SEMEN THAWER

WP·100

A robust, accurate appliance to assure the successful insemination of your herd.

SEMEN THAWER
WP·100

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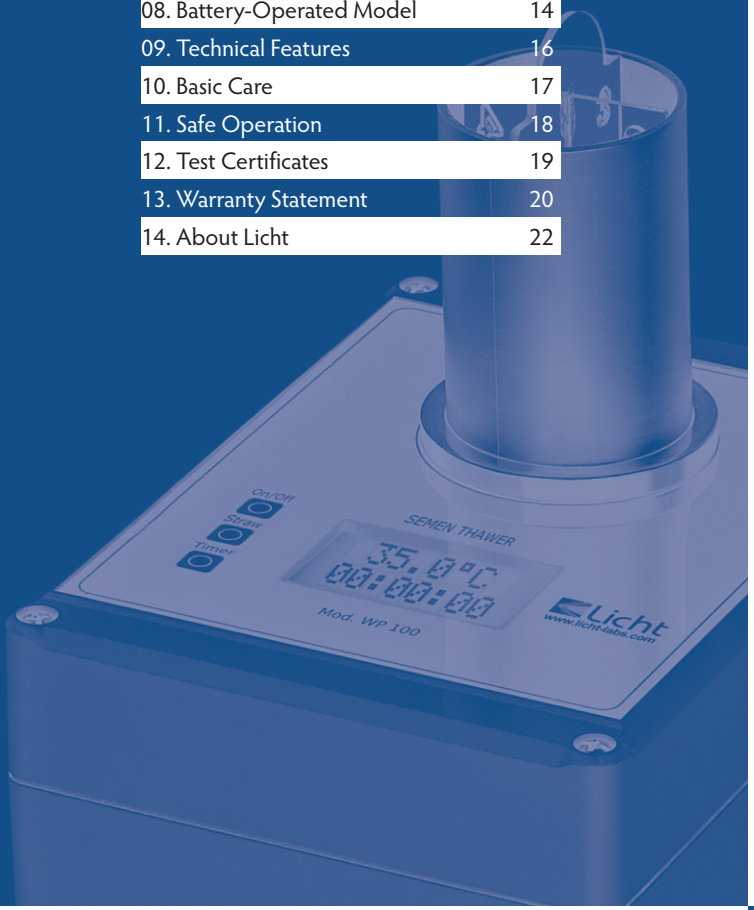
Índice



01. A Word from Licht

Your **WP-100** semen thawer is the most advanced product you can purchase, and it will offer you many years of service.

This appliance employs the best technology available, as detailed in this manual, never to be found in other similar devices existing on the market.

For over 25 years, **Licht** has manufactured electronic equipment for the power industry, and thus has acquired broad expertise in technology applied to electronic products – which have to be robust, reliable, and accurate.

For this reason, we kindly ask you to read this manual carefully, in order to learn how to correctly use and maintain your **WP-100** and get the most out of it.

If any questions should remain, don't hesitate to contact us and we will be glad to help you:

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Thank you and congratulations on your purchase!

Liscio Flavio Ribeiro – Managing Partner
Licht Eletro Eletrônica Ltda.

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02. Product Description

Licht WP-100 Semen Thawer is a robust appliance that incorporates high-precision, micro-processed electronics, especially designed for efficient and high quality semen thawing.

Such efficiency and high quality are demonstrated by the product's capability to warm up water (the medium through which semen is thawed out) quickly and accurately. Thanks to the device's modern and overdesigned electronics, the water can be heated at a rate of up to 3 °C per minute, stabilizing the temperature at 35 °C. Such accuracy in water heating is achievable at any room temperature ranging between 0 °C and 34 °C.

This is possible because the device's high power capacity – allowing fast water heating even at low room temperatures – is closely managed by an efficient software application that was tested in the most diverse operating conditions.

