

Instruction Manual (Operation)

Compact Bovine Blood iCa Checker
LAQUAtwin-Ca-11C

Preface

Warranty and responsibility

- For Research Use Only. Not for use in diagnostic procedures.
- Blood collection is medical practice. Blood collection should be performed by qualified personnel.

Specifications

Model	LAQUAtwin-Ca-11C
Target	Calcium ion (Ca ²⁺)
Measurement principle	ISE method
Minimum sample volume	More than 0.3 mL
Measurement range	0.1 ~ 5.0 mmol/L
Resolution	0.1 mmol/L ^{*1}
Calibration	2 points (1.25 mmol/L and 2.50 mmol/L)
Accuracy ^{*2}	±20% of reading value
Waterproof	IP67 (no failure when immersed in water at a depth of 1 m for 30 min) ^{*3}
Display	Custom (monochrome) digital LCD with backlight
Operating environment	Temperature: 5°C to 40°C Humidity: 85% relative humidity or less (no condensation)
Power	CR2032 batteries (×2)
Battery life	Approx. 150 h continuous operation ^{*4}
Material	ABS epoxy (main material)
Dimensions	164 × 29 × 20 mm (excluding projections)
Mass	Approx. 50 g (excluding batteries)

*1 It is possible to change the resolution to 0.01 mmol/L. (This value is a reference value.) Refer to page 3 of this manual for the resolution setting.

*2 The accuracy is the closeness of agreement between a measured value and an actual value of a standard reference material after a 2 point calibration using Y052L and Y052H standard solutions.

- It is obtained under the following conditions.
- NIST Electrolytes in Frozen Human Serum SRM 956d is used as a standard reference material.
 - The calibration and measurement are performed at the same temperature.
 - The error of standard solutions and rounding error (±1 digit) are not included.

*3 The meter cannot be used underwater.

*4 Battery life may vary depending on usage.

Items in package

Items	Quantity
Sensor	S051 1
Meter	1
Batteries	CR2032 2
Standard solution	Y052L 25 mL (×2)
	Y052H 25 mL (×2)
Cleaning solution	251 250 mL (×3)
Wash bottle for cleaning solution	1
Instruction manual (Operation)	1
Instruction manual (Before use)	1
Quick manual	1
Carrying case	1

Consumable parts sold separately

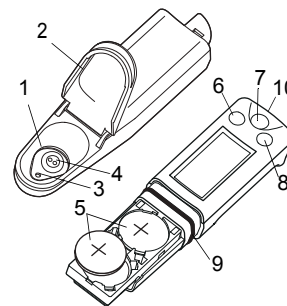
Items	Specifications	Part No.
Sensor	S051	3200772945

Items	Specifications	Part No.
Standard solution Y052L	1.25 mmol/L, 25 mL×2	3200774598
Standard solution Y052H	2.50 mmol/L, 25 mL×2	3200774599
Cleaning solution 251	250 mL×1	3200774601
Solution set Y053	Standard solution Y052L×2 Standard solution Y052H×2 Cleaning solution 251×3	3200774921

Note

Sensors other than S051 cannot be used.

Part Names



- 1 Flat sensor
- 2 Light shield cover
- 3 Liquid junction
- 4 Response membrane
- 5 Lithium batteries
- 6 MEAS switch
- 7 ON/OFF switch
- 8 CAL switch
- 9 Waterproof gasket
- 10 Strap eyelet

Note

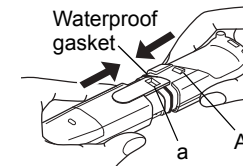
Press the switches 0.5 seconds or more unless otherwise specified.

Initial Setup

Attaching/detaching the sensor

Attaching the sensor

- Power OFF the meter.
- Confirm that the waterproofing gasket is clean and undamaged.
- Slide the sensor onto the meter so that catch "A" on the back of the meter fits into hole "a" on the sensor tongue as shown.

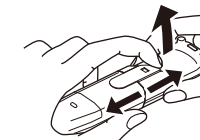


Note

- Be careful not to twist the waterproof gasket.
- Check whether there is any foreign matter or dirt, then attach the sensor.

