GRANT

Macaroni Thaw

Cryovial Thawing Device

OPERATING MANUAL

35974 V1 DMN Z76

If you have any feedback on Grant products or services, we would like to hear from you. Please send all feedback to:

Grant Instruments (Cambridge) Ltd
Evolution House
Unit 2 Durham Way
Royston Gateway • Royston
SG8 5GX • UK

Tel: +44 (0) 1763 260 811
Fax: +44 (0) 176 262 410

Email: feedback@grantinstruments.com
Sales: salesdesk@grantinstruments.com

www.grantinstruments.com

Representative in the European Union

Grant Instruments Europe
SIA BioSan
Ratsupites iela K2
Riga
LV-1067G8 5GX • Latvia

Tel: +371 67 426 437

Email: grant@eu.grantinstruments.com

CONTENTS

1 Use of products

The following products are covered by this operating manual:

- **Macaroni Thaw 1.8L-2.0L**

The **Grant Instruments Macaroni Thaw** modernizes sample thawing by replacing 37 °C water baths with a **clean, water-free, automated solution**. It delivers **consistent thawing**, minimizes contamination risk, and removes user-to-user variability—supporting safer and reliable cryopreservation workflow.

The Macaroni Thaw is a vial thawing device (referred to as “the equipment” throughout the manual) designed for indoor laboratory use by a professional user.

2 How to use this operating manual

This operating manual will allow you to unpack, set-up and operate the equipment correctly and safely. Important safety information, symbols and warnings are listed below and should be read carefully. Section 4 gives information about how to unpack and install the equipment correctly. Section 5 gives operating information for the unit. Product technical specifications and tips are provided in section 7. The warranty for the equipment is for ONE YEAR and is detailed in section 9 and should be registered by completing the on-line registration form at **www.grantinstruments.com**.

If there is a technical matter that this operating manual does not address, or any other question concerning the equipment, please contact Grant Instruments or your local distributor, who wil be able to provide any additional information.

3 Safety

3.1 SAFETY COMPLIANCE

The equipment meets the requirements of international safety standard IEC 61010: Safety requirements for electrical equipment for measurement, control, and laboratory use.

3.2 SAFETY SYMBOLS

The symbols below are marked on the equipment and throughout this manual to indicate:

 Read this manual before using the instrument

 Important safety warning

3.2 SAFETY WARNINGS

 Read the whole of these instructions. Safety may be impaired if they are not followed.

 Use only as specified by the operating instructions: if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

 If liquid is spilt inside the unit, disconnect it from the power supply and have it checked by a competent person.

4 Installation

4.1 UNPACKING INSTRUCTIONS

Standard equipment includes:

- Macaroni Thaw device
- External power supply unit
- Mains cable
- Initialisation Plug
- Quick start guide
- Warranty card

Unpack the contents, check everything is present and retain the outer packaging for future use.

4.2 POSITIONING THE MACARONI THAW

 The equipment is for indoor use only. Check that the environmental conditions of the laboratory are within the limits given in Section 5.

 The equipment must be placed on a level surface.

 Do not block or restrict the ventilation slots underneath.

 Ensure that the mains switch and power plug are easily accessible during use.

 Do not use in fume cupboards containing corrosive atmospheres.

4.3 ELECTRICAL SUPPLY

Check that the supply voltage marked on the serial number label, and the type of mains plug, are correct for your mains supply outlet.

To disconnect the equipment from the mains supply, remove the mains plug from the mains supply outlet.

4.4 ASSEMBLY

Fit the mains cable into the IEC power socket on the external power supply.

Figure 1

Plug the external power supply into the power socket on the rear of the equipment

Figure 2

5 Operation

5.1 POWER-UP AND INITIALISATION

The status of the equipment is displayed on the 12 multicoloured LEDs arranged as a clock face along with a single multicolour LED in the centre.

Figure 3

At startup, the device has to warm-up, this process can be accelerated by inserting the supplied initialization plug into the vial loading port. Once the device reaches temperature it displays the *Ready to Use* pattern on the display indicator, the plug should then be removed.

