INSTRUCTION MANUAL

DO Benchtop Meters

HI2640

HI2641 with Data Logging

Hanna Instruments Inc., 584 Park East Drive, Woonsocket, RI 02895 USA
www.hannainst.com

Dear Customer,

Thank you for choosing a Hanna Instruments® product.

Please read this instruction manual carefully before using this instrument as it provides the necessary information for correct use of this instrument, and a precise idea of its versatility.

If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com.
Visit www.hannainst.com for more information about Hanna Instruments and our products.

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1. PRELIMINARY EXAMINATION

Remove the instrument and accessories from the packaging and examine it carefully.
For further assistance, please contact your local Hanna Instruments office or email us at tech@hannainst.com.

Each device is supplied with:

- HI764080 Dissolved Oxygen electrode
- DO calibration kit
  - HI7041S Refill electrolyte solution
  - DO membrane caps (2 pcs.)
  - O-rings (2 pcs.)
- HI764026 Electrode holder for HI2600 family
- HI920018 USB-C to USB-C cable
- USB-C power adapter
- Instrument quality certificate
- Probe quality certificate
- Battery safety insert
- Quick reference guide with QR code for instruction manual download

Note: *Save all packing material until you are sure the instrument works correctly. Any damaged or defective item must be returned in its original packing material with the supplied accessories.*

Ordering information

- HI2640-01 (US power plug)
- HI2640-02 (EU power plug)
- HI2641-01 (US power plug)
- HI2641-02 (EU power plug)

1.1. SAFETY MEASURES

Handling and usage precautions

The unit, although not fragile, can be damaged by improper handling and usage.

- Transport the unit with all cables removed.
- Keep the unit on a stable and even surface, away from contact with liquid.
- Avoid excessive dirt and dust.
- Protect the unit from contact with food, oils, and chemicals.
- If the device becomes wet, gently wipe the exterior with a clean, dry cloth.
- Keep away from direct sunlight.
- Use in a safe place that is appropriate to application requirements.
- Use attachments and accessories specified in this manual only.
- Operate the capacitive keys without applying pressure.
- Do not puncture the screen or drop the unit.
- Do not use the device near heat sources.
- Do not place objects on top of the device.
- Do not insert objects into the ports, spaces around keys, other than the intended cable, USB drive.

Battery Safety

The coin-cell battery is replaceable by a professional service center only.

⚠ WARNING

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if digested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH OF CHILDREN.**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.

- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children.
  Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Coin-cell battery type CR2032 | Nominal voltage 3.0 V
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above 85 °C (185 °F) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and −).
- Do not mix old and new batteries, different brands or types of batteries, such as alkaline, carbon-zinc, or rechargeable batteries.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.

2. GENERAL DESCRIPTION & INTENDED USE

HI2640 and HI2641 enable fast, accurate measurements utilizing the Hanna Instruments® HI764080 digital dissolved oxygen probe with an integral temperature sensor.

The probe has a unique serial number and, once connected, is automatically identified by the meter.

Both meters measure dissolved oxygen in ppm and % saturation while the HI2641 adds data logging capabilities.

The intuitive design simplifies configuration, calibration, measurement, data logging and transfer (to a USB thumb drive or computer).

HI2640 and HI2641 benchtop meters offer a Basic Mode that streamlines measurement configuration and is useful for routine applications.

Additionally, HI2641can be used in Standard Operating Mode, where all features and capabilities are enabled.

Large display with capacitive keys

The meter features a 5.5" (14 cm) LCD display. The large display provides a 130 ° wide viewing angle.

Main Features

- Automatic parameter recognition
- Choice of measurement unit:
  - » ppm (mg/L)
  - » % saturation
- Basic mode for simplified operation
- Dedicated GLP key
- Internal clock and date
- Logging function (HI2641 only)
- GLP data included with logged data (HI2641 only)
- Simplified data transfer to a PC (HI2641 only)

3. SYSTEM SPECIFICATIONS

HI2640 and **HI2641** using HI764080 dissolved oxygen probe

	DO	Temperature
Range	0.00 to 45.00 ppm (mg/L) 0.0 to 300.0%	−20.0 to 120.0 °C * (−4.0 to 248.0 °F)
Resolution	0.01 ppm (mg/L) 0.1%	0.1 °C (0.1 °F)
Accuracy at 25 °C / 77 °F	±1.5% of reading ±1 digit	±0.5 °C (0.9 °F)
DO calibration	One or two points at 0% (HI7040) and 100% (water-saturated air)	
Pressure compensation	Automatic 450.0 to 850.0 mmHg	
Resolution	0.1 mmHg	
Salinity compensation	0 to 40 g/L	
Resolution	1 g/L	
Temperature compensation	0.0 to 50.0 °C (32.0 to 122 °F)	
Logging HI2641	Up to 1000 records organized in: • Manual log-on-demand, maximum 200 logs • Manual log-on-stability, maximum 200 logs • Interval logging**, maximum 600 logs (100 lots)	

* Temperature limits will be reduced to actual probe limits.

** When operating in Standard Mode only!

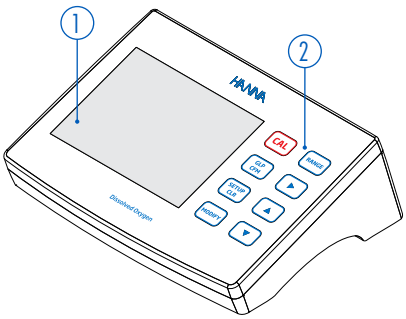
Additional Specifications

PC interface (**HI2641** only)	USB-C
Power supply	USB Type C (5 VDC; 500 mA)
Environment	0 to 50 °C (32 to 122 °F) Maximum 95% RH non-condensing
Dimensions	205 x 160 x 77 mm (8.0 x 6.2 x 3.0 ")
Weight	Approximately 0.85 kg (1.87 lbs.)