Detaching the sensor

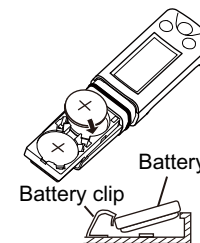
- Power OFF the meter.
- Lift the sensor tongue tip and slide the sensor a little away from the meter.
- Pull out the sensor all the way from the meter.



Inserting/removing batteries

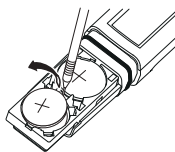
Inserting the batteries

- Power OFF the meter.
- Slide both batteries into the battery case as shown. Be sure to use two CR2032 batteries, and put them with the plus sides (+) upwards.



● Removing the batteries

1. Power OFF the meter.
2. Use a ball-point pen or other tool to pry the batteries out from the clips as shown.



■ Sensor conditioning

Note

- Before using the sensor for the first time or more than a week of disuse, perform sensor conditioning.
- Perform calibration after sensor conditioning.

1. Place some drops of the standard solution Y052L to cover the entire flat sensor.
2. Wait about an hour.
There is no need to switch the meter ON.
3. Wash the sensor with the cleaning solution and remove moisture by gently dabbing.

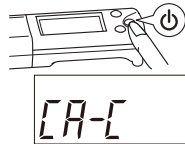
Preparation for blood sample

- Samples should be measured immediately.
- Use of an anticoagulant is recommended.
- Use lithium heparin as an anticoagulant. Other anticoagulant may affect the measurement value.

Basic Operation

■ Power ON

1. Press and hold the ON/OFF switch.
The power is switched ON, and "CA-C" is displayed.



■ Power OFF

1. Press and hold the ON/OFF switch.
The power is switched OFF.

Calibration

A 2 point calibration before every measurement is recommended for accurate measurement. Use only Y052L and Y052H standard solutions.

Tip

- Calibration values are saved even if the meter is switched OFF.
- Calibration values are rewritten if a 2 point calibration is repeated using same standard solutions.

■ Calibration points

The number of a calibration point is 2.

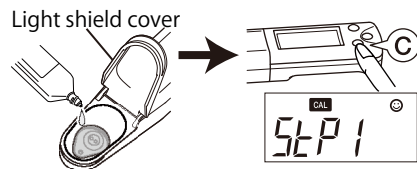
■ 2 point calibration

1. Open the light shield cover and place some drops of the standard solution Y052L to cover the entire flat sensor.

Rinsing the sensor with the standard solution beforehand will provide a more accurate calibration as it will reduce sample crossover contamination.

2. Close the light shield cover and press the CAL switch.

"StP1" and the measured value are displayed, and the ☺ blinks. After the calibration is completed, calibration value "1.3" and "donE" are displayed. The display returns to the measured value.



3. Open the light shield cover and wash the sensor with the cleaning solution.

Then remove moisture on the sensor by gently dabbing with soft tissue or cloth. This completes the 1st point calibration.

4. To perform 2nd point calibration. Repeat step 1. to 3. using the standard solution Y052H.

After the calibration is completed, calibration value "2.5" and "good" are displayed.

The display returns to the measurement mode automatically.

Note

Although concentrations of standard solutions are 1.25 mmol/L and 2.50 mmol/L, when the indicated resolution of measurement values is set to 0.1 mmol/L, the displayed concentrations during calibration are 1.3 mmol/L and 2.5 mmol/L. Calculations of measurement values are performed with 1.25 mmol/L and 2.50 mmol/L.

Refer to page 3 of this manual for the indicated resolution setting.

● Calibration error

If "Er4" appears after ☺ blinks, the calibration has failed.



If "Er4" appears, press the MEAS switch to return to measurement mode and clean the sensor with the cleaning solution. After that, try calibration again or try sensor conditioning. If the calibration repeatedly fails, the sensor may have deteriorated. Replace the sensor with a new one.

Measurement

1. Confirm that the meter is in the measurement mode, and place a sample to cover the entire flat sensor.

2. Close the light shield cover and press the MEAS switch.

☺ blinks until the measured value has stabilized. When the measured value is stable, ☺ stops blinking and the display value is locked with ☺ displayed simultaneously.



3. Document the displayed value.

4. Press the MEAS switch.

The auto hold function is deactivated and ☺ disappears. Be sure to perform this step before starting the next measurement.