The plug should also be inserted into the device when the unit is being stored, this is to protect the unit from any debris entering and damaging the sensitive internal parts.

Figure 4

Switch on the mains supply to the external power supply. (*If a custom thaw threshold has bee set, see Section 6 part 9*).

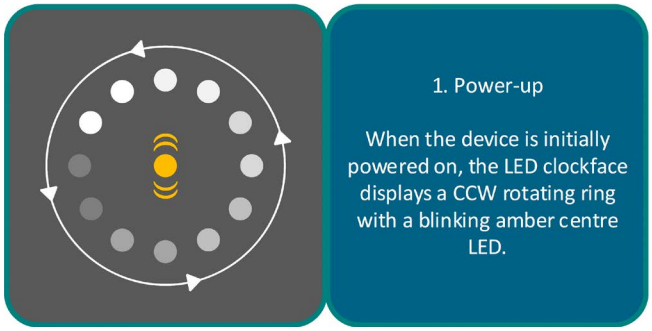

Figure 5

After a few seconds,

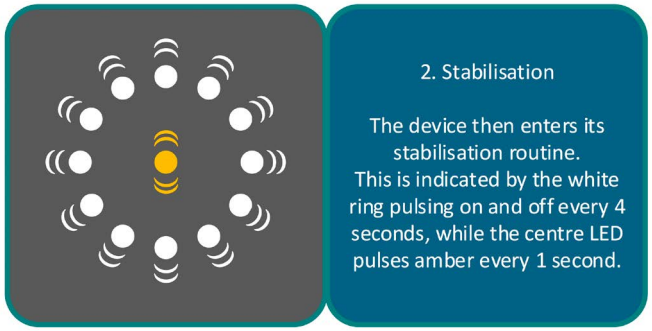

Figure 6

5.2 THAWING A CRYOVIAL

After about 3 minutes (this may take longer if the initialisation plug is not used) the equipment should be ready to use.

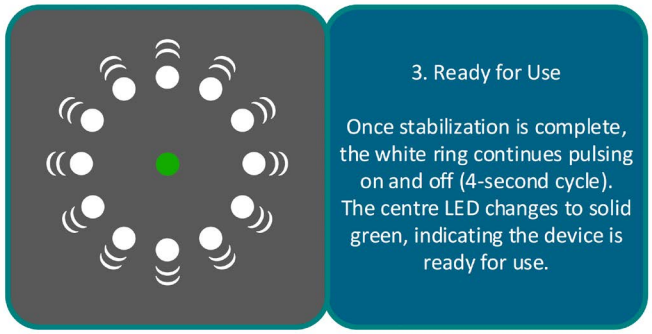

Figure 7

Ensure the cryovial is **clean, intact, and securely capped**

- Vial size: **1.8–2.0 mL**
- Fill volume: **1.0 mL** (*Larger fill volumes may take longer to thaw*)
- Storage temperature prior to use: **≤ −70 °C**

Remove the frozen vial from cold storage using appropriate protective equipment.