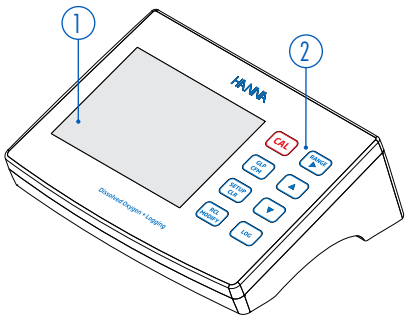
4. FUNCTIONAL & LCD DESCRIPTION

4.1. FRONT VIEW

HI2640



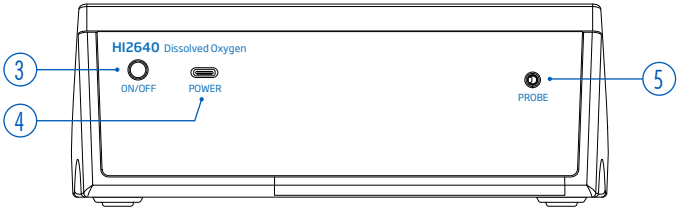
HI2641



1. Liquid Crystal Display (LCD)
2. Capacitive keys

4.2. REAR VIEW

HI2640

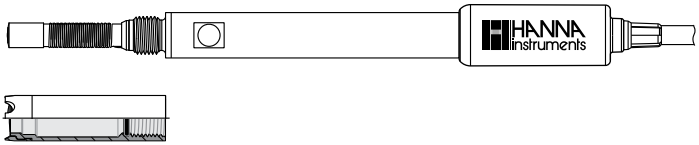


HI2641

3. Power button
4. USB-C port for power connection
   USB-C port for PC interface (HI2641)
5. Jack input (3 mm) for digital electrode

4.3. HI764080 DIGITAL PROBE

The HI764080 is a digital polarographic dissolved oxygen probe with integral temperature sensor.



Probe Features

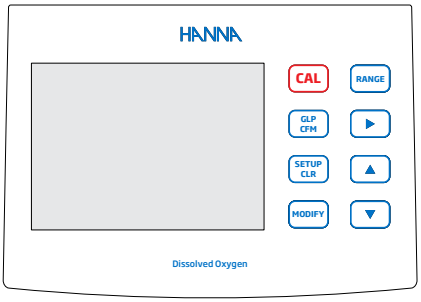
- Direct signal processing for noise-free measurements
- Automatic sensor recognition
- Storage of last calibration data
- Built with materials suitable for use in chemical analysis
- Integral temperature sensor
- 3 mm jack termination
- Unique serial ID for probe traceability

4.4. KEYPAD FUNCTION

Capacitive keys / Description

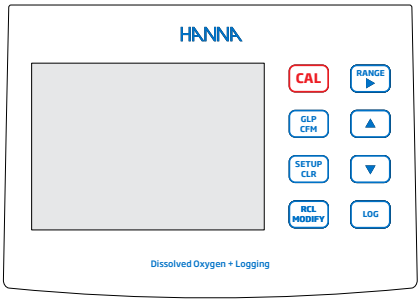
CAL	Enter and exit calibration.
GLP CFM	Display GLP calibration information. In SETUP, confirm change made. During calibration, accept calibration points.
SETUP CLR	Enter/exit SETUP mode. During calibration, clear previous calibration data. Clear log records in log recall.
▲ ▼	Scroll through setup menu items. Change selection when modifying a parameter in setup.*

HI2640



MODIFY	Edit option.
RANGE	Select measurement range.
▶	Navigate right.

HI2641



RCL MODIFY	View logged records. View percentage of used log memory.
RANGE ▶	Select measurement range. Navigate right in setup menu items. View GLP data for a data point in log recall.
LOG	Log data by manual log-on-demand or manual log-on-stability. Start/stop interval logging.

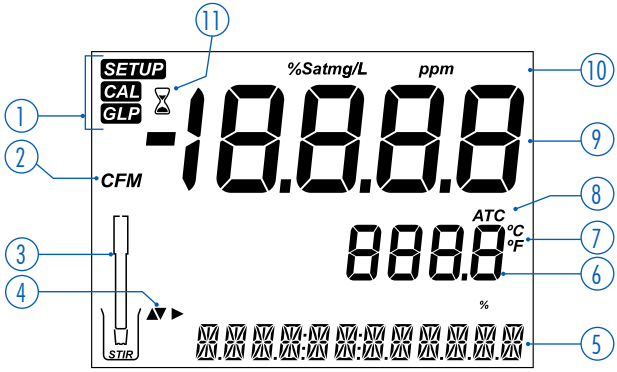
Note: *During measurement, use the ▲ ▼ keys to select desired message. Options include date, time, calibration data.*

If a measurement error or log status change occurs during measurement, the third line displays a pertinent message.

* To make number changes faster, hold down ▲ or ▼ key.

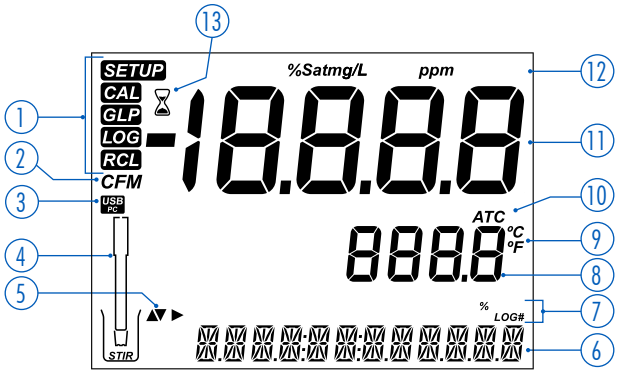
4.5. LCD DESCRIPTION

HI2640 Display



1. Mode tags
2. Confirm tag
3. Probe symbol
4. Arrow tags, displayed when they are available
5. Third LCD line (message area)
6. Second LCD line (temperature measurement)
7. Temperature units
8. Temperature compensation status
9. First LCD line (measurement line)
10. Measurement units
11. Stability indicator

HI2641 Display



1. Mode tags
2. Confirm tag
3. USB connection status
4. Probe symbol
5. Arrow tags, displayed when they are available
6. Third LCD line (message area)
7. Labels
8. Second LCD line (temperature measurement)
9. Temperature units
10. Temperature compensation status
11. First LCD line (measurement line)
12. Measurement units
13. Stability indicator

5. SETUP / INSTALLATION

5.1. SETTING UP THE METER

The main operating modes are setup, calibration, measurement, data logging, and data export. Follow this general outline of steps to get started.