Such accuracy in water heating is achieved by keeping the temperature evenly distributed throughout the cup, with neither hot nor cold spots. The correct distribution of heat in the water results from the adequate positioning of the heating element and temperature sensor, and from the cup's high-quality material and design. This way, the great amount of energy transferred to water in the form of heat is conveyed partly by the water and partly by the cup itself, which also works as a temperature equalizer on its inner surface.

The entire operation of the device can be monitored through a liquid crystal display, which shows water temperature in 0.1 °C units, as well as the correct time intervals for semen thawing, and allows the selection of the type of straw to be thawed (thin or medium). This display provides the safest and most efficient use of the appliance.

Because it presents steady temperature indicators at a 0.1 °C resolution on its display, the unit offers a reading that is at least 10 times more accurate than normally needed in this process.

Besides featuring modern micro-processed electronics, **Licht WP-100** Semen Thawer was designed and manufactured to be extremely robust, and to resist the most adverse conditions of use and transportation, including through unpaved roads. In other words, it was especially developed to operate under the most challenging service conditions, and it can be transported to and used in the most remote locations, according to the specifications listed in this manual.

Therefore, this document presents a robust, reliable, and highly accurate electronic appliance.

The temperature is evenly distributed throughout the cup, with neither hot nor cold spots.

0.1 °C Resolution display.

Water-proof, drop-resistant, robust polycarbonate casing.

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03. Water Resistance

The acronym **WP** (which stands for "**WATER-PROOF**"), in the thawer's name, indicates that the product was designed to operate in humid and wet environments without risk of damage.

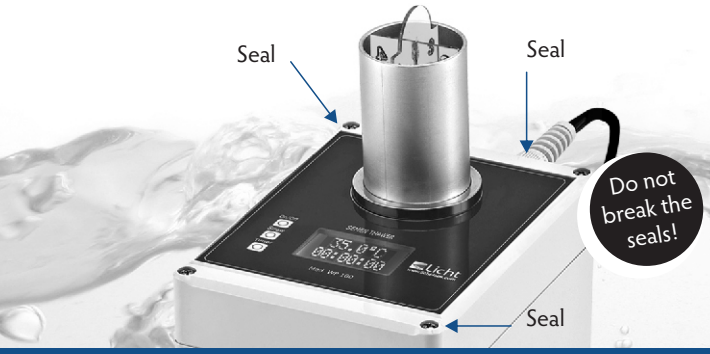
To meet this requirement, all the electronic components of the **WP-100** thawer are housed in a high-quality casing built in Germany which is liquid, moisture and dust-tight and impact-resistant.

The casing's outstanding features result from its mechanically precise and well-sealed design, as well as from the materials used in its construction: a high-quality engineering plastic (polycarbonate).

This appliance is in compliance with the applicable European (IEC), American (ANSI), and Brazilian (ABNT NBR) standards regarding the Ingress Protection Level for Electrical Enclosures, at their strictest level (IPX7, complete immersion in water), according to Test Certificate number 1006.1 (tests carried out at official laboratories – see Chapter 13 of this manual).

Warning!

In order to maintain the sealing capacity of the **WP-100** thawer, under no circumstances should the user try to open the casing or break the yellow seals (as shown in the picture below). Failure to follow this instruction will automatically render void the warranty offered by **Licht** for this product.



04. Included Items

Along with the **WP-100** thawer, **Licht** also provides a hard case made of superior-quality synthetic leather and internally lined with 1 cm thick EVA foam boards (in five of its sides), for the transportation and storage of the product. The hard case features a faux-velvet finish interior, a safety clasp, and a nylon handle for easy transportation.

The **WP-100** thawer may then be stored and carried conveniently and safely, thus extending its service life.

The thawer is accompanied by a separator ruler made of clear acrylic that, when inserted in the cup, allows the water volume to be divided into 4 equal parts (identified as 1 to 4), and separates the straws into groups.

WARNING: Carrying the **WP-100** without its protecting case will render void the warranty.