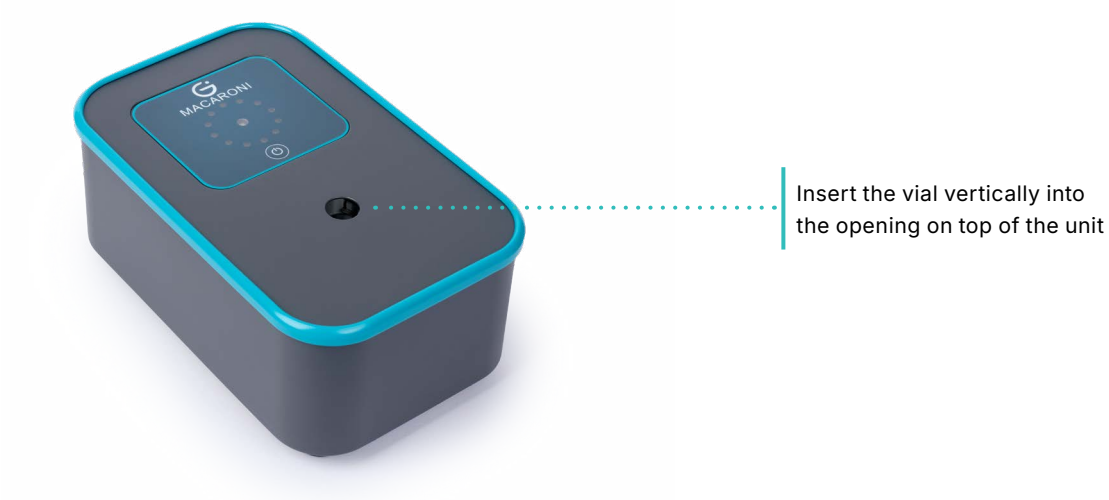

Figure 8

Gently push the vial and allow it to slide fully into position.

After two seconds the equipment will automatically detect that the vial has been inserted and start the thaw process.

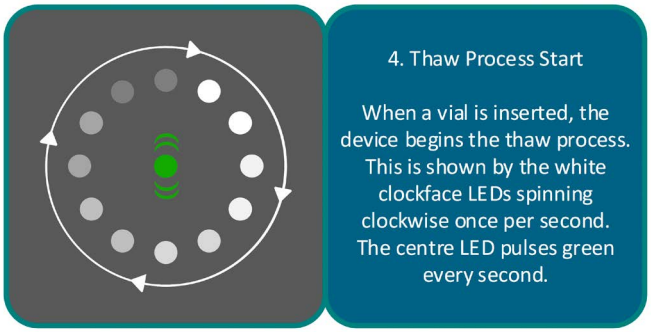

Figure 9

At the start of the thawing process, the internal blower gradually increases speed. This is a normal part of operation.

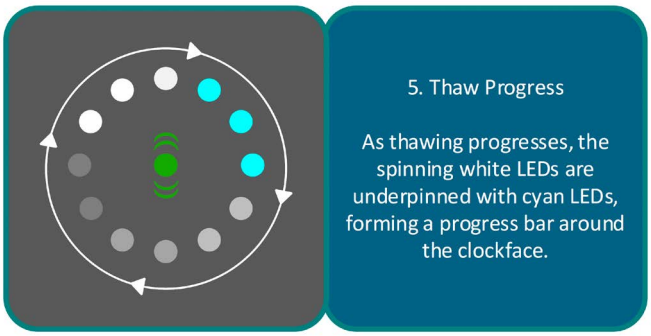

Figure 10

As the thaw nears completion, the internal blower will gradually slowdown in preparation for process completion.

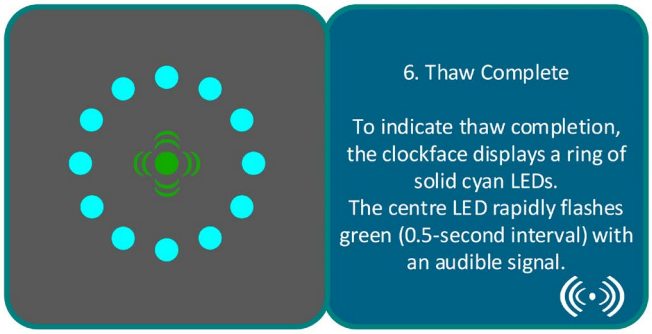

Figure 11

Remove the vial from the device by grasping the vial cap and pulling it vertically out. **Due to various factors (cryoprotectant concentration, ambient temperature, cell type, etc.) thaw detection can occasionally be triggered prematurely. While it is normal and often desirable for a small pellet of ice to remain, should an excessive amount of ice remain, simply re-insert the vial into the device for a short time to allow the temperature to equilibrate.** Alternatively, you can gently agitate the vial by hand from side to side. The ice should disappear as you transfer the vial to the next stage of your workflow.

After the vial has been removed, the multifunction button **MUST** be pressed to initialise the device in preparation for the next vial. The thaw audible signal will sound every 10s as a reminder to press the button.