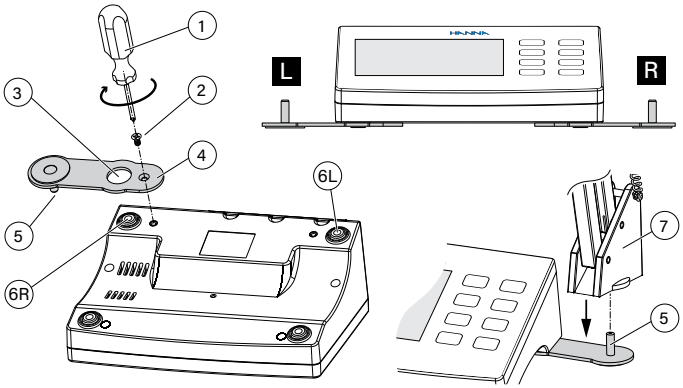
1. Use supplied USB-C to USB-C cable to connect the meter to power.
2. Press the ON/OFF button to turn the meter on.
3. Plug in the probe required for measurement.
4. Configure parameter settings required for the measurement.
5. Calibrate the sensor/probe.

The system is now ready for measurements.

5.2. ATTACHING THE ELECTRODE ARM

Attaching the Electrode Holder Base Plate

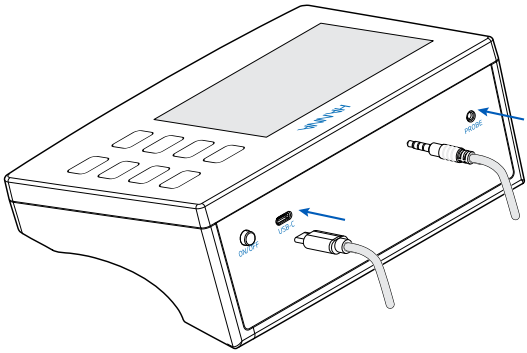
- Take the HI764026 electrode arm from the box.
- Identify the metal base plate (4) with the integral pivot pin (5) and the screw (2).
- The plate may be attached to either side of the meter, left (L) or right (R).
- Place the meter face down on a clean, dry surface.
- Align the hole on the base plate (3) over the rubber foot (6R or 6L).
  The pivot pin (5) should be facing downward.
- Use a screwdriver (1) to tighten the screw (2) and attach the base plate to the meter.



- Position the meter with the display facing up.
- Slide electrode holder (7) over the pivot pin (5).
  A "slide in" motion is required to lock the arm into position.

5.3. POWERING THE UNIT

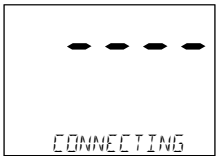
1. Plug one end of the USB-C cable into the USB-C port (HI2641) / POWER port (HI2640) of the meter.
2. Plug the other end of the USB-C cable to the power adapter.
3. Plug the adapter into the wall.
4. Press the black ON/OFF power button.
   At start up, the meter briefly displays the initialization screen.



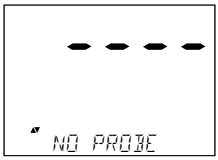
5.4. PROBE CONNECTION

DO probes attach to the meter through a jack connector, making attaching and removing the probe an easy process. When connected, the probe is automatically detected.

- Insert the plug into the socket located on the meter's rear panel.
- Make sure the probe is completely connected.
  If the probe is recognized, "CONNECTING" message is displayed along with sensor model.



If the probe is not connected or not recognized, "NO PROBE" message is displayed.



5.5. GENERAL SETUP

General settings remain even when no probe is connected.

Note: *The settings are reset to default when meter is restarted.*

» Tap [SETUP CLR] key to access configurable options.
» Use the [▲] [▼] keys to navigate options.
» To modify settings:
  HI2640 » tap [MODIFY] key
  HI2641 » tap [RCL MODIFY] key
» To modify options:
  HI2640 » use [▶] key
  HI2641 » use [RANGE ▶] key
  Both models » use [▲] [▼] keys
» Tap [GLP CFM] key to confirm the change.
» Tap [SETUP CLR] key to exit setup.

General Setup items	Description	Options	Default	Basic Mode
USB connection HI2641 only	When connected to a PC, select between logging or data export.	• LOG ON METER • EXPORT TO PC	LOG ON METER	Available
Log HI2641 only	• Manual log-on-demand • Manual log-on-stability • Timed interval lot logging	• Manual log • Stability log Fast, Medium, Accurate • Interval log 5, 10, 30 seconds • Interval log 1, 2, 5, 15, 30, 60, 120, 180 minutes	Interval (5 seconds)	Manual log Stability log (medium)
Set Calibration expiration warning	"CAL DUE" is displayed when set time in this parameter has been exceeded.	1, 2, 3, 4, 5, 6, 7 days OFF	7 days	Not available
Probe specific	Parameters that are specific to a measurement type are inserted here in the SETUP list.			
Set date	Tap [MODIFY] | [RCL MODIFY] to set date. Tap [GLP CFM] to save.	YYYY/MM/DD Date	Set date	Available
Set time	Tap [MODIFY] | [RCL MODIFY] to set time. Tap [GLP CFM] to save.	24 hr:MM:SS Time	Set time	Available

General Setup items	Description	Options	Default	Basic Mode
Set Auto-Off	Automatically turns off when no key press is detected for time set.	5, 10, 30, 60 minutes OFF	10 minutes	Available
Sound	If enabled, a short audible tone is produced for key stroke or calibration confirmation. A longer audible tone is produced for wrong key.	On Off	On	Available
Temperature unit	Select degree Celsius or Fahrenheit scale for displayed and logged temperatures.	°C or °F	°C	Available
LCD contrast	Permits modification of the display contrast for various lighting conditions.	1 to 8	3	Available
Message transition	Select how messages are displayed on third LCD line of display.	Word scroll Letter scroll	Letter scroll	Available
Reset configuration to default	Tap MODIFY | RCL MODIFY and GLP CFM when prompted to reset parameters.			Available*
Instrument Firmware Probe Firmware	Displays meter firmware version. Use ▶ | RANGE ▶ to switch to probe firmware (if connected) and diagnostic mode for troubleshooting.	View only	Current firmware version	Available
Meter ID Meter SN Probe SN	Meter ID Meter and connected probe serial number. Use ▶ | RANGE ▶ to navigate options.	User selectable meter ID	0000/Serial Number	Available
CSV file separator	Used to separate columns in the CSV file.	Comma (,) Semicolon (;)	Comma	Available

* It resets with Basic Mode OFF.