Faux-leather case and acrylic separator ruler provided with the **WP-100** thawer.

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05. Control

The thawer features a simple and intuitive interface for controlling its operation. Every procedure can be controlled through the three buttons located at the top of the unit.

CONTROL PANEL

- **ON/OFF:** Unit goes either on or off the standby mode. On standby mode, the device interrupts any heating in process and does not display any information on the screen.
- **STRAW:** Users may choose the type of straw to be used:
  - **Thin Straw:** The timer is automatically set to sound off after 20 seconds.
  - **Medium Straw:** The timer is automatically set to sound off after 30 seconds.
- **TIMER:** It will start or reset the thawing time when the device is ready to be used, that is, if it has achieved 34 °C of temperature.

Simple user-friendly interface.

06. Operation

01. Place the device on a flat, stable surface and away from the sun.
02. Fill up the device container (cup) with clean, residue-free water (160 ml). Please note the internal mark on the container, 2 centimeters below the rim.
03. Connect the power cord to a wall outlet. A blue backlight will then illuminate the display to indicate that the thawer's power supply has been turned on. However, there will not be any water heating, because the device will still be on standby mode.

Note

For devices with red and black cables with jumper clamps, a 12 V automotive battery with enough charge can be used as a power supply for the thawer. Please refer to Chapter 8 for more details.

04. Press the ON / OFF button. The screen will display the current water temperature and the word WAIT. The water will then begin to heat up.
05. If the ON / OFF button is pressed again, the heating process will stop and the device will go back to standby mode.
06. Press down the STRAW button to select the type of straw to be thawed (thin or medium). It will determine the amount of time that the device's timer will use for thawing: 20 seconds for thin straws, and 30 seconds for medium straws.

06. Operation

07. When the water reaches 34 °C, the device will give off a sound signal to indicate that the **WP-100** is ready for thawing. The WAIT message will then be replaced by a timer.
08. Insert the straws into the container (cup) with the plug facing down, and the seal facing up. The straws should be completely covered by water.
09. Press down the TIMER button to begin the thawing program, which is 20 seconds for thin straws and 30 seconds for medium straws.
10. As soon as the timer completes the required time interval, the device will sound off a signal to indicate that the straws can then be removed and used for insemination.
11. Remove the straws and proceed with the insemination procedure.
12. To proceed to thaw more groups of straws, simply follow steps 8 through 11 above.
13. After completing the desired number of insemination procedures, press down the ON / OFF button to turn the device off.
14. Disconnect the device from the power supply.
15. Clean your **WP-100** thawer with a cloth and dry it thoroughly, paying special attention to the power cord and the inside of the cup.
16. After cleaning and drying it, store your thawer in the provided hard case.

Notes

01. Up to four straws may be thawed at a time. **WARNING:** When handling both medium and thin straws in the same group, select the time interval indicated for medium straws (30 seconds) in order to avoid the risk of using straws that have not been completely thawed out.
02. The timer will keep computing the time until the user presses down the TIMER button again and resets it.
03. Once the heating process is completed, the water will be kept at 35 °C indefinitely. The device will not stop operating until the ON / OFF button is pressed down again, and the display will then stop indicating the water temperature.

07. Operation Failures

The **WP-100** thawer is equipped with a sophisticated software application that performs a continuous evaluation of its performance. If the application should detect any operation failure, this will be displayed on the screen. Below is a list of error messages and the corresponding corrective actions that should be taken.