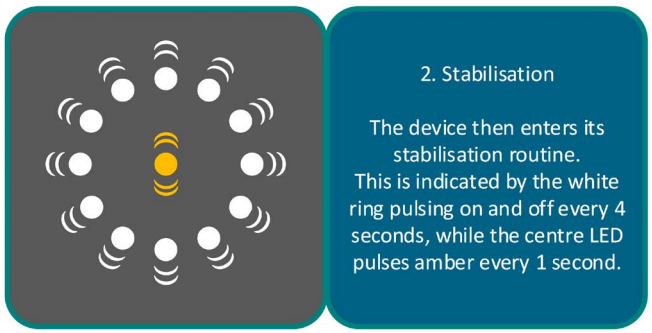

Figure 12

After a few minutes the device will reset and be ready to thaw the next vial. (***This cooling stage is essential as it prevents vials being exposed to temperatures that could affect cell viability***).

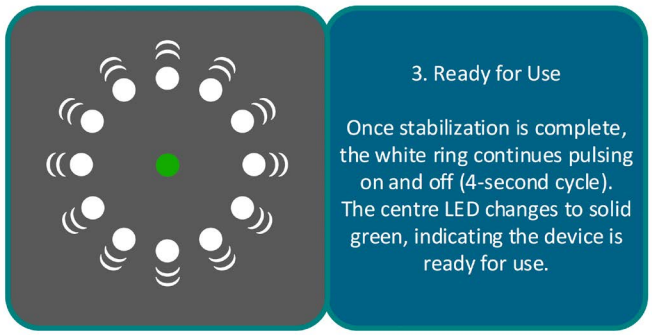

Figure 13

5.3 AUTO SLEEP MODE (LOW POWER STANDBY)

If the unit is not used for a period of 60 minutes, it will automatically switch into its low power sleep mode.

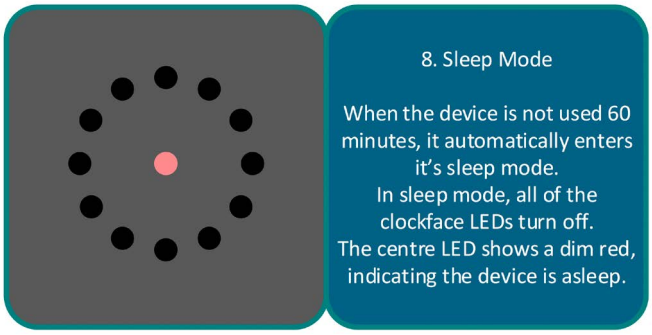

Figure 14

To prepare the unit for thawing a vial, press the multifunction Start/Reset button located below the LED clock display. The device will go through the normal startup sequence.

5.4 ERROR MESSAGES

The Macaroni device controls the internal temperature to ensure that samples are protected from excessive heating, this means that sometimes the unit is either heating or cooling, when this is happening the unit will be in the stabilisation mode.

Figure 15

If the user inserts a frozen vial, during this stage (before Ready for Use is displayed) the device will display an error message on the display.

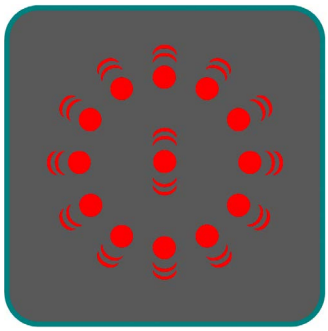

Figure 16

The vial should be removed and the multifunction button pressed to reset the error and put the device back into stabilisation mode, make sure to wait until the device displays Ready for Use before inserting a frozen vial.

6 Thaw threshold

The thaw profile can be adjusted to suit your vial type, cryoprotectant, and volume of frozen media being used. The device provides six levels of adjustment above and below the default value.

Before changing the thaw threshold for routine operation, prepare a set of reference vials filled with the required volume of your selected cryoprotectant and freeze them under normal conditions. Thaw the reference vials using the Macaroni device and inspect the samples when the thaw cycle has completed. If the samples remain frozen, increase the thaw setting. If the samples are fully thawed, reduce the thaw setting so that a small amount of ice remains at the end of the cycle.