6. UNDERSTANDING STANDARD VS BASIC OPERATING MODES

6.5.1. Standard Mode (HI2641 Only)

The Standard Mode permits:

- Salinity configuration for DO measurement
- **Concentration** measurements expressed in ppm or mg/L
  - » based upon oxygen solubility in air-saturated fresh water.
- **Percent saturation** measurements (suitable for measurement in samples other than air-saturated fresh water)
  - » based upon the partial pressure of oxygen
- Logging of measurement data using manual log-on-demand, manual log-on-stability, or interval logs.

6.5.2. Basic Mode

The Basic Mode permits:

- Salinity configuration for DO measurement
- **Concentration** measurements expressed in ppm or mg/L
  - » based upon oxygen solubility in air-saturated fresh water.
- **Percent saturation** measurements (suitable for measurement in samples other than air-saturated fresh water)
  - » based upon the partial pressure of oxygen
- Logging of measurement data using manual log-on-demand, manual log-on-stability (medium) (HI2641 only)

Note: *Always check material compatibility of the probe with the sample.*

6.1. DISSOLVED OXYGEN METER CONFIGURATION

- Connect the DO probe to the meter.
- Tap SETUP CLR to configure DO meter operation.
  The parameter-specific options will be seen inserted into the menu.

Parameter	Description	Choices	Default
Pressure	• Concentration measurements are pressure dependent	Automatic	On
Salinity (g/L)	• Dissolved oxygen solubility decreases if water contains salts. • To improve concentration calibration accuracy and measurement, select salinity to be close to known salt level.	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37,38, 39, 40 g/L	0
DO units	• Select preferred measurement units for DO concentration.	mg/L or ppm	ppm

6.1.1. Pressure & Salinity Compensation Explained

Temperature, pressure, and salinity compensation are used for DO concentration measurements.

Temperature

- Colder water holds more dissolved oxygen.
- Warmer water holds less dissolved oxygen.
- Compensation for temperature-related solubility is done using probe's built-in temperature sensor.

Pressure

Pressure has a direct and proportional relationship with DO levels.

- Higher pressure increases the amount of oxygen that can dissolve in the water.
- Lower pressure decreases the amount of oxygen that can dissolve in the water.

Salinity

- Oxygen solubility in water is influenced by the amount of salt in the water.
  Seawater has a salinity of 35 g/L. The oxygen solubility is 18 % less compared to fresh water at 25 °C.
- Enter the approximate salinity value to have the calibration and subsequent concentration measurement display the correct (compensated) oxygen concentration.
  An 18 % error would result if the salinity value is not entered.

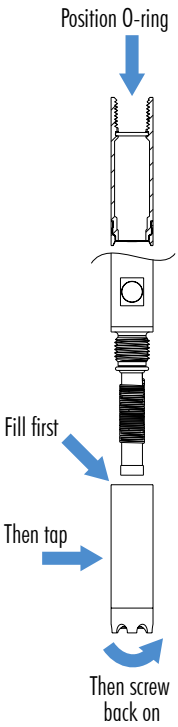
  Note: *Salinity and altitude have no effect on % oxygen solubility range.*
- In fresh water oxygen concentration is at a maximum.
- The solubility of the oxygen dissolved in water is decreased when water is brackish or seawater; or when measurements are made at elevations above sea level.

6.2. PROBE PREPARATION

Note: *The HI764080 contains a glass insulator. Handle with care!*

Probes from Hanna Instruments® are shipped dry.

1. Remove the protective shipping cap.
   Save the cap for storage.
2. Open membrane package and remove one O-ring and one membrane cap.
3. Rinse the membrane cap with a small amount of HI7041 electrolyte then discard.
4. Position the o-ring in the cap as indicated.
5. Refill membrane cap 3/4 full with electrolyte solution.
   The o-ring should be fully immersed in solution.
6. Hold the membrane cap by the top and tap the side walls to dislodge gas bubbles.
   Do not tap on the membrane directly!
7. With the probe facing down, slowly screw the cap counterclockwise until completely tightened.
   Some electrolyte will overflow!



8. Rinse the probe outer body and inspect membrane for entrapped gas bubbles.
9. Connect the DO probe to the meter then turn meter on.
10. Allow time for probe polarization.
    "DISSOLVED OXYGEN PROBE CONDITIONING" is displayed for ≈ 60 seconds.
    Non-polarized probes cause inaccuracy.

Note: *When not in use and during polarization, use the protective transparent cap.*

6.3. CALIBRATION

The accuracy of dissolved oxygen measurements is directly related to the sensing-surface cleanliness and calibration technique. Oily coatings and biological contaminations are the primary cause of calibration drift. A standard solution or a reference DO meter may be used to compare readings during calibration.
The meter supports:

- **Two-point calibration** at 100.0 % saturation (slope calibration) and 0.0 % saturation (0.00 mg/L)
- **Single-point calibration** at 100.0 % saturation or 0.0 % saturation (0.00 mg/L).

6.3.1. Calibration Guidelines

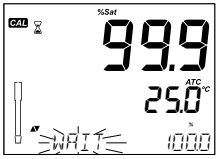
- Set up a routine service schedule where measurement integrity is validated.
- Do not handle the sensing surface of the sensor.
- Avoid rough handling and abrasive environments that can scratch the reactive surface of the sensor.
- Do not return the used standard to the bottle of "fresh" solution.
- For measurements across a temperature gradient (when water temperature is drastically different from the standard), allow the sensor to reach thermal equilibrium before conducting calibrations or making measurements.
- When calibrating in water-saturated air ensure there are no droplets on the DO sensor sensing surface.
- When a user calibration is performed it is assumed that the standard value is the DO value at the current temperature and salinity.