MESSAGE	ACTION
TEMPER-ATURE EXCEEDED	Before thawing, if the water temperature is at 37 °C or over, a TEMPERATURE EXCEEDED message will be seen on the display and the device will sound off an alarm. An error message may occur in the following situations: ▪ If the device is exposed to the sun, or if it was exposed to the sun. ▪ If the device is removed from inside a vehicle or any other warm interior. ▪ If the water poured into the cup is above 37 °C. ▪ If the room temperature is above 37 °C. In these cases, the device will not heat up the water until temperature falls back to 35 °C or lower. Please note that once the device is warmed up (after being inside a car in the sun, for example), it will not immediately cool down, because there will be too much heat accumulated in it. In that case, the water temperature will decrease to an acceptable level (below 35 °C) at a slow rate, especially if the room temperature is also high. To make the device cool down faster, the user may repeatedly replace the water in the container with cold water. Prior to use, however, the device should be left to rest with cold water for about 5 minutes. **WARNING:** For this reason, the device should not be used in the sun. In case the device was shipped from or stored in a high temperature location, please be aware of the possibility of this occurrence (temperature exceeded alarm).
SENSOR FAILURE	If a problem is detected in temperature acquisition by the **WP-100** thawer, the device will display a SENSOR FAILURE message and it will sound off an alarm. In this case, the device should be shipped back to **Licht** for repair (see our address at the end of this manual, and our warranty terms in Chapter 13).
LOW BATTERY (Message accompanied by an alarm)	Refer to Chapter 8 in this manual: BATTERY-OPERATED MODEL (OPTIONAL).

Erros messages are shown on the display.

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08. Battery-Operated Model (Optional)

To meet the requirements of clients using the **WP-100** thawer in locations without conventional power supply (110 or 220 Vac, 50/60 Hz), **Licht** can provide devices that can be operated by a 12 V automotive battery with enough charge.

Note

The manufacturer does not produce devices operated by both methods: automotive battery (12 V) and conventional mains power (110 or 220 Vac).

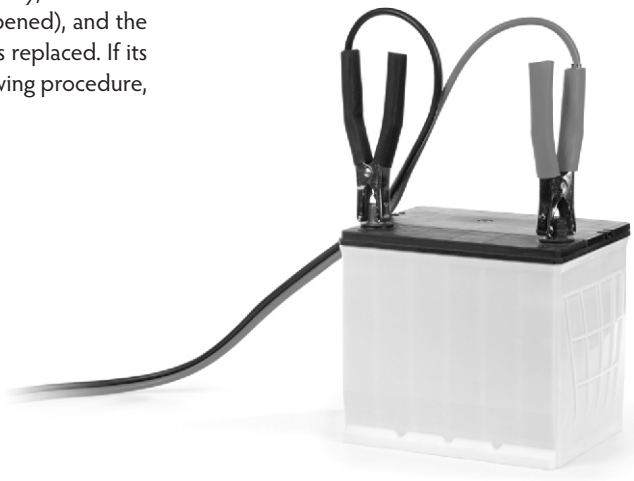
Should the device be operated by a low-charge battery, the screen will display a LOW BATTERY message and will sound off an alarm, both of which indicate that the battery must be recharged. Occasionally, depending on the battery charge level, the device will remain in operation despite the intermittent LOW BATTERY message, until it finishes heating up the water. Once the first heating process is over, the battery consumption needed to keep water at a steady 35 °C will be reduced to less than 10% of the device's regular consumption level. This way, the LOW BATTERY alarm may switch off (if this had happened), and the device may operate normally until the battery is replaced. If its battery level is proven to be too low for the thawing procedure, the device will automatically turn off.

Important Notes

The **WP-100** thawer continually measures its battery voltage and produces a LOW BATTERY message whenever voltage falls under 11 V.

For a conclusive analysis, a battery's charge state can only be checked using adequate tools. Nevertheless, we may infer that:

01. A battery that is able to normally start a vehicle has enough charge and may be used to operate the thawer.
02. A battery that will not start a vehicle, or that can do so with difficulty, does not have enough charge. This way, if a battery in that condition should be used to operate the thawer, the user must be aware of a possible LOW BATTERY alarm occurrence, as described in this chapter.