Note

- If a measured value is out of the specified measurement range, "Or" is displayed for upper range and "Ur" is displayed for under range.
- When you have a problem with the calibration or the measurement, refer to page 3 of this manual for Frequently asked questions.

Disposal

Blood samples, waste liquid or materials contaminated with blood or waste liquid should be disposed of in accordance with the relevant regulations.

Maintenance

■ Storage

1. Open the light shield cover and wash the sensor with the cleaning solution.
Dab gently with soft tissue or cloth to remove moisture on the sensor and meter.
2. Close the light shield cover before storing the meter.

Note

Especially be sure to treat the flat sensor gently to prevent damaging it.

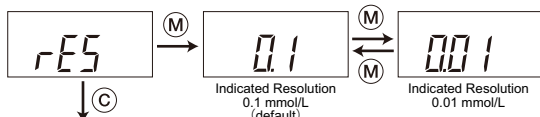
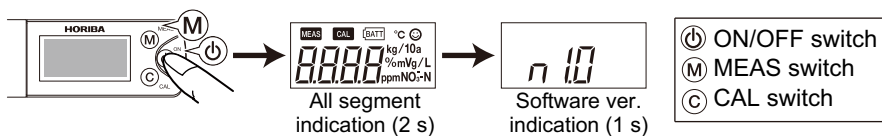
Indicated Resolution of Measurement Values Setting

You can switch the indicated resolution of measurement values to 0.1 mmol/L or 0.01 mmol/L. To enter the setup mode, press and hold the MEAS and ON/OFF switches for over 3 seconds when the meter is switched OFF. All the LCD segments appear and then the meter enters the setup mode.

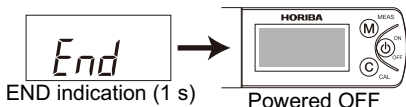
Tip

- When the indicated resolution is 0.01 mmol/L, the measurement value of 2 decimal points is reference value.
- To exit the setup mode with no change of settings, press the ON/OFF switch earlier than pressing CAL switch in the last step.

● Setup mode entry



● Setup completion



● Display range and resolution when the indicated resolution is set to 0.01 mmol/L.

Resolution [mmol/L]	Display range	Resolution
	0.10 ~ 1.60	0.01
	1.60 ~ 2.80	0.05
	2.80 ~ 5.00	0.5

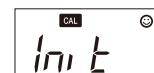
■ Initializing calibration data

Initialize calibration in the following cases.

- To delete the calibration data,
- After the sensor is replaced.

1. Press and hold the CAL and ON/OFF switches for over 3 seconds when the meter is switched OFF to initialize calibration.

After a moment of all segment indication, the software version is displayed. And then, the display changes "Init".



2. Press the CAL switch.

All calibration data is reset. When the initialization of calibration data is complete, "End" appears.



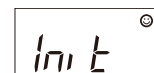
The meter automatically switches OFF.

■ Initializing the settings

All setup choices are erased. The meter is reset to the factory default values.

1. Press and hold the MEAS, CAL and ON/OFF switches for over 3 seconds when the meter is switched OFF to enter the initialization.

After a moment of all segment indication, the software version is displayed. And then, the display changes "Init".



2. Press the CAL switch.

All calibration data is reset. When the initialization of settings is complete, "End" appears.



The meter automatically switches OFF.

Appendix

■ Interfering ions

Target	Calcium ion (Ca ²⁺)
Interfering ions and selectivity coefficients	Fe ²⁺ : Zn ²⁺ : 1 Fe ³⁺ : 10 Cu ²⁺ : 1 × 10 ⁻² (at 10 ⁻³ mol/L Ca ²⁺)
pH range	4 pH to 12 pH (at 10 ⁻³ mol/L Ca ²⁺)

Selectivity coefficient is a concentration ratio of the interfering ion against the target ion, which affects the target ion measurement value. For example, selectivity coefficient of interfering ion against target ion is 1 × 10⁻², which means for the same concentration of interfering ion and target ion coexisting in a sample, the target measurement shows approximately 1 × 10⁻² (1%) higher result.