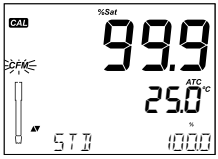
6.3.2. Procedure

Calibrate at 100% Saturation

- Rinse the polarized probe with clean water.
- Dry the probe tip and allow a few seconds for the reading to stabilize (probe in air).
- Suspend the probe with membrane just over beaker of water.
  Do not put the sensor in a sealed container!
- Allow for the reading to stabilize.
  The standard value is automatically recognized.
- Tap CAL.
  The "⌛" indicator is displayed along with "WAIT"message blinking.
- When the reading is stable, **CFM** tag is displayed blinking.

- Press GLP CFM to confirm calibration.

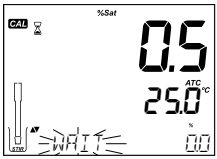


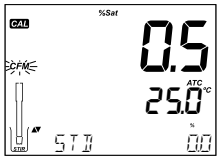


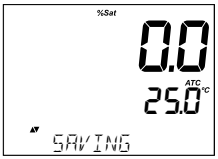
- Tap CAL to exit calibration after the first point.
- "SAVING" message is displayed and the meter returns to measurement mode.

Calibrate at 0 % saturation (0 mg/L)

- Prepare a fresh bottle of HI7040 Zero Oxygen Solution.
  Follow printed packaging instructions
- Fill the calibration beaker 2/3 full with HI7040 Zero Oxygen solution.
- Slowly place the probe in the solution.
- Dislodge bubbles that may adhere to the sensor.
- Stir gently for 2-3 minutes.
- Tap CAL or continue with calibration after confirming first point.
- "WAIT"message is displayed along with "00%.
- Wait for **CFM** tag to start blinking before confirming standard.
- Press GLP CFM to confirm.
  "SAVING" message is displayed then the meter returns to measurement mode.
- Rinse probe tip off in water before sample measurements.

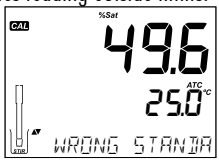




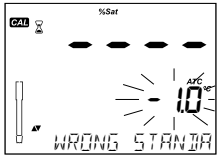


6.3.3. DO Calibration Error Messages

- "WRONG STANDARD" indicates reading outside limits.



- "WRONG STANDARD TEMPERATURE" indicates temperature outside 0.0 - 50.0 °C range during calibration.



6.4. GLP INFORMATION

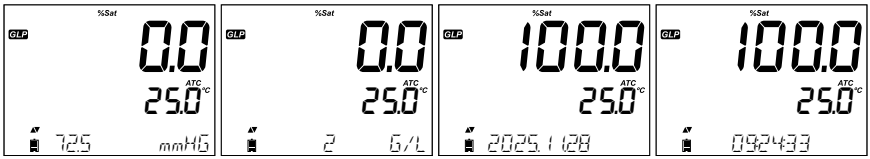
Good Laboratory Practice (GLP) is a quality control function used to ensure uniformity of sensor calibrations. GLP information is available in Basic and Standard Modes, and is included with every data log.

- Tap [GLP CFM] from measurement mode to open latest calibration file information.
  Newest calibration points are reported as a solid number whereas older calibration data (still used) is displayed blinking.
- Use [▲] [▼] to scroll through GLP information.

"NO CAL" message displayed blinking if calibration has not been performed

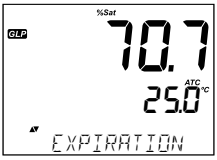
---

Temperature, pressure, salinity settings and calibration date and time



Calibration expired warning

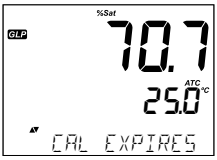
EXPIRATION WARNING DISABLED



Calibration due warning

CAL EXPIRES IN X DAYS

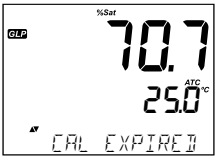
Standard mode only



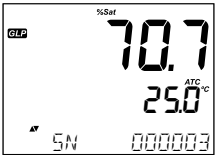
Number of days since calibration expired

CAL EXPIRED X DAYS AGO

Standard mode only



Probe serial number

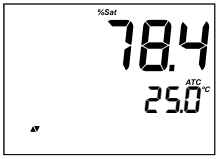


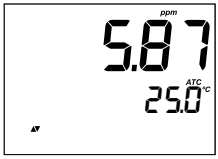
6.5. DO MEASUREMENTS

- Verify the temperature sensor is submerged in sample during measurement.
- Allow the probe to reach thermal equilibrium with the sample.
- Verify if temperature measurements are reading correctly.
- Verify the probe is calibrated in accordance with sampling protocols.
- The probe should be measuring the partial pressure of the dissolved oxygen in water. Gas bubbles have a greater partial pressure due to the surface tension of the bubble. Noisy (erratic) measurement or even higher measurements are possible.
- Set Salinity value if measuring ocean or brackish water samples.
- Carefully lower the probe into sample so no trapped air bubbles at the cap.
- Routinely inspect the probe for biofouling.
- Routinely clean off the probe with clean water (between measurements). Biologically active waters may require more frequent cleaning.
- For good sample circulation make sure the optical window/membrane is clean, without any coating.
- Only work with recently calibrated probes.
- Use the HI764026 holder for easy transfer in and out of containers during sample measurement.
- To limit sample contamination, pour 2 beakers of sample. Use one beaker to rinse the sensor, and another one for measurement.
- To ensure accuracy, the membrane needs constant oxygen replenishment.

  Note: *Ensure adequate water movement either manually or by use of a stirrer.*

- The Dissolved Oxygen value (in %) is displayed on the first LCD line.
- Tap RANGE to change from % to ppm (mg/L) and vice versa.

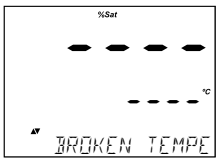




6.5.1. Error Messages During Measurement

- "PROBE OUT OF SPEC"scrolled on the third LCD line, indicates that the DO, pressure, salinity, or temperature measurements exceeds probe limits.
- " 120 °C" displayed blinking, indicates that the temperature exceeds the meter specification of 120 °.
- When logging, if the DO, pressure, salinity, or temperature exceeds probe limits, "OUT OF SPEC." message is displayed.

