the LCD displays dashes and "P1" (Total Hardness) and "P2" (pH) the meter is ready. The code that appears on the secondary display is the one of the last selected parameter. If necessary, press RANGE/GLP/ to change parameter. The blinking "ZERO" indicates that the instrument needs to be zeroed first. 3· For Total Hardness: Fill a graduated beaker up to the 50mL mark with the sample. Add 0.

5 mL of HI 93719A-0 Calcium And Magnesium Reagent indicator solution and mix. Add 0.5 mL of HI 93719B-0 Alkali solution for Calcium and Magnesium and mix. Fill three cuvettes with 10mL of sample each. Add 1 drop of HI 93719C-0 EDTA solution to one cuvette, replace the cap and swirl the solution. This is the ZERO sample. Add 1 drop of HI 93719D-0 EGTA solution to the second cuvette, replace the cap and swirl the solution. This is the READ1 sample. For Iron LR: Fill one graduated mixing cylinder up to the 25 mL mark with deionized water. @ @ This is the blank.

Fill a cuvette with 10 mL of the blank up to the mark and replace the cap. @ @ @ @ @ @ @ @ After a few seconds the display will show "-0.0-". @ @ Press and hold READ/ /TIMER for three seconds. The display will show the countdown prior to measurement.

The beeper is playing a beep at the end of countdown period. Alternatively, wait for 30 seconds. @ @ @ @ The meter is now zeroed and ready for measurement. 7· Remove the cuvette. @ @ @ @ @ @ 9· Replace the cap and swirl the solution.

@ @ 11· Press and hold READ/ /TIMER for three seconds. The display will show the countdown prior to measurement. The beeper is playing a beep at the end of countdown period. @ @ @ @ @ @ @ @ @ @ Total Hardness: Excessive amounts of heavy metals. @ @ @ @ @ @ @ @ @ @ Use the Hanna CAL

CHECKTM cuvettes (see "Accessories") to validate or calibrate instruments. VALIDATION Validation Note: The validation is performed only for the selected parameter. For full validation of the instrument, the following procedure must be performed for each parameter. 3 1· Turn the meter on by pressing ON/OFF. 2· When the beeper sounds briefly and the LCD displays dashes, the meter is ready. 3· Place the CAL CHECKTM Standard Cuvette A into the cuvette holder and ensure that the notch on the cap is positioned securely into the 4-5 groove.

4· Press ZERO/CFM and the lamp, cuvette and detector icons will appear on the display, depending on the measurement phase.



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5· After a few seconds the display will show "-0.0-". The meter is now zeroed and ready for validation. 6· Remove the cuvette. 7· Place the specific CAL CHECKTM Standard Cuvette B into the cuvette holder, for: Hardness: B, HI 96719-11 7 Iron LR: B, HI 96746-11 Ensure that the notch on the cap is positioned securely into the groove. Calibration Note: It is possible to interrupt the calibration procedure at any time by pressing CAL CHECK or ON/OFF keys. When calibrating, only the selected range is affected. 4 1· Turn the meter on by pressing ON/OFF. 2· When the beeper sounds briefly and the LCD displays dashes, the meter is ready.

3· To change the range, simply press RANGE/GLP/. 4· Press and hold CAL CHECK for three seconds to enter calibration mode. The display will show "CAL" during calibration procedure. The blinking "ZERO" asks for instrument zeroing. 5· Place the CAL CHECKTM Standard Cuvette A into the cuvette holder and ensure that the notch on the cap is positioned securely into the 6-7 groove.

6· Press ZERO/CFM and the lamp, cuvette and detector icons will appear on the display, depending on the measurement phase. 7· After a few seconds the display will show "-0.0-". The meter is now zeroed and ready for calibration. The blinking "READ" asks for reading calibration standard.

8· Remove the cuvette. 9· Place the specific CAL CHECKTM Standard Cuvette B into the cuvette holder, for: 9 Hardness: B, HI 96719-11 Iron LR: B, HI 96746-11 Ensure that the notch on the cap is positioned securely into the groove. 10· Press READ/TIMER and the lamp, cuvette and detector icons will appear on 10-11 the display, depending on the measurement phase. 11· The instrument will show for three seconds the CAL CHECKTM standard value. Note: If the dHI 96741 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to the instructions. This warranty is limited to repair or replacement free of charge. Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered. If service is required, contact your dealer. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred.

If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization Number from the Customer Service Department and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection. To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase. Recommendations for Users Before using these 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 equipments, this requiring the operator to take all necessary steps to correct interferences.

@@@The calibration month and day will appear on the main display and the year on the secondary display. 2· If no calibration was performed, the factory calibration message, "F.CAL" will appear on the main display and the instrument returns to measurement mode after three seconds. 1 Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice. For additional information, contact your dealer or the nearest Hanna Customer Service Center.

To find the Hanna Office in your area, visit our web site 2· Extract the battery from its location and replace it with a fresh one. · Insert back the battery cover and turn it clockwise to close. IST96741 11/10A w w w . h a n n a i n s t . c o m .



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