09. Technical Features

- Water stabilization temperature: 35 °C.
- Room temperature range for operation: 0 °C to 34 °C.
- Supply voltage: 100 to 264 Vac (50/60 Hz) or 12 Vdc (optional).
- A 1.3-meter long, 127/220-Vac, Brazilian standard-compliant, three-pin power cord (as per ABNT NBR 14136:2002 standard), with a grounded central pin (mandatory). Upon request, **Licht** can provide an appliance with a power cord with a plug compliant to the country's standard or an adequate adaptor.
- A 1.5-meter long red and black jumper cable for use with automotive batteries (when applicable).
- Power required during the water heating process: 50 Watts.
- Power required to keep water temperature at 35 °C (after heating): approximately 5 Watts.
- Storage temperature: 0 °C to 60 °C.
- Desirable amount of water in the container (cup): 160 ml.
- Hard case's external dimensions: 24 x 14 x 19 cm (length x width x height).
- Dimensions for transportation: 26 x 17 x 21 cm (length x width x height).
- Export-quality cardboard box: Weight: 800 g/m^2 / Thickness: 6 mm.
- Weight of thawer: 725 grams.
- Weight of device plus hard case: 1,400 grams.
- IPX7 Ingress Protection Level-licensed device, in compliance with ABNT NBR IEC 60529:2005 standard for Ingress Protection Level for Electrical Enclosures - IP Code, certified by an official laboratory (see Chapter 13 of this manual).
- Water container (cup) with up to 2000-V, 60-Hz voltage insulation, in compliance with IEC 60255-5 standard.

10. Basic Care

The following basic care procedures describe how to adequately **STORE** and **TRANSPORT** your **WP-100** thawer. Please carefully read and follow the good practices below:

- The thawer should only be stored and carried in its hard case (failure to do so will render the warranty void).
- Never leave the device unsheltered or out in the open.
- Never leave the device out of its hard case. Store the device in its hard case after use.
- Keep the hard case and the thawer in a dry, sheltered location at all times.
- Before storing the thawer in its hard case, remove all the water from the cup. With a dry cloth, wipe the inside of the container (cup), the device's exterior surface, and the power cord until completely dry. Never store the device if there are damp or wet parts – this includes the power cord.
- When transporting your **WP-100** thawer, make sure that it has been adequately secured in the vehicle's trunk, even if stored in its hard case. Exposing the device to repeated shocks and vibration may damage your thawer and also its hard case. Please note that the hard case is an important item to help maintain your device in operation for many years.
- Beware of a possible entrance of water in your thawer resulting from sealing failure. This will be evident if you see any fog inside the display (due to water condensation in the internal part of the screen). If that happens, the device should be immediately sent to **Licht** for repair.

Important Reminder

Your **WP-100** thawer will serve you for many years because it is the most advanced product you can purchase. It was built with the best technology available. So take good care of it: you can expect excellent financial returns from cattle insemination!

11. Safe Operation

Every power network is subject to voltage surges which can be accidentally transmitted to people using any electric device connected to it, no matter how simple such appliance may be.

This is of utmost importance when using devices with metallic parts and/or those requiring water in their operation, as it is the case of any semen thawing device.

It is important to stress that, in rural areas, power lines can function as real lighting rods as they extend for many miles in the open air. Air discharges (such as bolts of lightning) are often transmitted through those power lines, and may affect people in contact with any electric device connected to them. It is at this exact moment – when people touch the device – that the electric discharge passes through their body and finds its way to the earth.

Such occurrences are known to those who live or work in rural areas, and they may even cause devices to burn out when connected to powerlines.

For this reason, according to Brazilian regulations, it's mandatory for any electrical installation to have a ground line (green and yellow wire), to help protect both the user and the equipment.

In attendance to Brazilian ABNT NBR 14136:2002 standards, the **WP-100** thawer is provided with a three-wire power supply cable and a three-pin male plug (the central pin should be adequately connected to the utility grounding). This way, occasional voltage surges will be conducted to the earth through the ground wire, protecting the people operating the electric device.

! **REMEMBER THE OLD SAYING:**
One should not play with electricity!