  Note: *The log file indicates "°C!" next to the data.*



- "BROKEN TEMPERATURE SENSOR" scrolled along with unit tag blinking.

  Note: *The log file will indicate "°C!!" next to the data.*

7. LOGGING (HI2641 ONLY)

The instrument holds a maximum number of 1000 records divided as:

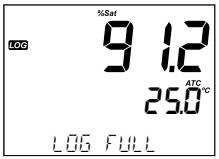
- Manual log-on-demand (maximum 200 logs)
- Manual log-on-stability (maximum 200 logs)
- Interval logging (maximum 600 samples organized in100 lots)

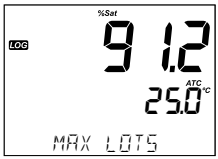
Note: *A record is a stored reading and a lot is a group of records.*

When operating in Standard Mode users can select between any of the three supported options and can set any of the three stability criteria i.e. fast, medium, accurate.
When operating in Basic Mode users can select between manual log on demand and manual log on stability and can set medium stability criteria only.

Stored data

- Manual log-on-demand and manual log-on-stability are stored in a single lot.
- The maximum number of records that may be stored in a manual or stability lot is 200 records.
- If the log memory is full during logging, the "LOG FULL" message is displayed and logging ceases. The display will return to the measurement screen.
- The maximum number of Interval lots that may be stored is 100.
  If a 101st lot is attempted, "MAX LOTS" will be displayed and some lots will need to be deleted.





- The lot numbering is up to 999 and restarts if all lot logs are deleted.

7.1. TYPES OF LOGGING

Logging type is configured in setup.

Interval logging

A continuous log is recorded using a user-selected time interval.

Note: *Interval logging is not available when operating in Basic Mode.*

Manual log-on-demand

Readings are logged each time [LOG] is used. All records are stored in a single manual lot for the measurement type. New records made on different days are stored in the same manual lot.

Manual log-on-stability

Stability criteria may be set to fast, medium, or accurate.

Note: *When operating in Basic Mode only medium stability criteria may be set.*

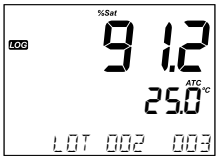
A log on demand is made each time [LOG] is used and the stability criteria is reached.

- In Setup mode, choose log parameter.
- Tap [RCL MODIFY] key.
- Use the [RANGE] key to select between Interval, Manual, or Stability.
- When Interval is displayed, use [▲] [▼] to select the setting for the timed interval.
- When Stability is displayed, use [▲] [▼] to select the measurement stability setting.

A complete set of GLP information including date, time, range selection, temperature reading, calibration information and probe serial number is stored with each log made.

7.1.1. Interval Logging

- Configure interval and sampling period in the setup menu.
- Tap [LOG] while the instrument is in measurement mode.
  "PLEASE WAIT" message is displayed followed by the number of free spaces.
  During active interval logging, lot information is displayed on the third LCD line.
  It indicates in which lot the data will be placed and keeps track of the number of logged records taken.
  The LOG tag is on continuously during active logging.

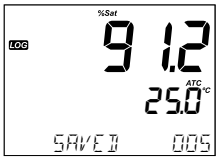


- Tap [RANGE] during logging to display the number of logs available.
- Tap [LOG] again to stop logging.
  The "LOG STOPPED" message will be displayed for a few seconds.

Note: *If a sensor failure occurs during interval logging, "OUT OF SPEC." message will alternate with logging information.*

7.1.2. Manual Log-On-Demand

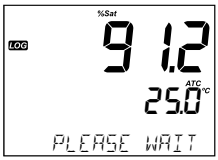
- Select Manual in the setup menu.
- Tap LOG while the instrument is in measurement mode.
  "PLEASE WAIT" message is displayed followed by saved measurement confirmation screen and the number of available (free) spaces.
  The **LOG** tag is kept on display.

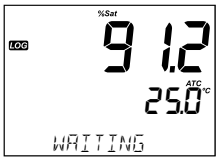


7.1.3. Manual Log-On-Stability

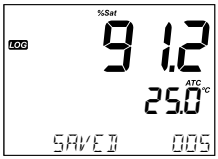
- Select Stability in the setup menu.
- Choose measurement stability criteria in the setup menu.

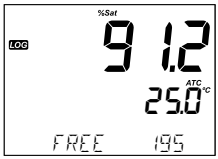
  Note: *In Basic Mode, Stability Medium is available only.*
- Tap LOG while the instrument is in measurement mode.
- "PLEASE WAIT" message is displayed followed by a screen displaying the stability tag, **LOG** tag. "WAITING" message is displayed next.
- Tap LOG again while "WAITING"message is on display to stop logging.





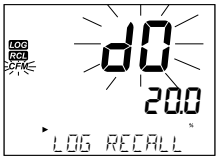
- When selected stability criteria has been met, "SAVED" message is displayed followed by a screen indicating how much log space is available (FREE).
  The **LOG** tag is kept on display.



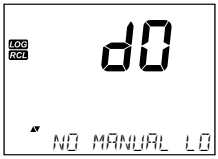


7.2. VIEW LOGGED DATA

- Tap [RCL MODIFY] to view all log records stored on the meter.
  The display also indicates the percentage of log memory used.
- Tap [GLP CFM] to display saved logs.
- If no sensor or probe is connected, tap [RANGE] to select measurement type.
- Tap [GLP CFM] to display those logs.



- Once a parameter is selected, use [▲] [▼] to select parameter log to view.
  Option to select from:
  - » Manual log-on-demand lot
  - » Manual log-on-stability lot
  - » Individual Interval logging lots
- If no data was logged for the selected measurement range, the instrument displays "NO MANUAL LOGS", "NO STABILITY LOGS" messages.