1. Disconnect the power adaptor from the Macaroni device.
2. Press and hold the Multifunction button while reconnecting the power adaptor.
3. Continue holding the Multifunction button as the LEDs illuminate, then keep holding it for approximately 3 seconds.
4. Release the Multifunction button. The LED at the 12 o'clock position will illuminate flashing white, indicating the default setting.
5. Press the Multifunction button briefly to move the LED position clockwise. Positions 1 to 6 o'clock display amber LEDs and increase the thaw level from +1 to +6.
6. After the 6 o'clock position, press the Multifunction button again to change the LED colour from amber to blue, blue LEDs indicate reduced thaw levels from -6 to -1.
7. When the required thaw level is selected, press and hold the Multifunction button for approximately 3 seconds. The centre LED will flash green, and an audible tone will confirm that the profile has been saved to memory.
8. The device will then start up using the saved thaw threshold. This setting remains stored until the adjustment procedure is repeated.
9. When the device is programmed with a custom thaw threshold, during the device power up sequence the set Thaw Threshold is briefly displayed on the clockface.

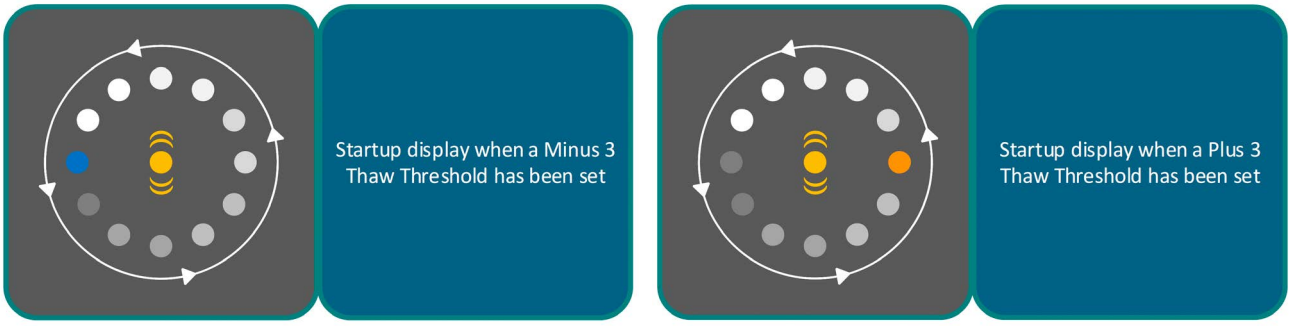

Figure 17

10. To restore the default setting, repeat the procedure and select the white LED at the 12 o'clock position. Press and hold the Multifunction button for approximately 5 seconds to save the default value.

7 Technical specification

7.1 OPERATING CONDITIONS

Ambient Temperature	**+18 to 25°C**
Maximum relative humidity	**80% R.H. in room temperatures up to 31° decreasing linearly to 50 % R.H. at 40°C**
Altitude above sea level	**Up to 2,000 m (6,600 ft)**
Operating Environment	**Indoor use only**

7.2 ELECTRICAL DETAILS

Mains Supply	**100-240V, 50-60Hz 0.5A (max)**
Permissible mains supply variation	**±10%**
Unit Supply	**24V DC, 3.75A**
Unit Power Consumption	**90W (max)**

7.3 PERFORMANCE & OPERATION

Thawing Profile	Equivalent to a **37°C water bath** heating rate
Thawing Time	Typically, **< 3 minutes**
Detection Technology	Patent-pending **thaw detection technology**
Start-up Time	Approximately **3 minutes** from power-on to ready
Capacity	**Single vial per cycle.**

7.4 VIAL COMPATIBILITY

The **Macaroni** is engineered for **standard 1.8 mL to 2.0 mL cryogenic vials**, providing reliable, hands-free thawing for the most widely used vial formats.