12. Test Certificates

During the manufacturing process, and after being completely assembled and sealed in its casing, the **WP-100** thawer is submitted to the following operation tests:

01. A complete water heating cycle, going from current room temperature to 35 °C, with a **90 Vac**, 60-Hz power supply.
02. A complete water heating cycle, going from current room temperature to 35 °C, with a **300 Vac**, 60-Hz power supply.
03. For devices powered by batteries, a complete water heating cycle is carried out, going from current room temperature to 35 °C, with a **12 Vdc** power supply.

During these test cycles, the following items are checked:

01. Initial water temperature.
02. Final water temperature (maximum temperature achieved).
03. Water heating speed (°C/minute).
04. Correct water temperature stabilization.

Still during the manufacturing process and before the final tests, several water heating cycles are carried out at maximum power, for a detailed check on the thawer's operation and calibration. In addition to those procedures, a visual inspection is made on the electronic assembly in operation.

The tests made on 90 Vac and 300 Vac voltages reflect extremely severe conditions, compared to Brazilian normalized voltages which range between 127 and 220 Vac, with an approximate 5% variation.

Test of voltage applied to the device's metallic part (the container or cup) against the power cable: 2000 V, 60 Hz, 1 min (IEC 60255-5 standard).

This Test Certificate attests the completion of the thorough manufacturing process of all **WP-100** model thawers.

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13. Warranty Statement

Licht provides a 180 day warranty for this product from its date of purchase, and hereby commits itself to making the necessary repairs. This warranty applies to products with a manufacturing defect, as long as they are kept at adequate conditions of maintenance and use.

This warranty does not cover products that have suffered damages resulting from accidents, natural phenomena such as lightning discharges, mishandling, incorrect use or application, or products with broken warranty seals.

In case of defect, the product should be sent to **Licht** at the business address provided at the end of this manual, along with its corresponding proof of purchase. Shipping costs (both forward and return) are the client's sole responsibility.

The devices under the coverage of this warranty must be sent to **Licht** inside their hard cases.

Licht will not grant any warranty in case the equipment is shipped for repair outside of its hard case.

WARNING: The **WP-100** thawer must only be carried inside its hard case.

Licht reserves the right to decide if the product should be repaired or replaced by a new one.

The warranty period for replaced parts ends as soon as the warranty period for the original parts ends.

This product's warranty shall be automatically rendered void in case any of the following situations occurs:

A) The device is dropped and/or suffers severe impacts.

B) The device is powered by a supply with a different voltage than the voltage range specified in this manual.

C) The device's seals are broken by anyone who has not been previously authorized by **Licht**.

D) Any unpredictable occurrence resulting from the incorrect use of the product by the client.

E) Any occurrence resulting from natural phenomena.

Warning

In order to evaluate the mechanical robustness of the **WP-100**, **Licht** has deliberately dropped some devices from an average-height table (0.7 m), in several positions (in 3 axes). No damages of any kind, broken or loose parts, cracks or breaks in their electronic boards have been observed. After being dropped, the thawers operated normally and successfully completed the water heating cycle and water stabilization at 35 °C.

Therefore, **Licht** assures that this thawer can even withstand occasional drops, because it features a case built in Germany with an engineering plastic (polycarbonate) that is known for its high performance and, more importantly, because it is resistant to severe mechanical shocks.

Despite its robust construction features, **Licht** warns that this product should be handled with the same care as given to any precision electronic device, and should only be carried and stored in its hard case, which was specially designed to best house and protect your **WP-100**.

Therefore, before considering any warranty claims related to this product, possible existing mechanical damages shall be evaluated and compared by **Licht** to evidence of the device's handling and transportation conditions.

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This warranty is limited to **Licht WP-100** Semen Thawer and does not cover any resulting and/or related costs, losses or liabilities, direct or indirectly, such as profit or revenue losses.

SERIAL NUMBER: .....

DATE OF PURCHASE: ...../...../.....

14. About Licht

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