- Tap [GLP CFM] to access lot information and view recorded data.
- Use [▲] [▼] to toggle between different records.
- Tap [RANGE] to display GLP data, including calibration information, date, time.
- Tap [SETUP CLR] then [GLP CFM] when deleting records or lots.
- Tap [RCL MODIFY] to:
  - » exit the logging type
  - » exit the parameter selection screen
  - » return to the measurement screen

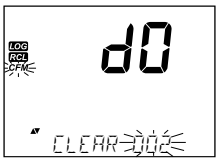
7.3. DELETE LOGGED DATA

Users can opt between:

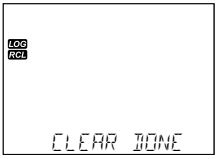
- Delete logging type/lot
- Delete records (manual log on demand or manual log on stability)
- Delete all

Procedure

- Tap RCL MODIFY.
- Select the parameter log.
- Use ▲ ▼ to select data to be deleted.
- Tap SETUP CLR.
  The instrument displays:
  - » "CLEAR MANUAL" if Manual Records was selected
  - » "CLEAR STAB" if Stability Records was selected
  - » If interval lots was selected, the "CLEAR" message is displayed followed by the selected lot, with **CFM** tag blinking.

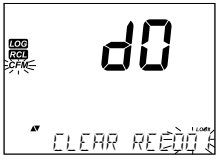


- Use ▲ ▼ to select a different lot.
- Tap GLP CFM.
  "PLEASE WAIT" message is displayed.
  "CLEAR DONE" is displayed for a few seconds after the selected Interval lot is deleted.



7.3.1. Delete Records (Manual Log-on-Demand & Manual Log-on-Stability)

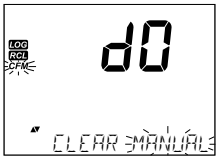
- Tap GLP CFM when Manual (Stability) is displayed, to enter Manual (Stability) log.
- Use ▲ ▼ to select record to be deleted.
- Tap SETUP CLR.
  "CLEAR RECORD" message is displayed along with record number and **CFM** tag blinking.
- Use ▲ ▼ to select another record if necessary.



- Tap GLP CFM.
  "PLEASE WAIT" then "CLEAR DONE" messages are displayed.

When individual logs are deleted within saved Manual or Stability logs, the logs will renumber, filling in the deleted data but staying in chronological order.

See 7.3. Delete Logged Data section to delete all Manual (Stability) logged records.



- Select the Manual (Stability) lot.
- Tap SETUP CLR. "CLEAR" message is displayed along with "MANUAL" or "STABILITY". **CFM** tag is displayed blinking.
- Tap GLP CFM to confirm deleting selected lot or all records.
- Tap SETUP CLR to exit without deleting.

A lot number is used to identify particular sets of data.

Lot numbers are allocated successively until 100, even if some lots were deleted. The total number of lots that can be saved is 100.

If some are deleted (for example 1-50), fifty additional logs may be stored. These will be numbered 101-150.

The lots are allocated successively (if enough memory space) until 999 is reached.

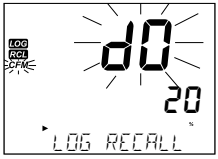
After number 999 is reached, delete all the lot logs to restart numbering.

7.3.2. Delete All

All logs (all parameters) can be deleted in a single clear.

This function will delete all Manual, Stability, and Interval logs for the measurement type selected.

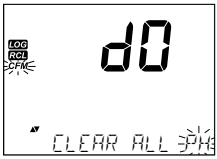
- Tap RCL MODIFY. The dO type will be blinking.
- With measurement type blinking and displayed message reading "LOG RECALL", tap SETUP CLR.

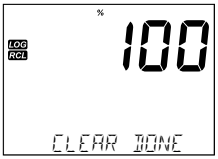


"CLEAR ALL" message and measurement type are displayed.

CFM tag is displayed blinking.

- Tap GLP CFM.
  "PLEASE WAIT" along with percent cleared will be displayed until completed.





Note: *If SETUP CLR is wrongly tapped, tap the key again to exit without deleting.*

7.4. PC & STORAGE INTERFACE

Meter to PC transfer

1. Connect the meter to the PC using the supplied USB cable.
2. Power the meter
3. Tap SETUP CLR and select "LOG ON METER".
4. Tap RCL MODIFY then use ▲ ▼ to change to "EXPORT TO PC".
5. Tap GLP CFM. The USB/PC tag is displayed.
6. Tap SETUP CLR to exit.

The PC detects the USB as a removable drive. Open the drive to view the stored files.
Log files are formatted as Comma Separated Values (*.CSV) and can be opened with any text editor or spreadsheet program.

Notes:

» *Western Europe (ISO-88859-1) character set and English language are suggested settings.*
» *Other files may be visible depending upon computer settings. All files stored will appear in this folder.*
» *Adjust font (column) width appropriately.*

Interval log	Manual log-on-demand	Manual log-on-stability
DOLOT###	DOLOTMAN	DOLOTSTA

All stability logs, regardless of configured stability criteria, are located in the same stability file for that measurement. Click on the desired log to view data.

Notes:

» *"°C!" displayed in log data indicates that the probe was used beyond it's operation specifications. Logged data should not be considered reliable!*
» *"°C!!" displayed in log data indicates ta broken temperature sensor. The probe should be replaced. Logged data should not be considered reliable!*

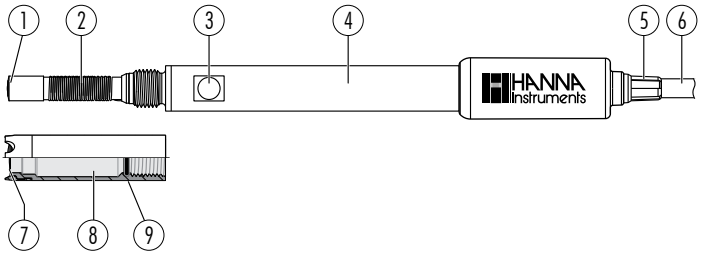
8. MAINTENANCE

8.1. METER

The following steps outline the process to ensure users keep the meter clean and disinfected while limiting the risk of damage from unsuitable cleaners.

- Disinfect the screen using commercially available, non-ammonia glass or disinfectant cleaner.
- Apply a small amount of cleaner directly to a microfiber or lint-free disposable cloth. Make sure the cloth is damp and not wet.
- Wipe the glass screen clean with the cloth. Do not apply cleaner directly to the interface.