■ Frequently asked questions

Item	Question	Answer
Sample	Can blood be measured for several days after blood collection?	Measurement is possible. However calcium ion concentrations may change over time.
	Can I measure high or low temperature samples?	The meter cannot measure a sample with temperatures outside the meter's operating temperature range (5°C to 40°C). The difference between the sample temperature and ambient temperature increases the measurement error. Perform measurement after sample temperature reaches the ambient temperature for accurate measurement.

Item	Question	Answer
Sample	The displayed value does not change even if I change the sample.	If ☺ lights steadily in measurement mode, the measured value is locked. Press the MEAS switch to unlock the value. If the value does not change after unlocking, the sensor may be damaged. Replace the sensor.
Standard solution	Can I prepare standard solutions myself?	Use only Y052L and Y052H standard solutions. When other standard solutions are used, it cannot be calibrated accurately.
	Is there an expiration date for standard solutions?	It is stated on the label of the bottle. Do not use standard solution that has passed its expiration date.
Measurement	"Or" or "Ur" blinks in measurement mode.	The measured value may be out of the specified measurement range. Perform a 2 point calibration again and measure a standard solution to check, if "Or" or "Ur" still blinks, replace the sensor.
	"°C" blinks during measurement.	The measured temperature is not within the specified operating temperature (5°C to 40°C). If the ambient temperature is within the specified range and "°C" blinks, replace the sensor.
Error message	"Er4" is displayed after a 2 point calibration.	Perform a 2 point calibration again. If "Er4" is still displayed, refer to page 2 of this manual and perform the sensor conditioning. If the "Er4" is still displayed after conditioning the sensor, the sensor may have deteriorated. Replace the sensor.

Item	Question	Answer
Error message	"Er1" is displayed after power ON.	The internal IC in the meter may be defective. Perform meter initialization. If "Er1" is still displayed after the initialization, the internal IC in the meter is defective. Replace the meter with a new one (the meter cannot be repaired).
	"Er2" or "Er3" is displayed after power ON.	The internal IC in the meter is defective. Replace the meter with a new one (the meter cannot be repaired).
Cleaning	Can I use pure water as cleaning solution?	The lifetime of the sensor may be shortened. Use only the cleaning solution 251.
	Can I use tap water or bottled water as cleaning solution?	The lifetime of the sensor may be shortened. If calcium ions are contained, calibration and measurement may be affected. Use the exclusive cleaning solution.
	Is there a guide for cleaning?	Wash with the cleaning solution until the sample is completely washed away. If standard solutions or samples remain on the sensor or the light shield, it may affect the measurement value.
	Is there no problem if I wipe the sensor?	Remove moisture on the sensor by gently dabbing with soft tissue or cloth.
	Is cleaning necessary before using the sensor?	It is necessary. Wash with the cleaning solution and remove moisture. After that, perform calibration.

Item	Question	Answer
Storage	Is there a way to check the status of the sensor?	Perform a 2 point calibration. If the "Er4" is displayed, consecutively the sensor may have deteriorated. Replace the sensor.
	The sensor was left wet or left unclean.	Wash the sensor and perform the sensor conditioning. After that, when a 2 point calibration can be performed without "Er4", measurement is possible. If the "Er4" is displayed, the sensor may have deteriorated. Replace the sensor.
Storage	Is any treatment necessary after a while from last measurement?	If you do not use for more than a week, perform the sensor conditioning. After that, when a 2 point calibration can be performed without "Er4", measurement is possible. If the "Er4" is displayed, the sensor may have deteriorated. Replace the sensor.
	White crystals are attached to the liquid junction of the sensor. Is it a failure?	This is not a failure. If the sensor is new or has not been used for some time the internal solution may seep out through the liquid junction. Rinse the sensor with the cleaning solution before use.
	The liquid junction of the sensor has discolored.	Discoloring may occur in the sensor depending on the usage condition. When a 2 point calibration can be performed without "Er4", measurement is possible.
	Can I store the sensor soaked in standard solution, cleaning solution or water?	Avoid storing it by soaking in any solution. The lifetime of the sensor may be shortened. Refer to page 2 of this manual, wash with cleaning solution and remove the moisture by gently. After that, close the light shield cover before storing the meter.

Item	Question	Answer
Others	The meter does not power ON.	Check that the batteries are inserted properly. If the battery voltage is low, replace them both with new ones at the same time.

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