Vial Body Diameter	**12.0 mm to 12.5 mm**
Vial Height (below cap ring)	**Minimum 30.06 mm**
Overall Height (with cap)	**Minimum 44.0 mm**
Max Cap Diameter	**13.5 mm**
Max Label Thickness	**0.1 mm**
Recommended Fill Volume	Optimized for **1.0 mL** (effective range typically 0.8 mL – 1.5 mL)

7.5 PHYSICAL & ELECTRICAL SPECIFICATIONS

Dimensions	**19cm x 12cm x 7.5cm (7.5 in x 4.75 in x 3.0 in)** [Length x Width x Height]
Weight	**0.8 kg (1.76 lbs)** without power supply **1.4 kg (3.1 lbs)** with power supply
Power Input	**AC 100 – 240V, 50–60 Hz**
Power Output/Rating	**24V DC, 3.75 A** (Max 90W)
Operating Temp	**18°C to 25°C** (up to 80% relative humidity)
Sound Pressure Level	**70 dB(A)** at 1 Meter distance

7.6 COMPLIANCE & SAFETY

Regulatory	**CE mark** (EMC and Safety), **RoHS,** and **WEEE compliant**
Standards	**IEC 61326, IEC 61010**
Maintenance	**Exterior surfaces can be cleaned with 70% ethanol**

NOTE: Performance figures apply within the ambient temperature range 18ºC to 25ºC

7.7 STORAGE AND TRANSPORT

Store and transport in original packaging. Temperature range **-20°C to +60°C**

8 Troubleshooting guide

Symptom	Possible cause	Action required
Thaw complete displayed after vial has been removed	Device not initialised in readiness for next vial	Press the multifunction button
Centre red LED plus another red in the ring	Power on Start Failure	Disconnect power and then reconnect

9 Warranty Information

When used in laboratory conditions and according to these operating instructions, this Macaroni Thaw is guaranteed for one year against faulty materials or workmanship.

Extended warranty for years two and three can be purchased by contacting our sales department at **salesdesk@grantinstruments.com**

10 Maintenance and service

10.1 CLEANING

The case can be wiped down with cloth after disconnection from the mains. Use 70% ethanol.

Do **not** insert anything other that cryovials into the equipment.

Before using any decontamination or cleaning method except that recommended, check with Grant Instruments' Service Department, or in other countries with our distributor, that the proposed method will not damage the equipment.

10.2 REPLACING THE MAINS CORD

Any replacement mains cord-set used with the Macaroni must meet the same specification as the one originally supplied with the unit to maintain safety of the unit and must be no more than 3m long.

For Europe (including the UK), the cable must have the following markings; <HAR>, HO5V2V2-F3Gx1mm 90degC and be rated to carry 10A. The mains plug and IEC connector must carry approvals from a European certification body (e.g. BSI, VDE or equivalent).

For USA and Canada, the cable must be marked with SVT 18AWG and rated to 10A. Cable and plugs must be marked with CSA & UL or UR mark or the associated file number (LR, LL or E followed by up to 6 digits)

10.3 SERVICE

For service, return to our Service Department in the UK, or to your local distributor.

Grant Instruments (Cambridge) Ltd.
Evolution House, Unit 2
Durham Way
Royston Gateway
SG8 5GX
UK

Tel: +44 (0) 1763 260 811
Fax: +44 (0) 1763 262 410
Email: service@grantinstruments.com
URL: www.grantinstruments.com

It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or inside the equipment before returning for service.

11 Compliance Information

The equipment covered by this manual complies with the following EU Directives:

- EMC Directive 2014/30/EU
- LVD Directive 2014/35/EU
- RoHS Directive 2011/65/EU

WEEE DIRECTIVE 2012/19/EU:

Grant Instruments complies fully with the Waste Electrical & Electronic Equipment (WEEE) regulations 2012. We are a member of the B2B compliance scheme (Scheme Approval Number WEE/MP3338PT/SCH), which handle our WEEE obligations on our behalf. Grant Instruments have been issued with a unique registration number by the Environmental Agency, this reference number is WEE/GA0048TZ. For information regarding WEEE collections in the UK please contact our B2B Compliance Scheme directly on 01691 676 124. For other countries please contact your equipment supplier.

For General WEEE information please visit: **www.b2bcompliance.org.uk**

REACH REGULATION

This product does not contain any Substances of Very High Concern (SVHCs) at greater than 0.1% that have to be identified in accordance with Regulation (EC) No 1907/2006 and therefore does not have an entry in the SCIP database.