8.2. DISSOLVED OXYGEN PROBE



1. Glass insulator/platinum cathode 2. Ag/AgCl anode and reference 3. Temperature sensor 4. Probe body 5. Cable relief	6. Cable 7. Oxygen permeable PTFE membrane 8. Screw cap 9. O-ring seal

General Maintenance

- Inspect membrane surface to ensure it is in good condition.
- Rinse carefully with distilled or deionized water to clean.
- Damaged membranes need to be replaced.
- Verify no bubbles are trapped between the cathode and membrane.

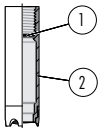
Cathode Cleaning

1. Remove cap and inspect platinum cathode is bright and untarnished. If tarnished, clean with a clean lint-free cardboard or cloth. Gently polish off any stains.
2. Rinse the probe with deionized or distilled water.
3. Install a new membrane cap using fresh electrolyte.

Note: *Use care when handling the probe tip.*

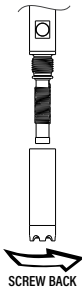
Inspect that the insulator has not been cracked.

Membrane Cap Replacement



New probe: unscrew the shipping cap and save.
Probe in use: unscrew the old cap.

1. Take one O-ring and one membrane cap and position the O-ring (1) in the cap (2).
2. Rinse the membrane cap with electrolyte and discard.
3. Fill the cap, above the O-ring, with electrolyte and tap the side walls to dislodge bubbles that may adhere to the threads.
4. Over a sink, with the cathode facing down, screw the cap counterclockwise until the threads are fully engaged.
5. Rinse the probe and inspect the membrane for trapped bubbles.
   If any, discard the electrolyte, refill, and tap the sides. Reinstall.



Storage

Store with protective cap on.

Conditioning

Before proceeding with the calibration make sure the probe is ready for measurements.

1. Reinstall the plastic protective cap over membrane end.
2. Reconnect probe to meter and allow probe to polarize.

8.3. TROUBLESHOOTING GUIDE

The meter gives warning messages:

- when erroneous conditions appear
- while logging (HI2641 only)
- when measured values are outside the expected range
- for invalid temperature values

Note: *See notifications area at the bottom of the screen.*

The information below provides an explanation of the errors and warnings, and recommended action(s) to be taken.

Symptoms	Problem(s)	Solution(s)
Readings fluctuate up and down (noise)	DO probe electrolyte contains entrapped gas.	Remove the cap. Refill, tap, and reinstall.
DO reading displayed blinking	Out of range	Verify no trapped bubbles inside cap. Verify solution movement past membrane. Remove cap, inspect, and clean if necessary. Install new cap, refill with fresh electrolyte (no bubbles) to allow longer polarization. Stir or increase flow rate.
Meter does not measure temperature	Broken temperature sensor	Replace the probe.
At startup meter displays all LCD tags continuously		Contact local Hanna Instruments Office.
CAL "Prod" message at startup.	Meter not factory calibrated	Contact local Hanna Instruments Office.

9. METER ERROR CODES

Error Code	Message	Description
ERR_MSG_FACT_CAL_CORRUPTED	CORRUPT FACTORY CALIBRATION	Factory calibration data is invalid or damaged. Device accuracy cannot be guaranteed.
ERR_MSG_UCAL_CORRUPTED	CORRUPT USER CALIBRATION	User calibration data is corrupt and must be redone.
ERR_MSG_RTC_INTERFACE	RTC INTERFACE	Real-time clock interface communication error.
ERR_MSG_FLASH_INTERFACE	FLASH INTERFACE	Flash memory communication interface error.
ERR_MSG_LCD_INTERFACE	LCD INTERFACE	LCD interface communication error; display may not update correctly.
ERR_MSG_RS232	RS232	RS232 interface serial communication error.
ERR_MSG_RTC	RTC	Real-time clock malfunction or invalid data.
ERR_MSG_FLASH	FLASH	Flash memory read/write failure.
ERR_MSG_FS_FACTORY	FS FACTORY	Corrup factory file system.
ERR_MSG_FS_CORRUPTED	CORRUPT FS	Corrupt main file system. Full flash format needed.
ERR_MSG_DISK_FULL_FACTORY	DISK FACTORY FULL	Factory storage area is full.
ERR_MSG_DISK_FULL	DISK FULL	User storage memory is full.
ERR_MSG_NO_FLASH	NO FLASH	No flash memory detected.
ERR_MSG_UNSUPP_FLASH	FLASH NOT SUPPORTED	Detected flash type is not supported by the firmware.
ERR_MSG_PRESSURE_ERROR	PRESSURE	Pressure sensor error or out-of-range reading.

10. ACCESSORIES

Probes

Ordering Information	Description
HI764080	Digital dissolved oxygen probe with built-in temperature sensor
HI764080A/P	Dissolved oxygen spare screw cap membranes for **HI764080** DO Probe (5 pcs.)

DO Solutions

Ordering Information	Description
HI7040L	Zero oxygen solution
HI7041S	Polarographic dissolved oxygen electrolyte solution, 30 mL

Other Accessories

Ordering Information	Description
HI764026	Electrode holder for **HI2600** family
HI75115U	115 to 230 VAC to 5 VDC USB-C power adapter, US plug
HI75230E	115 to 230 VAC to 5 VDC USB-C power adapter, European plug

CERTIFICATION

All Hanna® instruments conform to the **CE European Directives.**

Disposal of Electrical & Electronic Equipment. The product should not be treated as household waste. Instead, hand it over to the appropriate collection point for the recycling of electrical and electronic equipment, which will conserve natural resources.
Ensuring proper product disposal prevents potential negative consequences for the environment and human health. For more information, contact your city, your local household waste disposal service, or the place of purchase.

RECOMMENDATIONS FOR USERS

Before using this product, make sure it is entirely suitable for your specific application and for the environment in which it is used. Any variation introduced by the user to the supplied equipment may degrade the meter's performance. For your and the meter's safety do not use or store the meter in hazardous environments.

WARRANTY

The benchtop meter is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions.
Probe is warranted for six months.
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 charges 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 packed for complete protection.